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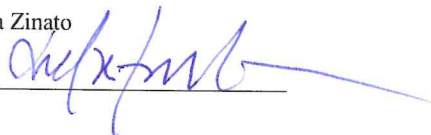
COUNTERFACTUALS IN LITERATURE: L2 READERS' PERCEPTION AND EVALUATION

IN CO-TUTELLE DE THÈSE WITH THE UNIVERSITY OF WARSAW

S.S.D. L-FIL-LET/14

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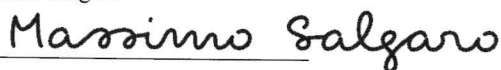
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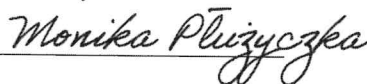
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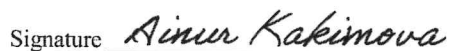
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Preface

This PhD thesis is part of the Empirical study of Literature Innovative Training network (ELIT) research project, funded by the European Union's Horizon 2020 Research and Innovation Programme under the Marie Skłodowska-Curie grant agreement No 860516. The ELIT programme emphasises the multidimensionality of reading by bridging the humanities, social sciences, and cognitive sciences, fostering true interdisciplinary research. Doctoral candidates in this programme are encouraged to combine theory-driven approaches with various empirical methods, creating a unique synergy between diverse academic disciplines.

Within the ELIT project, this specific research focuses on counterfactuals in literature, combining linguistic approaches with the perspective of literary studies. The goal is first to study counterfactuals as a literary device, particularly how readers perceive, evaluate, and cognitively process them. Second, this research examines the linguistic features of literary counterfactuals, exploring how their unique grammatical and semantic structures are processed, especially by second-language readers.

This dissertation is interdisciplinary by design, combining insights and methodologies from literary studies, cognitive science, and linguistics. The research draws on literary theory to explore the role of counterfactuals as foregrounding elements in narrative texts, enhancing the understanding of their aesthetic and cognitive impact. It delves into the linguistic features of counterfactuals, examining how their formal and semantic deviations contribute to their literariness. Simultaneously, the study employs cognitive scientific methods to investigate how readers, particularly those reading in a second language, process and respond to these complex literary constructs. The use of empirical techniques, such as eye tracking, further bridges the gap between traditional literary analysis, cognitive science, and applied linguistics, allowing for a nuanced exploration of how literary devices are engaged on both a cognitive and emotional level.

The Cotutelle Agreement between the University of Warsaw and the University of Verona has been instrumental in enabling this interdisciplinary approach. By drawing on the strengths of both institutions, this research contributes to the broader fields of literary studies and linguistics, offering novel insights into the cognitive processing of literary counterfactuals and their significance as a narrative device.

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I am grateful for the opportunity of doing PhD and choosing the path of academic research and learning. I thank the University of Warsaw and the University of Verona for providing facilities and access to libraries and courses. I have learned a lot, polished my old skills, obtained new skills, and met wonderful and like-minded people passionate about science and research. I thank those who supported me throughout my challenging but rewarding PhD journey.

I express my sincere gratitude to my dear supervisors, Prof. Monika Płużyczka and Prof. Massimo Salgaro.

Prof. Monika Płużyczka provided scholarly supervision and guidance on linguistic theory and empirical research methodology. She welcomed me into her research team in the eye-tracking lab LELO, where I trained my skills in eye-tracking methodology and participated in team projects. I spent some parts of my PhD life in this lab. She gave me useful methodological suggestions and was always open to discussions. I highly appreciate her friendly attitude, constant support, and helpful guidance. She recruited me for the position of an early-stage researcher to the ELIT (Empirical study of Literature Innovative Training network).

Thanks to the ELIT project, I met Prof. Massimo Salgaro, who kindly welcomed me to Italy. He helped me integrate into the Verona team by encouraging my participation in the teamwork on the theory of mind and also organising team-building activities, which I very much enjoyed, especially hiking in Monte Tomba, Lessinia. He has provided scholarly supervision on theory in the field of literary studies. He motivated me to work on the possible worlds theory, which I found to be a useful theoretical framework. I highly appreciate his positive attitude, kind support, and valuable advice.

I extend my thanks to Anja Meyer for constant support, finding me accommodation in Verona and becoming my dear friend.

I feel lucky to have Prof. Płużyczka and Prof. Salgaro as my supervisors, and I appreciate their feedback. Collaborating with my supervisors on additional projects helped me gain experience working with eye trackers such as SMI RED 500 and EyeLink 1000 plus and sharpen my intellectual rigour.

I thank the members of the ELIT network for organising functional training, seminars, and workshops. I am thankful to my teachers in numerous courses I attended, especially those who conducted courses on SPSS for statistical analyses and Python programming language. Those skills were crucial in processing and analysing data.

I want to thank my family and friends for their unwavering support and constant

availability throughout my PhD journey. Their encouragement and ability to lift my spirits have been invaluable. I am grateful for their belief in me and their faith in my PhD work.

Abstract

The primary aim of this dissertation is to analyse counterfactuals as a literary device and explore their cognitive processing by both L1 (native) and L2 (second language) readers. It proposes a model for understanding how readers cognitively engage with literary counterfactuals - alternative scenarios in literature that could have happened but did not. This analysis encompasses both embedded counterfactuals and counterfactual historical fiction. Counterfactuals as a literary device are examined on two levels. At the micro level, they appear as a character's or narrator's reflections on events that might have occurred but did not. At the macro level, counterfactuality shapes the entire narrative by placing the story in an alternative historical context. The former, termed "disnarrated", depicts unactualised past events within fiction, while the latter, known as "counterfactual historical fiction", reimagines actual historical events that never transpired.

To achieve this goal, the study employs a multifaceted methodology. The possible worlds framework is utilised to propose a novel model of cognitive engagement with counterfactuals. The model's feasibility is first tested using two literary texts: *The Snows of Kilimanjaro* by Ernest Hemingway (1936) and *Fatherland* by Robert Harris (1992). Subsequently, an empirical investigation using eye tracking, complemented by self-report questionnaires, is conducted to examine how readers engage with literary counterfactuals. Additionally, linguistic analysis is employed to explore the form and meaning of counterfactuals, focusing on the complex processing demands they place on L2 readers.

The findings indicate that while processing counterfactuals in literature, readers engage in cognitive processes such as imagination, comparison, evaluation, and emotional response. When encountering the disnarrated, readers contrast the textual actual world with its alternatives, while in counterfactual historical fiction, they contrast the actual historical world with its fictional counterpart. Notably, fictional recentring plays a critical role in counterfactual historical fiction, preventing readers from constantly comparing the two worlds. Moreover, literary counterfactuals are found to be emotionally engaging for readers. The linguistic analysis reveals that counterfactuals function as deviations that foreground the narrative through their formal features and semantics, requiring additional cognitive effort from L2 readers. However, L2 readers can fully comprehend literary counterfactuals without significant influence from their L1.

In conclusion, the dissertation demonstrates that counterfactuals are potent tools for enriching literary texts by enhancing their semantic depth and emotional resonance. Although

they are cognitively demanding to process, the effect of L1 on L2 readers' comprehension is minimal.

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Introduction

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair...

A Tale of Two Cities, Dickens, 1859, Chapter 1, p.1

This iconic passage from Dickens captures the inherent duality at the core of counterfactuals. What if this work had never been written? What if I had not written this dissertation? Without it, I would not be on the path to earning a PhD. These seemingly simple questions are examples of counterfactual thinking, where we explore “what if” scenarios. This construct, born from counterfactual thinking, is central to my dissertation.

The research subject of this multidisciplinary study, situated at the intersection of literary studies and linguistics, is literary counterfactuals – counterfactuals employed in literature at both micro and macro levels. At the micro level, counterfactuals are embedded within the narrative, reflecting the thoughts of characters or narrators, such as their wishes, hopes, fears, and unrealised dreams. For instance, in *The Portrait of a Lady* (1881) by Henry James: “If he had come to Gardencourt, he would have seen Madam Merle.” At the macro level, counterfactuals function as a literary device to create alternative worlds where history diverges from our own, as in Robert Harris’s *Fatherland* (1992), which speculates, “What if Hitler had won World War II?” While micro-level counterfactuals create alternative scenarios within individual sentences, macro-level counterfactuals operate across entire texts, establishing new realities. Both embedded counterfactuals and counterfactual historical fiction employ this literary device to enrich the narrative, enhancing its depth and making it more salient.

The aim of the PhD dissertation is threefold: (a) to recognise the potential of counterfactuals as a literary device; (b) to understand cognitive engagement with counterfactuals in literature; and (c) to explore the second language processing of counterfactuals.

The dissertation addresses the following research questions:

1. What is the aesthetic function of counterfactuals in literature?

2. Do counterfactuals foreground the narrative?
3. How are literary counterfactuals processed?
4. Does the first language influence second language processing when reading counterfactuals?

The main research hypothesis posits that literary counterfactuals are processed with increased cognitive costs and emotionality compared to literary non-counterfactuals in both L1 and L2. I propose that counterfactuals should be considered a literary device that foregrounds the text due to (a) mapping to an alternative past, (b) an affective component (emotionality), and (c) their deviation from normative form and/or semantics.

Counterfactuals enhance the literariness of a narrative. As Jakobson (1987), building on Shklovsky (1917/1965) and Mukarovsky (1932/1964), notes, ‘literariness’ is defined by unique formal features (semantics, grammar, phonetics, style) that distinguish literature from conventional language (cf. Salgado, 2015). As will be illustrated in Chapter 4 (pp. 159-171), counterfactuals possess unique grammar and semantics. Moreover, their use by prominent authors such as Dickens makes the literary text more thought-provoking rather than plot-driven, as seen in popular fiction. Despite this, counterfactuals have not received sufficient attention in literary studies, even though research has addressed counterfactual historical fiction, such as *The Man in the High Castle* by Philip K. Dick (1962) and *Fatherland* by Robert Harris (1992), where the central theme is “What if Hitler had won World War II?” These works create a counterfactual reality on a macro level by presenting narratives that contradict historical facts.

While some literary scholars have explored counterfactuals as a distinct literary genre (e.g., Raghunath, 2017), they have often overlooked micro-level counterfactuals embedded within the narrative, which contradict the fictional world. It will be argued that these minor yet powerful elements enrich narrative semantics and enhance the reader’s aesthetic experience. Notable researchers like Prince (2004; 2005) and Warhol (2010; 2011; 2013) have examined the pragmatics and literary purposes of counterfactuals within the narrative. Literature suggests that disnarration, which encompasses counterfactuals, allows readers to access characters’ minds (Ryan, 1991), evaluate events (Harding, 2004; 2007), emphasise tellability, and enhance narrative values (Prince, 2004), as well as create coherence (Warhol, 2010).

However, even though embedded counterfactuals have been studied under the broader concept of disnarration, current research does not provide comprehensive answers to questions such as, “What are the properties of counterfactuals that make them foregrounding elements in a literary text?” or “How do readers cognitively process them?” These questions are crucial for establishing counterfactuals as a distinct literary device, separate from other modes of

disnarration, such as negation. Additionally, while counterfactuals are often referred to as hypothetical, they are different in that they contain hypothetical elements but specifically involve scenarios that contradict known facts. I believe that linguistic analysis can enrich literary interpretation and evaluation. As Leech (2014) suggests, combining the two approaches results in greater appreciation and enhances the comprehension of a literary text as an artistic work. Leech further writes that “linguistic analysis may bring to light features which might be overlooked in a critical assessment, but which might, on further investigation, prove to have an important aesthetic function” (Leech, 2014: 42). Regarding embedded counterfactuals, my focus will be on counterfactual conditionals, as they are the primary linguistic construct used to denote counterfactuals and clearly show causal inference (if A, then B).

In the case of counterfactual historical fiction, points of divergence can be regarded as linguistic elements that establish a counterfactual world where history unfolds differently. Analysing these elements can contribute to a top-down understanding of counterfactual historical fiction, identifying a nexus point in history that is altered to create an alternative reality and maintaining this reality throughout the narrative. Since these points of divergence map to an alternative reality, making the narrative semantically more complex, it is assumed to be more aesthetically appreciated than its non-counterfactual counterpart.

Not all fiction is counterfactual because not all fiction contradicts the truth. It is essential to distinguish between fantasy and counterfactuals as genres: while the former diverges from reality by including magic, mythical creatures, and entirely fictional worlds, the latter diverges from historical reality by altering specific events in the real world’s timeline. Similarly, science fiction explores speculative futures and advanced technology, while counterfactuals reimagine historical events with different outcomes. While counterfactuals can include advanced technology, this is not a necessary feature for them to be considered counterfactual. Therefore, counterfactual historical fiction is neither classified as fantasy nor science fiction.

In the dissertation, I consider past counterfactuals within the narrative and the narrative itself as a past counterfactual. This focus leads to examining past counterfactual conditionals in literary texts and counterfactual historical fiction that contradicts known history. Past counterfactuals are chosen because while the present and future might be altered, the past is generally accepted as fact. Moreover, the cognitive processing of these two types of counterfactuals involves similar mechanisms, which will be explored through theoretical considerations and empirical investigations.

Bell and Ryan (2019: 36) acknowledge that “one of the most important contributions that possible worlds theory has made to literary studies has been demonstrating the role that

alternatives play in narrative dynamics.” They refer to Grishakova (2019), who, to my knowledge, is the only author besides Ryan to pay attention to hypotheticals in fiction within a possible world framework. She developed Ryan’s concept of virtual narratives (unactualised events). She coined the term “virtual voice,” which denotes the alteration of the narrator’s voice by another voice, whether that of the narrator or a character. While the importance of narrative alternatives has been highlighted by Bell and Ryan (2019), work in this area has been limited to alternative perspectives rather than alternative plots. The latter is crucial for conceptualising what is represented in a reader’s mind. The possible worlds framework has been used to investigate literary devices such as metalepsis by Bell and Alber (2012). They advocated for using this theoretical framework to explain the ontology and defamiliarisation effect of the device. The possible worlds framework was also applied to explain cognitive engagement with counterfactual historical fiction by Raghunath (2017), but this approach remains under-theorized and lacks empirical support. Readers are unlikely to move between the real world and the fictional world (ontological movement) while reading counterfactual historical fiction, as suggested by a recent empirical study (Kakimova and Salgaro, 2024). Given the recent cognitive turn in narratology, investigating the cognitive processing of counterfactuals as a literary device within the possible world framework is timely.

The dissertation is structured into two main parts: the first focuses on the literary domain, and the second addresses linguistic aspects.

In the first part, counterfactuals will be considered from a literary perspective. The first chapter will define literary counterfactuals, and possible worlds theory will be applied to conceptualise their processing. The possible worlds framework will be used to propose a model of cognitive engagement with counterfactuals, as it helps map the fictional world into its subworlds and link it to the real world. Bell and Ryan (2019: 35) note that while the concept of the world is informally displayed in a reader’s mind, it remains under-theorized. The dissertation contributes to this theorisation and empirically tests world display in a reader’s mind by investigating cognitive processing. Specifically, the possible worlds theory will be used to explore how readers engage with counterfactuals in literature. Ryan (1991) proposed a model of possible worlds that includes the construction of three universes - the referential universe, the textual universe, and the actual universe - each consisting of its actual world and possible worlds. However, this model is still insufficient in its current form to fully capture the fiction-reading experience. The interaction between the three universes is unclear, and how a reader recentres to the fictional world is not evident. Moreover, Ryan’s model lacks a clear

ontological stance, which obscures the fictional recentring process and largely neglects the reader's role in the fiction reading process. These gaps will be addressed in the first chapter.

The second chapter will discuss cognitive theories that propose different processing methods for counterfactuals. The research on the cognitive processing of literary counterfactuals is scarce. To address this gap, I will draw on cognitive linguistics, particularly Conceptual Integration Theory (Turner and Fauconnier, 1998), and cognitive science, which offers Mental Models Theory (Johnson-Laird, 1980) and the Suppositional Account (Evans and Over, 2004). While Conceptual Blending remains theoretical and empirically untestable, both the mental models and suppositional accounts can be empirically scrutinised. The former suggests that people envision both supposition and factual inference, thus the dual meaning of counterfactuals, whereas the latter posits that people consider only supposition. For example, when one hears, "If there had been a pencil, there would have been a paper," the mental models theory suggests that people think of both possibilities: a pencil and a paper (supposition) and no pencil and no paper (factual inference). In contrast, the suppositional theory posits that people think only of the supposition, i.e., a pencil and a paper. Although empirical outcomes vary, the mental models account currently has more support. However, it is still being determined if this is true for readers in a fictional environment. Will readers imagine only the actualised event, or will they also, or instead, envision the actual event? This question will be empirically tested in the following chapter.

The third chapter presents two eye-tracking experiments, complemented by self-report questionnaires, to explore hypotheses related to cognitive engagement with literary counterfactuals. The first study empirically tests the proposed model for cognitive engagement with disnarration using a visual world paradigm and perceived emotionality. The second study explores reading counterfactual historical fiction, testing the proposed model for its cognitive engagement.

The second part of the dissertation examines literary counterfactuals from a linguistic perspective. In the fourth chapter, counterfactuals will be considered as foregrounding. It will demonstrate how counterfactuals employ formal and semantic deviations, such as additional morphological layers and references to alternative worlds outside the context set. According to Jacobs' (2015) neurocognitive model of poetics, foregrounding (see Chapter 4, p. 156) is associated with slower reading, whereas backgrounding is associated with faster reading. Literary counterfactuals foreground the narrative text due to its form and/or meaning, potentially enhancing the complexity of the literary text and increasing the duration of perception.

The fifth chapter will explore the second-language processing of literary counterfactuals. To my knowledge, this is the first work that considers literary counterfactuals and second language processing together. Given the growing number of people reading literature in a second language, primarily English, examining how second language speakers process counterfactuals in literature reflects real-world situations. Furthermore, the findings from this research may have didactic implications for teaching English as a second language. Also, as complex morpho-syntactic constructs, counterfactuals are intriguing subjects for exploring their processing of second-language processing accounts. As more people read in English as a second language to practice their skills in today's international environment, it is essential to determine whether second-language reading imposes additional cognitive costs when processing literary counterfactuals. In this context, second-language processing research suggests the language interference account, where the first language's morphosyntactic representation affects processing in the second language. But still, empirical research on this topic is inconclusive, with some studies finding evidence of such influence and others not. Most research has focused on simple constructions. However, the question of whether we can observe L1 influence in processing complex sentences within a literary context has not been addressed so far. And therefore, it will be empirically tested in the next chapter.

The sixth chapter includes two further eye-tracking studies triangulated with self-report questionnaires, investigating how second-language readers perceive and evaluate literary counterfactuals. The third study explores the processing of literary counterfactuals as deviations by second-language readers, and the fourth study examines the influence of the first-language morphosyntactic representation on the second-language processing of literary counterfactuals.

Overall, the dissertation is structured around why, what, and how. The first part addresses why people create non-factual narratives, including fiction and counterfactuals, and how these are processed using the possible world framework supported by empirical studies. The second part explains why counterfactuals should be considered foregrounding, describing the linguistic deviations they employ and exploring how second-language readers might process these deviations. The dissertation includes four empirical studies on literary counterfactuals involving 234 participants, bridging the gap between literary studies and linguistics by identifying both types of counterfactuals as deviations that contribute to foregrounding.

This dissertation makes several significant contributions to literary studies and linguistics. I propose an enhanced model of possible worlds for fiction reading. This model introduces new terms to the vocabulary of possible worlds in literary theory, including the AK-

world (author's world) to account for the often-overlooked referential universe, and RP-worlds (reader's possible worlds) to emphasise the reader's role in co-creating the textual universe. Additionally, I clarify an ontological stance that has been previously undefined, providing a detailed cognitive perspective on the RK-world (reader's knowledge world). Fictional recentring is explained as the recentring of the RK-world to the textual actual world, along with a cognitive explanation of how this recentring might influence the re-evaluation of the real world. Ryan's principle of minimal departure is also reinterpreted through Bartlett's schemas for greater clarity.

After addressing issues within the existing possible worlds theory in literary studies, the improved model will be applied to explore cognitive engagement with embedded counterfactuals and counterfactual historical fiction. For the former, I integrate Eco's concept of textual states and propose alternative textual states, demonstrating the model's application using Hemingway's *The Snows of Kilimanjaro* (1936). For the latter, the initial contrast and fictional recentring to an alternative reality will be highlighted as a means of conserving cognitive resources by suspending contradictory historical knowledge, illustrated through an analysis of Robert Harris's *Fatherland* (1992). These models of engagement with literary counterfactuals reveal cognitive processes such as imagination, comparison of worlds, evaluation, and emotional response. Diagrams throughout the dissertation will visually represent how text maps onto possible worlds and their connection to the actual world. The proposed model's connection to cognitive theories of counterfactual comprehension will also be examined and empirically tested.

The dissertation contributes to the intersection of literature and linguistics, i.e., stylistics, by examining counterfactuals as a literary device that foregrounds the text. The grammatical structure of counterfactuals will be demonstrated, identifying the extra layer of past tense morphology as a formal deviation and its resultant meaning as a semantic deviation. Additionally, the referential deviation used in counterfactual historical fiction will be explained, using *Fatherland* (1992) as a case study. To my knowledge, this is the first work to identify counterfactuals as a foregrounding element in narrative. After these theoretical considerations, it will be empirically tested how second-language readers process literary counterfactuals as deviations. Furthermore, this dissertation contributes to applied linguistics by investigating how second-language speakers process counterfactuals. A contrastive analysis of the grammatical structure of counterfactuals in English (L2) and Polish (L1) will be conducted, followed by empirical tests to determine whether L2 readers rely on L1 morphosyntactic representations when reading in a second language.

Thus, this dissertation makes the following contributions:

- extends Ryan's possible worlds vocabulary with the AK-world (author's knowledge world) and RP-world (reader's possible world),
- clarifies the ontological stance of fiction,
- defines the RK-world (reader's knowledge world) from a cognitive perspective,
- provides a cognitive explanation of the fictional recentring process,
- explains the re-evaluation of the real world within the possible worlds framework,
- reinterprets the principle of minimal departure through Bartlett's schemas,
- proposes a new possible worlds model for cognitive engagement with embedded counterfactuals,
- applies this model to analyse *The Snows of Kilimanjaro* (1936) by Ernest Hemingway,
- introduces a new model for cognitive engagement with counterfactual historical fiction,
- applies this model to analyse *Fatherland* (1992) by Robert Harris,
- empirically tests the proposed models,
- tests cognitive accounts of counterfactual comprehension in a literary context,
- identifies counterfactuals as a foregrounding element in the narrative,
- empirically tests the processing of counterfactuals as formal and semantic deviations,
- empirically tests the second-language processing of literary counterfactuals.

Part I: A cognitive approach to counterfactuals in literature

1 The aesthetic function of counterfactuals

This chapter is devoted to the consideration of counterfactuals used in literature. First, the fondness for non-facts, including fiction and counterfactuals, will be explained from an evolutionary aesthetics perspective. It is important to understand why the mind creates non-facts to see the bigger picture and conceive their role in our lives. Second, counterfactuals will be defined as a type of conditional thinking. It is necessary to define and identify the typology of conditionals to distinguish counterfactual conditionals from other types of conditionals. The purpose of it is not to provide an exhaustive list of definitions and classifications of conditionals in general but to focus on counterfactuals specifically. Then, it will be discussed how counterfactuals are treated in the literary domain. It will be argued that counterfactuals as an independent literary device have not received due attention. Afterwards, I will delve into the genre of counterfactual historical fiction that employs points of divergence from actual world history to construct the whole counterfactual world.

Furthermore, to illustrate how counterfactuals are processed, the possible worlds account will be used. However, before discussing possible worlds theory, the difference between overlapping terms such as fictional worlds, possible worlds and text worlds will be identified. As the current model of possible worlds proposed by Ryan lacks essential elements for the application of embedded counterfactuals, an improved model will be proposed useful for the purpose of the dissertation highlighting the role of the reader and author to better understand the textual universe. The ontological stance will be defined, and Ryan's principle of minimal departure will be explained through Bartlett's schemas. By embedded counterfactuals, I refer to counterfactuals used in the literary texts as embedment to the narrative. In other words, counterfactual worlds are nested around the textual actual world. In addition, the proposed model will be extended to the genre of counterfactual historical fiction to give a unified cognitive framework for analysing counterfactuals in literature.

The application of the possible worlds theory helps to explain and visualise the cognitive engagement with counterfactuals that underscores the aesthetic function of counterfactuals. After developing the model based on Ryan's work and Eco's ([1976]1984) textual states, I will apply the model to the analysis of *The Snows of Kilimanjaro* (1936) by Ernest Hemingway and argue that the consideration of counterfactuals as a literary device is crucial for the interpretation of the text. Moreover, the extended model will be applied to the analysis of *Fatherland* (1992) by Robert Harris to illustrate the model of cognitive engagement with counterfactuals at the macro level.

1.1 Counterfactuals and literature

1.1.1 An evolutionary aesthetics approach to non-facts

It was a bright cold day in April, and the clocks were striking thirteen.

1984, George Orwell, 1949: 1

Reading the quote above from *1984* by George Orwell, a reader wants to know what happened on that day, even if it is an imaginary scenario. It is fascinating that people create and consume fiction, intentionally deceiving themselves with imaginary worlds that do not exist. There should be some explanation for why the most intelligent creatures on this planet, *homo sapiens*, engage in such conscious self-deception and love stories regardless of their truthfulness.

Boyd (2018) explores the evolutionary trajectory of storytelling in humans. Initially, storytelling may seem like an evolutionary paradox given its basis in fictional narratives that neither the storyteller nor the listener believes. However, the ability to track and recombine true information, coupled with evolved capacities for event comprehension, memory, imagination, and communication, set the stage for the emergence of storytelling. Boyd explains that early humans, specifically *homo erectus*, developed a dependence on one another, which involved sharing information through mimetic, prelinguistic ways. As the need to pool information grew, it led to the invention of language, which in turn enabled more efficient forms of narrative. This allowed early humans to learn about their kind and environment beyond their immediate experiences, fostering better cooperation and competition. The transition from factual narrative to fiction combined existing cognitive capacities like memory, imagination, and language with a natural predisposition for play. This evolution enabled humans to explore a broader range of human experiences in engaging and memorable forms. The invention of language and the subsequent development of narrative and fiction created new cognitive niches, altering selection pressures and deepening humans' dependency on social knowledge and cooperation. Boyd further emphasises that storytelling, especially fiction, played a critical role in human evolution by shaping cognition, development, and social structures. Fictional narratives allowed humans to explore hypothetical scenarios. This cultural invention became ingrained in human societies, evolving alongside language and continuously adapting to changing circumstances.

From an evolutionary perspective, human brains are wired to receive pleasure from activities that contribute to survival and reproduction. But why do we experience pleasure, aesthetic feeling, from reading imaginary stories that do not seem to have a direct link to either of these two evolutionary goals at first glance? This question is a core of the field known as evolutionary aesthetics that applies principles of evolutionary biology to understand the origins and functions of human artistic preferences, creativity, and aesthetic experiences.

Some researchers, led by Steven Pinker (2007), suggest that fiction is just an accidental by-product of some other useful functions. According to Pinker, consuming fiction is like taking drugs – an addictive and useless activity. Although he acknowledges a useful didactic role of instructive literature as opposed to literature for delighting, imaginary scenarios might be helpful because these what-if events create a problem and solution that may be applicable in a real-life situation. Despite being critical of fiction as an adaptive function, it seems that Pinker agrees with fiction being a cognitive adaptation. On the other hand, literary critics argue that fiction is not a mere adaptation by-product of natural selection but an evolutionary adaptation itself that performs an adaptive function. Dutton (2004) compares two perspectives: one that treats literature as a useless by-product, the same way as drugs (Pinker, 2007), and the other that regards literature as useful for the adaptive function of fitness behaviour (Carroll, 2004). Dutton believes that both are true because they deal with two different categories of fiction: “popular, effects-driven blockbuster movies, TV, and cheap thrillers” and high literature “classics” such as *Middlemarch*, *Great Expectations* and *Robinson Crusoe*.

Distinguishing between a by-product and adaptation is of special importance because defining it as a by-product would lessen the evolutionary value of literature. By-product is often explained as evolutionary ‘spandrel’, the concept coined by Gould and Lewontin (1979). The term ‘spandrel’ originally came from architecture. In a classical arch, the spandrel is the roughly triangular space between the top of an arch and the ceiling. This space is not created by design for its own sake but is an unavoidable by-product of constructing an arch. Gould and Lewontin (1979) used this architectural term to draw an analogy in evolutionary biology. They argued that some biological traits are spandrels: they are not direct results of adaptive selection but are by-products of the evolution of other traits. These traits may eventually acquire functions, but they were not originally selected for those purposes. For example, the human chin is thought to be a by-product of the evolutionary reduction in the size of the jaw and teeth. It is not clear what specific adaptive advantage a chin provides, but it arises as a structural consequence of other changes in facial anatomy. Thus, a by-product, or spandrel, is a trait that evolves as a side effect of the evolution of other traits, rather than because it provides a direct

adaptive benefit (Gould and Lewontin, 1979). In contrast, adaptation is a trait that has evolved through natural selection because it provides some advantages in terms of survival and reproduction in a specific environment (Dawkins, 1976; Mayr, 2001). For example, the colouration of a chameleon allows it to blend into its surroundings and avoid predators. Whereas adaptation provides a clear functional benefit to an organism, by-product does not necessarily provide any direct functional benefit. Therefore, by integrating insights from biology, psychology, and anthropology, literary scholars suggest different hypotheses about how literature contributes to human survival. It is proposed by literary critics and evolutionary aestheticians that literature contributes to structuring the external world, transferring knowledge, values and norms, serves as a test run for survival, helps to understand others and self, enhances cognitive skills and improves psychological well-being.

Tooby and Cosmides (2001: 16) propose that fiction has a useful function for learning about the external world. Even if the information generated from fiction does not aid the functional mode (performative act), it is helpful for the organisational mode of adaptation – “designed to construct the adaptation, to provide it with the correct weightings, information, and representations, and in general to develop a better organisation for carrying out its function”. Abbott (2000) claimed that the narrative structure is a product of cognitive adaptation. He believes that such a capacity of human beings rests on the pre-narrative tools that help to organise, process, assess, and deal with the collected information through our senses. Tooby and Cosmides (2001) support this view, suggesting that it is similar to how the meaning is derived from experiences via their mental representation and storage in memory. Thus, literature and storytelling help organise information in ways that align with our cognitive processes. Tooby and Cosmides (2001) propose that narrative structures evolved to sequence and integrate diverse aspects of human experience and cognition, bridging ancient instincts with more complex cognitive abilities. This adaptation enhances our ability to understand and navigate the world effectively (Carroll, 2006). According to Dutton (2004), literature allows us to comprehend social relations, evoke interactions, depict intimate relationships, and model the entire world order. This universal need to create such order provides unique pleasure and fulfilment.

Another function of fiction is regarded as knowledge transfer. According to Austin (2010: 6), stories “create a rough simulation of reality from which people can derive useful content”. Carroll (2018) emphasises that meaning in fiction is not merely a product of individual imagination but is constrained and shaped by the universal elements of human nature, as well as the specific cultural contexts in which authors and readers exist. Besides

deriving useful information, it has didactic implications in transmitting virtues and values. It fosters a sense of belonging to a community or cultural group, which is essential for cooperation and collective action. Dissanayake (1992) notes that fiction highlights a specific object, idea and space, making it special. The shared experience of this special strengthens social bonding enhancing survival as well as granting people with a specific trait a better chance of surviving. Carroll (2004) suggests that recurring themes such as love, conflict, heroism, and morality are rooted in universal aspects of human nature. These themes resonate with readers because they reflect fundamental human concerns and experiences that have been shaped by evolutionary pressures. Fiction serves as a medium through which cultural values, norms, and knowledge are passed down through generations and reinforced (Carroll, 2004; Davies, 2012). According to Carroll, consuming and discussing fictional narratives leads to an understanding of social norms and moral principles within a community and reinforcement of cultural identity and cohesion.

Fiction serves as a test run of activities in mind so that people can be prepared if the need for action arises. According to Tooby and Cosmides (2001), this is explained by the abstract knowledge yielded from fiction, such as recognising the shape of a snake or flight reaction if chased by an animal. Brian Boyd (2018) notes that fiction's appeal lies in its ability to provide aesthetic pleasure without real risks, fostering enhanced attention and interest. Fictional stories offer a safe, simulated environment where readers can explore different aspects of human behaviour, motives, and social interactions, thereby enhancing their understanding of real-life experiences (Carroll, 2004). This simulation helps readers practice and refine their social cognition and problem-solving skills, enhancing their ability to navigate real-life interactions without facing actual consequences. John Tooby and Leda Cosmides highlight the benefits of "decoupled" imaginative acts. Imagining scenarios contrary to reality, such as a neighbouring tribe attacking or surviving in areas with scarce water, helps in hypothesising non-existing states (Carroll, 2004). Michelle Sugiyama (2001) views fiction as imaginative preparation for real-world challenges, and Pinker compares life to chess, suggesting that fictional plots are like famous chess games studied by players to prepare for similar situations.

Fictional narratives play a crucial role in human cognition and social understanding by providing a platform for simulating social experiences (Mar, 2008; Oatley, 2016). Austin posits that our fascination with romance fiction stems from our evolutionary development of a keen interest in understanding and cooperating with others, crucial for survival and mating. William Flesch (2007) argues that humans are inherently wired to track and understand each other's

behaviour, a trait fiction taps into by exploring nonfactual scenarios and the consequences of actions, including the pleasure derived from reciprocation and punishment in social interactions. Fiction introduces a variety of minds and different reactions to certain events so that one can imagine what others think scenarios, which might be quite different from the usual processing of the mind dealing with one's individual experiences. According to Carroll (2018), literature is fundamentally social, involving the interplay of three sets of minds: those of the authors, the characters, and the readers. Authors imbue their characters with psychological insights, cultural values, and personal identities while readers engage with these characters and narratives, interpreting them based on their own experiences and perspectives. This interaction produces meaning that is deeply rooted in human motives and emotions. The novel's creation and experience unite diverse perspectives, creating a shared sensibility that broadens readers' views. Being part of this exclusive group is a significant pleasure for readers. It helps to understand people in the real life. For example, if there is an abstract isomorphism between the psychology of the character in fiction and the psychology of the friend, understanding a character helps to figure out the mental state of a friend. It is referred to as metarepresentation by Cosmides and Tooby (2000) and involves creating representations of representations, such as understanding that someone else holds a belief about a situation. This ability is crucial for effective communication and social interactions, as it enables individuals to attribute mental states to others and predict their behaviour (Zunshine and Dutton). Boyd (2018) and Austin (2010) refer to this function as 'cognitive play'. Austin (2010:9) believes as much as physical play among youngsters is needed to practice adaptive skills (e.g., "predator avoidance in "hide-and-seek""), cognitive play is needed to practice cognitive functions useful for social interaction. The same line of thought can be observed in Lisa Zunshine (2006), who elaborates on the concept of "theory of mind" (ability to infer others' thoughts and emotions) essential for navigating social interactions in expanding social groups. It is better to practice reading minds in fiction in a safe zone rather than in reality, as the practice of reading one's mind and the failure of its successful interpretation might lead to unwanted consequences. Dunbar (2004) extends this view, suggesting that fiction arises from our capacity to imagine hypothetical responses, an extension of our theory of mind.

Understanding others' feelings, according to Carroll (2018), also helps understand people's own emotions, offering templates for a normal emotional life. Though entertaining, fiction profoundly shapes our identity. For example, in *David Copperfield*, by reading books, the protagonist is not fleeing reality but expanding from a limited existence into a broader realm of human potential. Through his literary imagination, he nurtures his identity, enhancing his

adaptability and demonstrating literature's adaptive advantage by improving his human fitness. According to Davies and Carroll, literature often evokes strong emotional responses and allows readers to experience different emotions vicariously through characters and situations. This emotional engagement may help individuals regulate their own emotions. Van Mulukom and Clasen (2021) add that fiction shapes identity and worldviews by prompting reflection on traits and values, enhancing moral decision-making, and fostering empathy. By examining the adaptive psychological functions of fiction, Carroll (2018) suggests that narratives play a crucial role in helping individuals navigate their social and psychological worlds.

According to Davies (2012), reading literature is associated with cognitive development. He states that literature frequently explores diverse themes, moral dilemmas, and complex narratives. Engaging with these narratives encourages intellectual exploration and critical thinking. Carroll also highlights the cognitive benefits of engaging with fiction, particularly in terms of cognitive flexibility and creativity. Fictional narratives stimulate imagination and encourage readers to think beyond their immediate reality, fostering creativity and innovation (Davies, 2012). The ability to think creatively and adaptively has been advantageous in human evolution, enabling individuals to devise novel solutions to problems and adapt to changing environments.

Davies (2012) suggests that literature provides aesthetic enjoyment and entertainment, which can reduce stress, enhance mood, and contribute to well-being. Van Mulukom and Clasen (2021) suggest that during unrest or boredom, such as during the COVID-19 pandemic, fiction regulates mood by providing relief from anxiety or practising coping strategies through comedy or horror. They argue that immersion in fiction enhances enjoyment, story-consistent beliefs, and behaviours, positively impacting psychological well-being.

Based on the previous research discussed above, we see that fiction serves important adaptive functions. Another related question is how can our mind do this magic? Tooby and Cosmides (2001) acknowledge that our mind develops by evolution and is transmitted to new generations in the form of abstract concepts and emotions, and therefore we already have concepts such as fear and family in our mind (though in non-organised abstract form) – these concepts are not learned but rather elicited by the situations. Austin (2010) makes an analogy between the mind and the computer: the mind is born with preloaded systems as much as a computer comes with software such as a word processor. At first, it might seem to be a “blank space”, but there are lots of programming codes functioning in the background. The mind has preinstalled modules including “the mechanisms for acquiring language, imputing causality, and understanding the thoughts and motivations of other people (the so-called ‘theory of mind’

module)” (Austin, 2010: 21). Austin suggests that there is a “narrative-building model” in mind. However, he does not mean a specific brain region responsible for the narrative construction, and what he means is that “the human ability to construct narratives relies on a series of interrelated cognitive predispositions that evolved to allow us to use information more effectively.” (Austin, 2010: 21) Van Mulukom and Clasen (2021) suggest that event simulation relies on memory’s constructive nature, allowing the flexible recombination of details into imagined events that integrate past, present, and future experiences into coherent narratives.

Austin (2010) follows Tuner’s idea that structuring in time and space is the most essential element for narrative-building. As a critique of Turner, David Herman argues that it is overextension to sequencing as a short temporal and space sequence may not be representative of a story. However, Austin proposes that the tendency and pleasure to build spatial sequences are fundamental to the development of our narrative-building mind. He highlights the role of spatial sequencing for survival. Spatial sequencing (naïve physics of cognitive scientists), as Austin suggests, is adaptive. It helps to orient and predict. Austin highlights Steven Pinker’s proposal that spatial relations play a role in abstract concept construction. Spatial sequencing is closely related to temporal sequencing (“episodic culture” by Merlin Donald). By episodic, it is meant the event/episode representation. It is believed that animals have episodic representations and can also learn to sequence them based on conditions, but only humans can do “mental time travel” to past and future and construct more elaborate sequences of events. Sequential narratives help to understand cause and effect, thus facilitating causal reasoning. As Austin (2010) asserts, causal reasoning is crucial for tackling anxiety because anxiety emerges when there is no evident cause for the observed unusual situation. Newberg et al. (2001) claim that there is a “causal operator” that sets out to produce a narrative to deal with the situations that trigger anxiety. Anxiety might be a result of hearing unexpected noise while sitting in a quiet room; at this moment, the amygdala is activated, and one is in a mental alert state to find out the cause of that strange noise. As Austin explains, cliffhangers have the same effect on story listeners because it induces anxiety until the end is revealed.

In her detailed exploration of cognitive processes in “Useful Fictions” (2010), Austin identifies several key mechanisms essential for narrative construction. These include classification, which serves as a foundational reasoning strategy possibly shaping our affinity for fiction, and information compression, focusing on vital details amidst complex information. Schematisation is another important element that involves organising schemas or scripts into generic templates, streamlining memory for recurring events like dining out. Austin contrasts abstractive fiction’s focus on specific events with schematic fiction’s broader frameworks.

Scripts, as described by Roger Schank and Tamara Berman (2002), enhance efficiency in interpreting new events, albeit sometimes leading to selective recall aligned with schemas (e.g., Brewe and Treyen's 1981 experiment). Despite occasional pitfalls, schematic memories function as useful fiction, aiding recall and conserving cognitive resources. Austin also emphasises concept integration, akin to creating and recalling schemas, paralleling the cognitive process of storytelling. In addition, according to Mar (2008), abstraction and compression of social information are essential as they facilitate simulation.

Austin (2010: 40) views constructed narratives of events in a postmodernist light, seeing stories as “fragmented, incomplete, unreliable, perspectival, and contradictory” - useful fiction in the cognitive science sense. Previously, it was thought that memory consists of two types: semantic, storing facts, and episodic, storing narratives of events (Endel Tulving, 1972). Later, it was proposed that even facts are stored in narrative forms (Catherine Emmott, 1977). According to Schank and Abelson (2014), knowledge is generated and stored as narratives of experiences. Instead of storing events themselves, we store stories about them. This poses a risk, as we can fabricate stories to make events coherent, leading to false memories and the belief they are true, creating fictional narratives. Dennett (1991), in “Consciousness Explained”, describes the “Cartesian Theatre” as a single region in the brain where all sensory input is edited into a cohesive narrative experienced by our conscious minds (Austin, 2010: 38). However, he argues against a final narrative product, suggesting instead that we have multiple drafts of narratives.

But then, how can we track which narrative is true and which one is fictitious? According to Tooby and Cosmides (2001: 20), people can discern fiction from truth effectively because of scope syntax and its important element called decoupling. Scope syntax is interpreted as what “tag and track the boundaries within which a given set of representations can safely be used for inference or action”. They further state that decouple is “cognitively quarantine sets of representations from each other, so that they do not interact with each other promiscuously – that is, without respect to the scope boundaries within which they are applicable (Leslie, 1987)”. In other words, it refers to the cognitive process of separating representations (such as thoughts or beliefs) from direct sensory input or reality. Hence, people can discern truth from fiction and have different cognitive mechanisms for processing because of the effective tracking of boundaries between the two. Evolutionary psychologists Leda Cosmides and John Tooby distinguish between “architectural truth”, absolute propositions, and contingent beliefs tagged with source markers (“source tagging”), which function like a representational immune system. This system allows humans to handle contradictory ideas

without conflict, facilitating complex and hypothetical thinking crucial for innovation. By managing contingent propositions, individuals can infer potential future scenarios beyond what a system processing only absolute truths could accommodate. Tooby and Cosmides emphasise the role of suppositional thinking in human discovery, citing the transition from hunting to agriculture as an example where counterfactual propositions played a pivotal role. These propositions, stored as metarepresentations with tags indicating their degree of counterfactuality, circulate in the mind without causing anxiety, supporting long-term inference. Fictional scenarios teach practical lessons by allowing us to generalise from specific instances, leveraging the cognitive benefits of narrative metarepresentations with source tags, as argued by Lisa Zunshine (2006). Both in literature and life, navigating conflicting assumptions, diverse perspectives, and intricate narratives requires cognitive skills akin to those early humans used to navigate physical landscapes, as noted by Nancy Easterlin (2010). This dual capacity involves acquiring and evaluating information amidst complexity and mystery.

The question of why we have a tendency to build fiction generated a few hypotheses, including the anxiety response proposed by Austin (2010). He explains the humans' love of fiction as a response to anxiety about knowing information. The amygdala, responsible for coordinating anxiety responses, integrates sensory and contextual information with long-term memories to trigger physiological reactions like increased heart rate and adrenaline release. Austin (2010) argues that the same brain region, in combination with the hippocampus that gives access to long-term memory, is essential for narrative building. In narrative formation, anxiety precedes obsessive thoughts, as seen in conditions like obsessive-compulsive disorder (OCD), where sufferers experience intrusive fears and engage in compulsive behaviours. This narrative cycle involves creating multiple, sometimes contradictory scenarios, influencing behaviour temporarily perceived as rational. Randolph M. Nesse (2001) suggests OCD could be adaptive in low-risk environments, where our evolved cognitive systems exaggerate potential dangers. It follows that narrative-building mechanisms, akin to fictional storytelling, evolved for survival tasks, emphasising exciting and speculative narratives over mundane truths. Austin compares children's pretend games and adult fiction consumption, both serving survival functions by simulating scenarios to escape predators or overcome challenges. Anxiety from unresolved narratives drives narrative completion, providing closure and managing uncertainty. Narrative endings, as proposed by David Herman (1999), alleviate anxiety by offering closure and coherence to experiences, similar to Edmund Burke's (1986) aesthetic pleasure from experiencing threat in a safe context.

Another hypothesis links creating imaginary worlds with dreaming, although the former is intentional and the latter is not. While dreaming, people see the set of episodes that are most often sequential and follow the narrative path quite as experiencing fictive stories in mind but without knowing that it is fiction (except for lucid dreamers who understand that they are dreaming and can interfere with the plot). Making a parallel between these two might be helpful in deciphering the adaptive function of fiction from an evolutionary perspective. The adaptive function of dreaming and the function of fictional narratives are connected, with both serving as mechanisms for the construction and maintenance of the human neurocognitive design (Tooby, 2001). Fictional narratives, like dreams, can be seen as a form of storytelling which has been retained by natural and sexual selection due to its survival and reproductive payoff (Yang, 2013). From an evolutionary aesthetics perspective, fiction is vital, as it creates an imaginative universe that brings environmental and internal forces into emotionally meaningful relations (Sugiyama, 2008). This suggests that both dreaming and fiction play a role in the construction and maintenance of the human neurocognitive design and are, therefore, important from an evolutionary perspective. The relationship between dreams and art is a complex one, with some scholars suggesting that dreams are the source of artistic inspiration (Forrer, 2021). This idea is supported by the observation that both dreams and works of art often attempt to deny or present an alternative view of painful reality and are associated with the problem of reality (Balter, 2006). These findings suggest that dreams may indeed play a significant role in the creative process, serving as a source of inspiration and a means of grappling with the complexities of reality.

Freudian view of dreaming suggests that it is a random by-product of REM sleep without any natural function. Schrage-Früh (2012) argues against this view of dream as a display shield while other operations are running in the background and that dreams implement unrealised and repressed wishes “analogous to neurotic symptoms” (Rycroft 1979: 8) that have been refuted by researchers (e.g., Palombo 1983). The similarity between dreams and waking imagination suggests that there must be a more important function than just viewing it as an “abnormal psychic phenomenon” (Freud, 1992: 5). Schrage-Früh argues that if rapid eye movement sleep (REM sleep) that happens every 90 minutes of sleeping (25 % of our sleep) and characterised by heightened dreams, there should be some essential biological function. She supports Hobson’s and McCarley’s (1977) activation-synthesis model and later Hobson’s (1992) perspective on dreams, according to which the brain makes coherence from random images creating stories. The bizarreness of incoherent dreams is explained by the failure of the forebrain to make a coherent whole. Schrage-Früh (2012) highlights the importance of REM

sleep in structuring new experiences into memory. The debate is whether dreaming is just a by-product of this activity or whether it participated in the structuring. The latter view is favoured as dreams can be a metaphor for explaining emotion (e.g., Hartmann 1998). Dreaming is useful in creating art and science because it helps to heighten memory connections, and therefore, an adaptive function of dreaming relates to the cross-connections that improve memory. For example, an anecdote regarding Mendeleev's invention of a periodic table in chemistry. He had been working tirelessly to organise the chemical elements according to their properties. After days of intense study and struggling to find a coherent system, he fell asleep at his desk. In his dream, he saw a table where the elements fell into place according to their atomic weights, forming a coherent pattern. When he woke up, he wrote down what he had seen, which became the basis for the periodic table of elements.

Furthermore, Revonsuo (2000) argues that dream content is organised and selective rather than random. During dreaming, the brain constructs a complex model of the world, with certain elements being overrepresented or underrepresented compared to waking life. Revonsuo hypothesises that the biological function of dreaming is to simulate threatening events, aiding in threat perception and avoidance. He examines the evolutionary context, noting that early humans faced many threats, and any advantage in dealing with danger would boost reproductive success. A dream mechanism that simulates threats could develop and maintain threat-avoidance skills. Empirical evidence from various types of dreams, including normative, children's, recurrent, nightmares, post-traumatic, and those of hunter-gatherers, supports the idea that our dream-production mechanisms specialise in threat simulation, bolstering Revonsuo's threat simulation hypothesis.

According to Stephen (2003:97), there are two memory registers: one is the "semantic/language register of memory", and the other is the "emotionally-coded memory register". Dreaming is associated with the second register, e.g., REM sleep, and dreaming has vital functions by reviewing "the day's sensory input and relate it to, and encode it in, the emotional memory system. This process of storing in memory involves linking new sensory information to existing emotional categories or schemas", representing "a different way of apprehending and evaluating the world" (Stephen 2003: 98, 110). The second memory register is powerful because it can put together what the first register fails to implement. According to Hartman (2000:72), art is similar to dreaming because it makes novel connections influenced by emotions.

Boyd (2018) also addresses the potential connection between dreaming and the adaptive functions of fiction and narrative. Boyd suggests that dreaming may have played a foundational

role in the development of fictional narrative. He notes that dreaming, which occurs across many species, involves the recombination of memories into new configurations, presenting experiences vividly to the inner eye and engaging both attention and emotion. This process of dreaming resembles a fictional narrative and likely anticipated it, providing more material to work with as factual narratives began to circulate more frequently and elaborately. Boyd further argues that the primary function of dreams might be to maintain the retrieval and recombinatorial mechanisms of the brain's default mode or actor-scene network, which is crucial for daytime retrieval and planning. This same network, being active during both dreaming and waking states, would have been readily available for idle daydreaming and could have been easily co-opted for the purposeful invention of fictional stories. Thus, the mental infrastructure supporting dreaming may have inadvertently facilitated the evolution of narrative and fiction by keeping cognitive processes sharp and adaptable for both practical planning and creative endeavours. By linking the mechanisms of dreaming to the cognitive processes involved in storytelling, Boyd underscores the adaptive value of fiction. He posits that both dreaming and fiction share the function of recombining elements of memory to explore new possibilities, thereby enhancing cognitive flexibility and problem-solving abilities. This connection highlights how the evolution of storytelling might be deeply rooted in fundamental brain functions that originally served other adaptive purposes, such as memory consolidation and future planning.

In *The Roots of Art Are in the Dream*, Schrage-Früh (2012) argues that understanding dreaming as adaptation is key to conceiving the evolutionary function of storytelling. She states that “dream and art, in all its varieties, are manifestations of the same biological need to convert experiences into structure and [...] dreaming, in all likelihood, preceded art-making in historical priority” (States 1997: 1). Schrage-Früh (2012) underscores States (1987) who links dreaming with fictions. According to States, the dream is an initial draft of fiction, and fiction is an improved draft, and both of them stem from the “need to structure the world by turning our experience into narrative” (Schrage-Früh, 2012: 165). It is an adaptive function that prepares for unexpected changes. Based on Cosmides and Tooby (2001:8), “fictional worlds engage emotion systems while disengaging action systems (just as dreams do)”. According to Schrage-Früh (2012: 165-166), “there is some evidence, moreover, that the need to tell stories may have been sparked not least of all by the need to communicate one's dreams. The earliest documents of written down stories record and interpret the author's dreams, e.g., a Sumerian dream text inscribed on a clay tablet over 5000 years ago”. For example, S.T. Coleridge, R.L. Stevenson and Franz Kafka found creative inspiration from dreams as Schrage-Früh (2012)

writes. According to Schrage-Früh (2012: 166), “empirical research supports the hypothesis that a rich and vivid dream life frequently coincides with heightened creativity”. Hartmann (1998:220) states that “persons with “thin boundaries”, “in whose minds, things are relatively fluid”, “thoughts and feeling tending to merge and overlap, are both more likely to experience frequent vivid dreams and to be creative in their waking lives.” (Schrage-Früh, 2012:166) For example, “writers and poets as various as William Styron, Isabel Allende, Stephen King, Bharati Mukherjee, Denise Levertov and Joyce Carol Oates compellingly testify to their own rich dream life that many of them see as indispensable to their waking imagination” (Schrage-Früh, 2012:166).

So far, I have discussed the evolutionary function of fiction, which received considerably more attention rather than counterfactual thinking per se, leading to the creation of a specific field termed evolutionary aesthetics. However, fiction can be considered an extension of counterfactual thoughts, as it involves the creation of hypothetical scenarios (Shiloh, 2020). This is supported by the idea that interpretation, a key aspect of fiction, is a form of counterfactual thinking (Dohrn, 2009). Whereas fiction might be considered an evolved form of counterfactual thought, it is important to distinguish between fiction and counterfactual historical fiction as a certain type, as well as between fiction and counterfactuals as a literary device. Counterfactual historical fiction, aka alternative reality, is a special type of fiction because it is based on the contrast between the real world and the alternative world. Robert Harris’ exploration (1992) of a victorious Hitler in *What if Hitler had won WWII* illustrates how counterfactual narratives create alternative realities rooted in historical events, highlighting their unique role in blending truth and fiction. Whereas all counterfactual historical fiction is fiction, not all fiction can be considered counterfactual because they do not always contradict the past. For example, *Middlemarch* is fiction set in a realistic representation of 19th-century provincial England and focuses on the lives, relationships, and societal issues of its characters. It does not present an alternative history or hypothetical scenarios that contrast with known facts; instead, it offers a detailed and realistic depiction of life during that period. However, counterfactual historical fiction similarly involves a suppositional element prevalent in fiction, such as what can happen if Jane Eyre becomes the governess of Mr. Rochester, as speculated in *Jane Eyre* by Charlotte Brontë (1847). The evolutionary functions of fiction described previously also hold for counterfactual historical fiction, making them useful from an evolutionary perspective in structuring the world in norms, simulating events, understanding others and self, enhancing cognitive skills and improving psychological well-being.

The difference between fiction and counterfactual as a literary device might be obvious as the former concerns the whole narrative developed for creating a fictional world, the latter focuses on building alternative worlds inside the fictional worlds. Whereas both are non-facts and involve causality, that one event leads to another event, only the latter makes an obvious contrast with the past, similar to counterfactual historical fiction. Whereas counterfactual historical fiction is a fictional narrative developed on a single counterfactual thought of the author, such as “what if Hitler had won WWII”, counterfactuals as a literary device inside of fictional worlds are expressed by characters and narrators, such as “what if Daisy had waited for me and we had been together?” by Gatsby, “what if I had not betrayed my siblings to the White Witch?” By Edmund from *The Chronicles of Narnia*, “what if I had accepted Mr. Darcy’s first proposal?” from *Pride and Prejudice*, just as we, human beings, engage in thoughts such as “what if I had chosen a different major in college?”, “what if I had stayed in that relationship?” and “what if I had taken that trip abroad?”. It is not surprising that counterfactual thinking performs similar adaptive functions to those of fiction as, from an evolutionary point of view, counterfactual thinking precedes the creation and enjoyment of fictional narratives (Beck, 2016). Further, I elaborate on the adaptive function of counterfactual thoughts that also convey imaginary scenarios.

Counterfactuals play a crucial role in organising the world based on social norms, as they are shaped by existing norms and deviations from expected behaviours, often aiming to restore situations to a normal state (Roese, 1997). This framework suggests that the content of counterfactual thoughts is heavily influenced by perceived norms, where deviations from expected behaviour frequently prompt the generation of counterfactuals. This perspective draws from norm theory, which explains counterfactual thinking as a process involving the mental simulation and comparison of alternative scenarios based on established norms and base rates. Base rates represent the typical or expected occurrence of behaviours and events based on past data or common experiences. They serve as a reference point against which deviations are measured, influencing the generation and content of counterfactual thoughts.

Counterfactual thoughts help people simulate alternative events and their possible outcomes (Brigard, 2012, 2013; Gerlach, 2014; Schacter, 2015). These imaginary worlds are crucial for envisioning the consequences of different scenarios. For example, one might think, “If I had worked out at the gym three times a week for the past three months, I would have looked fitter”. This counterfactual thought simulates an imaginary event, such as going to the gym regularly for an extended period and consequently being fitter.

By engaging in counterfactual thoughts, people can understand others better (Spellman, 1999; Galinsky, 2002; Byrne, 2017). This is realised by putting oneself in another's shoes in a counterfactual: *if I were you, I would do...* Especially while reading fiction, readers might imaginatively take up the role of the protagonist, thinking about *what I would do next if I were him/her*. This practice helps to enhance the theory of mind and easily take another perspective that might not be quite the same as one's own. Moreover, engaging in counterfactual thoughts can enhance self-understanding, as it allows individuals to simulate their own choices and learn about their beliefs and desires (McCoy, 2019). For example, in Charles Dickens' *A Christmas Carol*, Scrooge imagines how his life might have been different if he had made different choices. This reflection helps him understand his deep-seated desire for connection and compassion, ultimately transforming his outlook on life.

Counterfactuals improve cognitive skills such as problem-solving and creativity (Markman, 2007). Counterfactual thinking improves problem-solving by encouraging the exploration of alternative scenarios and outcomes. For instance, when a software application crashes, developers might ask, "What if we had used a different database?" or "What if we had conducted more extensive testing?" These questions can lead to insights that help identify and fix the root cause of the problem. In Arthur Conan Doyle's *Sherlock Holmes* series, Sherlock often engages in counterfactual thinking, such as imagining different scenarios of a crime to deduce the true sequence of events. This improves his problem-solving skills and showcases his creative approach to detective work.

Counterfactual thinking, or the consideration of alternative outcomes to past events, is essential for psychological well-being and serves predominantly positive functions. Roese (1993) proposed that people engage in downward counterfactuals - imagining how situations could have been worse - to feel better, providing emotional relief and boosting resilience, referred to as affective function. This process affects both event judgment and emotional reactions (Sherman, 1996; Byrne, 2016). McMullen (1997) further supported this by showing that counterfactual thinking can lead to positive affect such as feeling relief.

In addition to the adaptive functions similar to those of fiction, imagining alternative outcomes to past events can have a direct implication for a performative act. Roese (1993) distinguishes downward counterfactuals, aimed at emotional comfort promoting psychological resilience (Leithy, 2006), from upward counterfactuals, focused on improving future performance, referred to as performative function (Roese, 1994; 1997). These thoughts often arise automatically during negative emotional states often generated in response to controllable events (McEleney, 2006), helping individuals identify potential causes of setbacks and

triggering contrasting emotions that provide insights into causal relationships. Epstude and Roese (2008) developed the functional theory of counterfactuals, emphasising the role of upward counterfactuals in behaviour regulation and performance improvement. This theory posits two primary pathways through which counterfactual thinking influences behaviour: the content-specific pathway, which directly affects behavioural intentions by providing specific information, and the content-neutral pathway, which indirectly influences behaviour through affect, mindsets, or motivation. Grounded in norm theory, this framework explains how counterfactual thoughts are integral to goal cognition. The theory underscores counterfactual thinking's role in generating behaviours aimed at addressing unmet goals or problems, thus facilitating behaviour change (Epstude, 2008; 2011). Roese and Epstude (2017) integrate insights from diverse psychological disciplines, highlighting the adaptive functions of counterfactual thinking in preparing for future actions influencing decisions (Byrne, 2016). Empirical evidence supports this by demonstrating that upward counterfactuals, envisioning better alternatives, can enhance motivation and performance by pinpointing areas for improvement (Nasco and Marsh, 1999; Wong, 2007). Thus, whereas downward counterfactuals can serve an affective function, increasing satisfaction with the present state, upward counterfactuals can serve a performative function, improving behaviour.

As it has been discussed, counterfactuals perform essential adaptive functions that make them of special importance and worthy of investigation. In the subsequent sections, I will define counterfactuals as a form of conditional and discuss two main concepts that are central to my dissertation: embedded counterfactuals in literary texts and counterfactual historical fiction.

1.2.2 Counterfactuals as a type of conditionals

Conditional structures encompass the conditional clause known as if-clause p and the adverbial clause known as then-clause q (Bhatt and Pancheva, 2017). Conditionals have been defined by virtue of their truth value (e.g., Stalnaker, 1968; Haiman, 1978; Bussman, 1996). According to this view, we consider conditionals by assessing the truthfulness of the then-clause based on the if-clause, which is known as modus ponens. In other words, q takes place on the condition that p holds. For example, *if the temperature drops below freezing, then water turns into ice*; given the premise that the temperature drops below freezing, we conclude that, therefore, water turns into ice (if p then q ; p therefore q). However, the reverse is possible, such as modus tollens, when we assess the truthfulness of the if-clause based on the then-clause. For example,

if the soil is well-nourished, then plants will thrive; given the premise that plants are not thriving, we conclude that the soil is not well-nourished (if p , then q ; not q , therefore not p).

If one applies the truth table using Frege's logic ("Introduction to Logic" in Frege, 1979: 186, Suppes, 1999: 11) mentioned by Edgington (1995) for the previous example *if the temperature drops below freezing, then the water turns into ice* to analyse the implication $p \rightarrow q$, it will look like as the following:

p : "The temperature drops below freezing".

q : "The water turns into ice".

p (Temperature drops below freezing)	q (Water turns into ice)	$p \rightarrow q$ (If temperature drops below freezing, then the water turns into ice)
True	True	True
True	False	False
False	True	True
False	False	True

Table 1.2.2 The application of the truth table (based on Frege's logic, e.g., Frege, 1979:186; Suppes, 1999:11) to the example *if the temperature drops below freezing, then the water turns into ice*.

In this truth table:

- When p (Temperature drops below freezing) is true and q (Water turns into ice) is true, the implication $p \rightarrow q$ is true.
- When p is true and q is false, the implication $p \rightarrow q$ is false.
- When p is false and q is true, the implication $p \rightarrow q$ is true.
- When both p and q are false, the implication $p \rightarrow q$ is true.

Therefore, according to the truth table, the statement *if the temperature drops below freezing, then the water turns into ice* is true in all scenarios except when the temperature drops below freezing but water does not turn into ice.

However, the truth table approach might lead to unrelated propositions being as p and q (e.g., see Comrie, 1986) because it does not assume any inherent relationship between propositions. For example, *if the grass is green, the sky is blue*. One can analyse the example

using a truth table and draw the conclusion that the statement is true in all scenarios except when the grass is green and the sky is not blue.

Wierzbicka (1997) proposed to define conditionals in terms of their lexical properties, i.e., conditionals as if-sentences, whereas counterfactuals as if-would sentences. The choice of these notions is reasoned by her as conceptual primitives. She further differentiates between two types of conditionals referring to if-sentences as imaginary situations that can occur and to if-would sentences as imaginary situations that cannot occur. However, the possibility is judged from the speaker's perspective.

In contrast to conditionals, counterfactuals, as a special type of conditionals, have been defined extensively by scholars from different areas of research. It is identified as a prototypical conditional sentence that involves imagined scenarios (that could/did not occur) in which the falseness of the if-clause is presupposed (Sweetser, 1996; Molencki, 1999). Bussman (1996) also mentions the importance of subjunctive mood in the counterfactuals. Cognitive scholars extend the definition, highlighting the counterfactuality of the utterance, suggesting that situations depicted are contrary to fact (Kulakova and Nieuwland, 2016) and suppositionally true (Byrne, 2002). Fauconnier (1996) suggests that counterfactuals do not refer to the actual world; whereas McCawley (1981) opposes claiming the interaction between the actual world and alternative worlds. The former suggestion seems to be more accurate if we consider only the supposition, i.e., what is supposed to be true. Although, the latter makes sense if we take into consideration also the factual inference that some events did not take place in the actual world. Thus, counterfactual conditional is a type of conditional that expresses what might have been true under certain cases. To differentiate between indicative conditionals that depict open possibilities and counterfactuals that depict closed possibilities, let us consider the following example in present tense:

- (1) a. If the oven is preheated, I will bake the cookies.
- b. If the oven was preheated, I would bake the cookies.

From this example, we can see that indicative conditional (1a) expresses suppositional information only, whereas counterfactual conditional (1b) also conveys contrary-to-fact information that the oven is not preheated, and I will not bake the cookies.

There is also a difference between past indicative and past counterfactual conditionals:

- (2) a. If it rained yesterday, the Smiths stayed indoors.
- b. If it had rained yesterday, the Smiths would have stayed indoors.

The difference between examples is that the first example (1) refers to the present time, whereas the second (2) to the past time. The conditional sentence includes the conditional

clause, from example (1), it is *if the oven is/was warm preheated*. This conditional clause is also known as antecedent or protasis. The main clause that usually follows the conditional clause is known to be the consequent or apodosis. From example (1), the main clause is *I will/would bake the cookies*. Conditionals are broadly described as the proposition conveyed by the protasis, which defines the situations in which the proposition conveyed by the apodosis is true (Bhatt, Pancheva, 2017).

Wierzbicka (1997) proposes five types of English if-sentences: negative counterfactuals, inverse counterfactuals, affirmative counterfactuals, hypotheticals, and conditionals. She describes conditionals with such structure: if *p* is the case, *q* will be the case. Hypotheticals can have a past tense but not pluperfect or subjunctive: if *p* took place, *q* would take place. Affirmative counterfactuals are composed of pluperfect or subjunctive: if *p* had taken place/were the case, *q* would have taken place/be the case. Inverse counterfactuals have an inverse structure: had *p* taken place, *q* would have taken place. Negative counterfactuals convey both counterfactuality and negation: if *p* had not taken place, *q* would not have taken place. The difference between hypotheticals and counterfactuals is that hypotheticals convey implicit inference that “I don’t say I think this will be the case”. For example, the hypothetical *If Dorota married Ladislaw, Mr Casaubon would disinherit her* can be explained as the following: If Dorota marries Ladislaw, Mr Casaubon will disinherit her, but I don’t say that I think this will be the case.

Wierzbicka (1997) opposes Comrie’s (1986) hypothetical continuum perspective that factual sentences convey the lowest level of hypotheticality, whereas counterfactuals show the highest level of hypotheticality. I agree with Wierzbicka (1997) since a factual sentence such as *Warsaw is the capital city of Poland* conveys no hypotheticality. In the same vein, it is not always feasible to consider counterfactuals in terms of probability, as Wierzbicka (1997) notes, because such an example as *if I were you, I would do otherwise* does not imply that it is very unlikely that I am you. Wierzbicka (1997) explains affirmative counterfactuals using conceptual primitives such as KNOW and THINK: I know *p* and *q* did not take place, and I think that before now, one could say: “If *p* takes place, *q* will take place”. According to her logic, one layer of the past tense is used for locating the occurrence in the past time, and the second layer of the past tense is used to distance oneself from the present moment and consider the occasion from a past perspective.

Among formal linguists who studied counterfactuals extensively is Ippolito (2013). She calls counterfactuals subjunctives not because they always contain the subjunctive mood as they do not, but because they contain the temporal morphology that does not locate the

antecedent in time, suggesting *irreality*. In modern English, the subjunctive mood is rarely used, e.g., *were* instead of *was* (e.g., if I were a man). She distinguishes two types of counterfactuals: simple past subjunctive conditionals (3a) and past perfect subjunctive conditionals (3b):

(3) Mr. Casaubon died before Dorota's arrival.

a. #If he died after Dorota's arrival, she would inherit a fortune.

b. If he had died after Dorota's arrival, she would have inherited a fortune.

In this example, (3a) is not felicitous/appropriate (#) because Mr. Casaubon already died. Ippolito (2013) differentiates two subjunctives by their morphology in the spirit of Iatridou (2000), according to which (3a) has one layer of nontemporal past tense morphology, whereas (3b) has two layers. Ippolito (2013) interprets the appropriateness of two layers of past tense morphology from a complex formal semantics perspective, but it follows the same rationale as Wierzbicka (1997) explained in simpler words. In Ippolito's interpretation, it is important to have *If he dies after Dorota's arrival* accessible at some past time or in Reichenbach's (1947) spirit reference/utterance time for counterfactual conditionals to be felicitous. In the future past perfect subjunctive conditional such as (3b), the reference time is moved to the past so that the presupposition *Mr. Casaubon is alive after Dorota's arrival* is possible at the time just before Mr. Casaubon died. Wierzbicka (1997) would tell the same as follows: I know that Mr Casaubon died before Dorota's arrival and that Dorota did not inherit a fortune; and I think that before now, one could say: "if he dies after Dorota's arrival, Dorota will inherit a fortune".

In literary theory, two terms such as *hypothetical* and *counterfactual* are mistakenly interchangeably used, although they are not the same. The main difference is that counterfactuals convey a factual inference. In the above example, (3a) is hypothetical, whereas (3b) is counterfactual if we ignore the contextual information that Mr Casaubon died before Dorota's arrival, which would make (3a) inappropriate. From (3b), we can infer that Mr Casaubon died before Dorota's arrival, but from (3a), we cannot because it refers to the future possibility that is less likely to happen. In this example, the difference is clearly shown by their structure, i.e., hypotheticals containing past tense and counterfactuals containing pluperfect (two layers of past tense). However, present counterfactuals also have only one layer of past tense. For example, *if he knew the answer, he would tell you*. The example suggests the factual inference that he does not know the answer. To see the difference between (3a) and this example, one should investigate the properties of the verb. Whilst the former made use of a dynamic verb that is action-oriented, in the latter example, there is a stative verb that is state-oriented (e.g., to have, to be, to know). According to Iatridou (2000), the predicate of

hypotheticals is telic (a verb that has an endpoint), whereas the predicate of present counterfactuals is stative, which does not have an endpoint, that is static. However, stative verbs can be further divided into individual-level (e.g., know) and stage-level predicates (e.g., be); whilst the former can only yield present counterfactual, the latter can be both. Likewise, Arregui (2005) suggested the predicate of the antecedent should be a stative to make a present counterfactual rather than future hypothetical. As Decklerck and Reed (2006) noted, present counterfactual refers to the present time, whereas hypothetical refers to the future. However, Iatridou (2000) names hypotheticals *future-less-vivid* counterfactuals even if they do not reveal counter-to-fact information.

In literature, some linguists have classified conditionals into different typologies based on formal terminology such as type I (e.g., if I study hard, I will pass the exam), type II (e.g., if I won a lottery, I would buy a new car) and type III (if I had studied hard, I would have passed the exam) (Molencski, 1999); based on semantic contents such as open/theoretical (the same as type I), factual and hypotheticals (the same as type I and II) (Leech, 1971; Leech and Svartvik, 1975; Molencski, 1999) as well as real (present, habitual/generic, past) and unreal (predictive and imaginative (hypotheticals and counterfactuals)) (Thompson and Longacre, 1985); based on the function such as content (condition and consequent), epistemic (evidence and conclusion), speech-act (elliptical) (Sweetser, 1990; Molencski 1999) as well as consequential (cause and effect) or non-consequential (content and epistemic in Haegeman's words) (Dancygier and Mioduszevska, 1984) also course of events (descriptive, inference and instructive), hypothetical (neutral, non-neutral and peripheral), marginal (logical and conversational) (Athanasiadou and Dirven, 1996).

However, for the purpose of the dissertation, I will consider three types of conditionals based on the suppositional and factual continuum mentioned in Kakimova (2022): suppositional, factual, and counterfactual. This typology is preferred because it accounts for the dual meaning of counterfactuals (factual and suppositional meaning). It is inspired by conceptual primitives KNOW and THINK in the spirit of Wierzbicka (1997). She proposed universals, which are basic concepts that she argues are present in all human languages, which form part of her Natural Semantic Metalanguage (NSM) theory that aims to understand and compare languages based on a common set of simple, universal meanings. As there is less certainty in SUPPOSE rather than in THINK, I use the concept of SUPPOSE that is not included in the universals. It is used due to the suppositional meaning conveyed by hypothetical conditionals. The division of conditionals, noted in Kakimova (2022), is based on the concepts of KNOW and SUPPOSE. For suppositional/hypothetical conditionals, we use SUPPOSE,

whereas for factual conditionals, we use KNOW. As for counterfactual conditionals, we apply both SUPPOSE and KNOW because they convey both suppositional and factual meanings. Suppositional conditionals have future reference and convey what is supposed. It can be further divided into more likely to happen “if p occurs, q will occur” (I suppose that q will occur if p occurs, and I think it is likely to be the case) and less likely to happen “if p occurred, q would occur (dynamic verb) (I suppose that q will occur if p occurs but I do not think it is likely to be the case). Factual conditionals are uttered when we know that there is a strong causal link between two events. It can refer to the present time “if p occurs, q occurs” (I know that q usually occurs when p occurs) or past time “if p occurred, q occurred” (I know that q usually occurred when p occurred). However, for a conditional to be regarded as factual, it should describe habitual events or facts, such as *if you heat water at 100 degrees, it boils*. Counterfactual conditionals are used when we both suppose and know. It can be further divided into five based on the reference (past, present stative verb, present subjunctive, mixed).

- Past counterfactual: If p had occurred, q would have occurred (I suppose that q occurred if p occurred, but I know that q did not occur because p did not). For example, *if he had exercised, he would have lost weight* (I suppose that he lost weight if he exercised, but I know that he did not lose weight because he did not exercise).
- Present stative verb counterfactual: If p occurred (stative verb), q would occur (I suppose that q occurs if p occurs, but I know that q does not occur because p does not). For example, *if she knew the answer, she would tell you* (I suppose that she tells you if she knows the answer, but I know that she does not tell you because she does not know the answer).
- Present subjunctive counterfactual: if p were q , r would occur (I suppose that r occurs if p is q , but I know that r does not occur because p is not q). For example, *if he were the president, he would rule the government* (I suppose that he rules the government if he is the president, but I know that he does not rule the government because he is not the president).
- Mixed counterfactual: if p had occurred, q would occur (I suppose that q occurs if p occurred, but I know that q does not occur because p did not occur). For example, *if he had bought Bitcoin early, he would be wealthy now* (I suppose that he is wealthy now if he bought Bitcoin early, but I know that he is not wealthy now because he did not buy Bitcoin early).

In the scope of the dissertation work, I will focus on past counterfactual conditionals that are (almost) always counterfactual if there is no cancellation of counterfactuality, as in the highly

quoted arsenic case: “If Jones had taken arsenic, he would have shown just exactly those symptoms which he does in fact show” (Anderson, 1951: 37). The example such as arsenic case will be explored in more detail in the second part of dissertation about the semantics of counterfactuals (see Chapter 4, p. 162). I will further identify the use of past counterfactuals in literature.

1.2.3 Counterfactuals as disnarrated

Birke, Butter and Koppe (2011) show the use of counterfactuals across the disciplines suggesting that interdisciplinary exchange may yield fruitful results. A special focus is made on the field of literary studies, where the notion of ‘counterfactuality’ is predicted to be topical in the foreseeable future. And indeed, their foresight came true as it is an issue of current interest. Screen adaptations of ‘alternate histories’ that represent scenarios contradicting the past, such as *The Man in the High Castle* (1962) by Philip K. Dick, paved the way to the popularity of the genre named counterfactual historical fiction. The recurring topic in this genre is what would have happened if Nazi Germany had won the World War II, e.g., *Fatherland* (1992) by Robert Harris, *The Sound of His Horn* (1952) by Sarban, etc. For creating counterfactual historical fiction, one should change an important historical event and make up a consequent based on that change. Thus, an alternative reality contradicts a real-world history, e.g. Hitler winning the war. Alternative histories have been extensively studied in the literature (e.g., Raghunath 2017). Although such a genre represents counterfactual, it is the historical background of the whole text that is counterfactual. To deduce counterfactuality, readers should rely on their historical knowledge, as there are no linguistic markers of counterfactuality in the text. However, counterfactuals can also be used at the micro level as a literary device to add depth to the literary text – these can be referred to as counterfactuals embedded in the literary text, making use of linguistic markers that signal counterfactuality. These embedded counterfactuals counter-represent the actual world of fiction, describing how things could have been different if characters had behaved differently. Counterfactuals as embedded constructions inside the narrative have not been studied scrupulously as alternative histories, which I will discuss afterwards (see p. 40). Nevertheless, some research has been done in this direction, which will be described/mentioned in the following several pages.

Dupriez (1991), in the *Dictionary of Literary Devices*, refers to counterfactuals under the umbrella notion supposition/hypothesis and defines it as “a modality of the assertion consisting in positing something as possible. An idea introduced for consideration and

subsequent verification; a pure possibility put forward by the imagination.” (Dupriez, 1991: 435). The counterfactual possibility is mentioned by Dupriez (1991), who states that supposition can be rejected or make antithesis, i.e., strong contradiction, e.g. “...If what had come to him wouldn’t do, he must make something different” (Henry James, *The Golden Bowl*, ch.1; Dupriez, 1991: 436). He shows that Henry James used this type of literary device often in his writings to explore the intentions of others (e.g., “...yet if her sense hadn’t been closed to the possibility in him of any thought of wounding her, she might have taken his undisturbed manner,...” James, *The Golden Bowl*, ch.35; Dupriez, 1991: 437).

Among literary scholars, embedded counterfactuals are regarded as *disnarrated*. The term “disnarrated” was first coined by Prince (1988). Disnarrated is an eligible part of the text as Prince (2004: 5) writes, “every narrative function opens an alternative, a set of possible directions, and every narrative progresses by following certain directions as opposed to others: the disnarrated or choices not made, roads not taken, possibilities not actualised, goals not reached.” It involves “hopes, desires, imaginings and pondering, unreasonable expectations and incorrect beliefs” (Prince, 1992: 34-35). Prince regard disnarrated as all the events expressed via negative or hypothetical mode and David Herman names the latter as “hypothetical focalization”. For example, when writing his famous work, Tolkien begins as the following:

In a hole in the ground there lived a hobbit. Not a nasty, dirty, wet hole, filled with the ends of worms and an oozy smell, nor yet a dry, bare, sandy hole with nothing in it to sit down on or to eat; it was a hobbit-hole, and that means comfort.

The Hobbit, Tolkien, 1937, p.1

The above example shows disnarration using a negative mode. Tolkien used a negative mode to invite comparison and contrast between two contrasting depictions of the hobbit-hole could look like, one that invited the reader to imagine an uncomfortable hobbit-hole (in two different ways, i.e., wet and dry) and the other that depicts a comfortable hobbit-hole. Although the second depiction is hinted at by the negation of the first, it is suspended till the end of the passage. However, hypotheticals as the type of disnarration can also be skilfully used, as Dickens shows us:

“If I could have settled down,” I said to Biddy, plucking up the shore grass within reach . . . “if I could have settled down and been but half as fond of the forge as I was

when I was little, I know it would have been much better for me. You and I and Joe would have wanted nothing then, and Joe and I would perhaps have gone partners when I was of my time, and I might even have grown up to keep company with you, and we might have sat on this very bank on a fine Sunday, quite different people. I should have been good enough for you; shouldn't I, Biddy?"

Great Expectation, Dickens, 1861, chapter 17, p.143

Hypothetical disnarration (counterfactual) conveys comparison between two contrasting possibilities and it is emotionally charged. Pip, the protagonist of *Great Expectation*, ponders what would have been if he had settled down with Joe and Biddy instead of leaving them and going to London in the pursuit of becoming a gentleman to be a good match for Estella. But through struggles, he realises the importance of genuine connections and loyalty over wealth and social status. He regrets distancing himself from his humble friends and imagines that if he had stayed with Joe and Biddy, he would have remained a true self. Thus, the counterfactual (or hypothetical disnarration) is used to show the alternative world.

Another major figure in studying disnarrated is Warhol, who defines them as events that did not happen. According to him, disnarration occurs by means of negation or subjunctive constructions. Warhol believes that disnarration makes the diegesis (the virtual world of the text) more complex, splitting it into many levels. He views it as a narrative engine to make up a story. Warhol regards the following example from *Nicholas Nickleby* by Dickens as disnarrated:

*He thought of **what his home might be if Kate were there**; he placed her in the empty chair, looked upon her, heard her speak; he felt again upon his arm the gentle pressure of the trembling hand; he strewed his costly rooms with the hundred silent tokens of feminine presence and occupation; he came back again to the cold fireside and the silent dreary splendour; and in that one glimpse of a better nature, born as it was in selfish thoughts, the rich man felt himself friendless, childless, and alone.*

Nicholas Nickleby, Dickens, 1839, p.384

In the above example, the use of the subjunctive mode “what his home might be if Kate were there” sets the counterfactual world. According to Warhol, it is used to elevate the depth of

character, representing the character's psychology, as was also noted by Birke et al. (2011). It explicitly marks "the unconscious of a text...shadow world behind the diegesis" (Warhol, 2011: 239). He believes that once a counterfactual story world emerges, it is rejected but not quite forgotten. Labov used the term "comparator" to refer to counterfactuals and noted its occurrence only in the narrative of "highly skilled narrators" (Labov, 1972: 386).

The aesthetic function of disnarrated is multifaceted, as literary scholars suggest. Prince proposes that their function is rhetorical or interpretive, foregrounding narrative. He relates its function to the process of narrating, highlighting the value of narrative because of a different and more engaging strategy than it could be. According to Warhol, the main function of narrative refusals is to assist readers in evaluating the represented world. Richard Saint-Gelais propose that disnarration might have a mimetic function as readers also think of unrealised events. Freed (2020) says that the use of counterfactual narrative is powerful in two ways: first, counterfactuals activate readers' imagination of what did not happen, and second, it gives credibility to the true account critiquing the narrative conventions. According to Freed (2020), counterfactual scenarios strengthen unnarration by giving the opposite of what happened. Also, he suggests that "disnarration prompts readers to imagine not one but two versions of events: the counterfactual scenario that is narrated, as well as the true one that is not" (Freed, 2020: 203). Lambrou (2019:89) suggests that "unrealized events are foregrounded because they require greater processing and are marked stylistically for this reason".

Based on the current literature, embedded counterfactuals are mostly viewed as *hypotheticals* or *subjunctives*. However, neither of these two terms is sufficient for *counterfactuals*. As has been shown in a previous section, counterfactuals and hypotheticals are different. Whereas counterfactuals can be regarded as unreal imagined events, thus hypothetical, not all hypotheticals are counterfactual, i.e., they do not always contradict some fact. Identifying counterfactuals as hypotheticals prescribes them only half of the quality that they have because, on top of being unreal imagined events, they also convey factual inference. And the very potential of counterfactuals being considered as a literary device lies in the comparison between what we suppose and what we know. When it comes to subjunctive, as will be illustrated in the second part of the dissertation, counterfactuals rarely have subjunctive in their morphosyntax. If one considers only subjunctives, we exclude other constructions that represent counterfactuals. I propose to consider counterfactuals independently, avoiding the confusion of either generalising them to hypotheticals or shrinking them to subjunctives. Despite the lack of linguistic clarification, the exceptions apply to Harding (2004) and Dannenberg (2008), who treat counterfactual as a literary device on its own rights.

Harding proposes to consider counterfactuals as a rhetorical device based on their evaluative stance, “a speaker’s expressed evaluation of a counterfactual space” (Harding 2004: 10). Harding (2004) develops her proposal based on the concept of epistemic stance put forward by Fillmore. According to Fillmore, the positive evaluation of the protasis is regarded as “positive interest” (Fillmore, 1990: 142), e.g., the constructions with *hope* and *wish*. In contrast, negative interest is created using the construction with *regret*. The role of counterfactual scenarios in discourse is called “evaluative stance” by Harding (2004). It takes the roots from Fillmore’s “interest” and refers to the speaker’s attitude. Its rhetorical effect is due to the communication of a personal perspective that makes the listener consider an event from the speaker’s angle. Harding elaborates on the words of Roesse and Olson (1995:11), “with its assertion of a false antecedent, the counterfactual sets up an inherent relation to a factual state of affairs” by saying that counterfactuals have an evaluative stance, that is, counterfactuals help us to evaluate the situation either as bad or good. The evaluation of the counterfactual event motivates a listener to share the speaker’s perspective but not necessarily adopt it. According to Harding (2004), counterfactuals in literature follow the same logic as in everyday discourse and leave the possibility of accepting, revising, or rejecting for a reader. She draws attention specifically to evaluative counterfactuals and defines a counterfactual as a nonactual scenario, the scenario that did not take place. According to Harding (2004), evaluative counterfactual scenarios are those that convey judgment. The usage of some words in counterfactuals, such as *should*, *ought to*, *better*, and *worse*, can suggest an evaluative stance as well as a pragmatic context. She claims that expressions with “good thing” and “too bad” entail evaluation, suggesting a counterfactual alternative to ground the evaluation.

In a literary context, counterfactuals are an important element of literary meaning, as Harding (2004) points out. She suggests that counterfactuals are rhetorical because they are “embedded cognitive scenarios” that represent speakers’ perspectives and counterfactuality. In her view, counterfactuals in fictional narratives are the most suitable for exploring their embedded and rhetorical aspects. Harding views the “contingency” (a former possibility/likelihood) of Ferguson as an important characteristic of counterfactuals. In her view, another crucial element is comparison as a cognitive process for counterfactuals, which helps to convey the evaluation of whether the event happened is better or worse than its alternative.

Harding (2004) associates the emotive component of counterfactuals with an evaluative stance, differentiating positive and negative emotional attitudes towards a counterfactual event. She states that “emotions are a way for us to indicate our evaluative stance toward a scenario”

(Harding, 2004: 68). She explains further that the evaluative judgement of a negative scenario fosters regret. Hence, based on Harding's logic, it seems to work in a circle: emotion prompts an evaluative stance (emotional attitude), which reinforces emotion. Harding (2004) proposes that the emotional appeal of counterfactuals can be used for persuasion purposes, making the audience take a particular attitude towards the event. This feature, in her view, makes counterfactual rhetorical. In *The Rhetoric of Fiction*, Wayne Booth (1969) identified the rhetorical aspect of fiction as consisting of the communication of values and beliefs to readers. Harding (2004: 109) defines "rhetoric" as "a result of the cumulative effect of the implied author, narrator, character viewpoints and the details of the text that make available to the reader these particular perspectives". According to her, such narrative features as a dialogic nature will lead to the aforementioned cumulative effect. Harding (2004) assumes that narrators and implied authors represent their perspectives in the text and provide a negative stance to the alternative through cues suggesting its counterfactual nature. Harding (2004) considers counterfactuals embedded in a literary narrative as characters' thoughts/perspectives that contradict a fictional reality. The counterfactuality, however, sustains a character's perspective. The evaluative stance of a counterfactual statement is shared among the implied author, narrator, and character.

Dannenberg adopts the definition of counterfactuals provided by Roese and Olson (1995) and McMullen, Markman, and Gavanski (1995): "A counterfactual is generated by creating a nonfactual or false antecedent. This is done by mentally mutating or "undoing" a real-world event in the past to produce an outcome or consequent contrary to reality" (Dannenberg, 2008:111). She further elaborates on counterfactuals in the words of McMullen, Markman and Gavanski (1995): "Upward counterfactuals construct a better consequent, improving on circumstances in the factual world, whereas downward counterfactuals construct a worse version of the factual world" (Dannenberg, 2008:119). Upward and downward counterfactuals are referred to as direction counterfactuals. Gilovich and Medvec (1995) outlined satisfaction and regret as two emotions related to the downward and upward counterfactuals respectively. McMullen, Markman and Gavanski (1995) further distinguish self-focus (self as a "counterfactualizing agent" in Dannenberg's words) and external counterfactuals: the former is when the self is a perpetrator and the latter is when the self is a victim. According to Dannenberg (2008), the counterfactualizing agent can be character pondering about counterfactual events of her/his life forming self-focused counterfactuals; but also, can be another character/heterodiegetic narrator forming externally focused one. The former is more subjective and emotional, whereas the latter lacks such properties. However, as

in the case of Jane Austen and George Eliot, the narrator might be emotionally engaged in a counterfactual thought about the character. McMullen, Markman and Gavanski (1995) also distinguish counterfactuals into behaviorial (focused on action) and characteriological (focused on character), although, it was previously mentioned by Janoff-Bulman (1979). In the realm of narrative fiction, Dannenberg calls behaviorial one as story counterfactual and characteriological as character-based counterfactuals. Anyway, these counterfactuals are classified as “intratextual” referring to the possibility of a character to have different alternative paths that is different from “extratextual” focused on the alternative histories of real people (Margolin, 1996). However, it is also possible that readers engage in counterfactualizing themselves regarding the narrative plot, especially when there is a negative outcome (see Gerig 1993). Despite Fauconnier and Turner’s (2003: 133) claim that the causal inference can be absent in counterfactuals such as “if Clinton were the Titanic, the iceberg would sink”, Roesse and Olson (1995) and Danennberg (2008) assert the importance of causal inference conveyed by counterfactuals.

Matt Hills (2003) proposed to distinguish between internal disnarration what have been discussed so far and external disnarration. The latter is termed as counterfictionality referring to the narratives that have intertextual elements by reconstruction, modification, and merging. However, Saint-Gelais (2011) argues against this operationalisation of the term and proposes to limit its definition to the modification of a pre-existing text and refocalization (different perspective). Saint-Gelais (2011: 244) defines counterfiction as “a text that sets out to modify the diegesis of a former fictional narrative”. As an example, he provides Jacques Cellard’s *Emma, oh! Emma!* that changes the destiny of Emma by avoiding her suicide happened in *Madame Bovary*. Two types of counterfiction are discussed by Saint-Gelais (2011): “explicit” when the text explicitly introduces the departure from the original text (metafiction); and “implicit” or silent when the former does not happen. The latter is less common rather than the former because, as Saint-Gelais (2011) points out, make-believe is essential for fiction. Counterfiction can be realized when the author wants to rewrite the character’s destiny or to represent the misperception and the true story is told at the end that falsifies the former representation, e.g., *Fight Club*. Saint-Gelais (2011) argues that such counterfictions are not straightforward counterfactuals because they do not necessarily propose that the consequent happens if antecedent holds. Instead, readers might come up with such conclusions themselves. However, if one wants to discover real counterfactuals, then commentary on literary texts might be useful, in which the authors frame their texts with propositions such as “plausibility would have been less stretched if the author had imagined instead that...” (Saint-Gelais, 2011: 248).

In Saint-Gelais (2011)'s words, they are "bona fide counterfactuals" (means counterfactuals in good faith from Latin), i.e., maintain coherence and plausibility, and their truth value can be discussed. Although Saint-Gelais (2011) acknowledges that the focus of the counterfictions is not on counterfactuality but rather on the "rewritability" of narrative texts.

It should be highlighted that not all fictional narratives are counterfactuals. Some scholars, such as Tobias Klauk (2011), argue also against naming fiction as a "thought experiment". He claims that a thought experiment must encompass three steps: (a) imagining a scenario, (b) judging the scenario regarding a particular question, (c) making use of this judgement. However, fiction often lacks the final step to define it as a thought experiment. He proposes to consider similarities between literary text and philosophical thought experiment rather than treat it as a thought experiment. Moreover, he proposes to distinguish between the usage of counterfactual conditionals and counterfactual scenarios; the latter should not necessarily be the former and vice versa. If the truthfulness of counterfactual conditionals can be later falsified, counterfactual scenarios must remain counterfactual and can be expressed by different constructions. If Klauk's logic is applied, then both counterfactual conditionals and counterfactual scenarios can be entitled as 'thought experiments' because they comply with the aforementioned three steps.

As discussed above, counterfactuals as a literary device and as a rhetorical device specifically have already been given some attention. However, it still lacks two main aspects. First, the distinction of "bona fide" counterfactuals linguistic properties that will be given a necessary consideration in the second part of the dissertation (see Chapter 4, p.159). Second, readers' cognitive engagement with counterfactuals. Harding (2004) proposed that Fauconnier and Turner's conceptual blending (2002) can be applied for explaining cognitive processing of counterfactuals. However, I will argue in the second chapter against this view as it is not well suited for counterfactuals (see Chapter 2, p. 94). Instead, I propose to develop a new model applying possible worlds to conceptualise how reader, character, narrator, and implied author participate in the cognitive elaboration of counterfactuals. To make a parallel between counterfactuals at the micro-level and macro-level, taking a holistic approach, I will further define the genre called counterfactual historical fiction.

1.2.3 Counterfactual historical fiction

Counterfactual historical fiction is also known by such terms as "alternate history", "uchronia" and "parahistory" (cf. Singles, 2013:16) as well as "alternative history" and "allohistory" (cf.

Hellekson, 2000:2). Despite Singles' (2013) and Hellekson's (2000) preference of the term "alternate history", I use the term "counterfactual historical fiction" because as Raghunath (2017) suggests, it indicates that it deals with fiction that contradicts historical facts. According to Hellekson (2001:13), the first counterfactual historical fiction appeared in 1836 by a French writer about a counterfactual victory of Napoleon, i.e., *Napoleon apocryphe* by Louis-Napoleon Geoffroy-Chateau. In French, the word "uchronie", introduced by Charles Renouvier (1857), means alternate history, and therefore similar versions, such as 'uchronia' and 'uchronic' are used in English. Although, the term 'uchronia' as well as 'parahistory' encompass not only counterfactual historical fiction but also utopia (cf. Singles, 2013). Singles (2013) advocates to consider counterfactual historical fiction as a separate subgenre of traditional historical fiction rather than including it under the category of either postmodern historiography (e.g., Spedo, 2009) or historiographic metafiction, which has been previously claimed by Hutcheon (1989) and later by McKnight (1994) as well as Smith (2010). Her main argument is that whilst the two interpret history from different perspectives without settling on the recognised real history, the genre of counterfactual historical fiction is inherently based on the existence of "the normalized narrative of the real past" (Singles, 2013:7). By the normalised narrative of the real past, Singles (2013:47) defines "a consensus resulting from history writing, cultural memory as well as texts furnished by the alternate history itself". In other words, the past should be fixed and knowable. Furthermore, counterfactual historical fiction can be categorised both under science fiction and fantasy (cf. Singles, 2013) but not all of them contain the elements of these genres (e.g., *Fatherland* by Robert Harris, 1992; *The Underground Railroad* by Colson Whitehead, 2016; *Dominion* by Sansom, 2012; *The Plot Against America* by Philip Roth, 2004; *The Great War: American Front* by Harry Turtledove, 1998) and these elements are not essential characteristics of the counterfactual historical fiction.

Alternative realities show how the world in which we live might have been. It is referred to as counterfactual historical fiction because it is counter-to-factual history. As Ryan (2006:657) puts it, such a genre "creates a world whose evolution, following a certain event, diverges from what we regard as actual history". To make historical fiction a counterfactual one, a point of divergence (aka 'nexus' by Hellekson, 2001 and Gallagher, 2011) should be introduced. It is the point in the historical line starting from which the history of the fictional world unfolds in the opposite direction to the history that we know. The development of history in two different directions is regarded as bifurcation, and the historical path of the fictional world can be symbolised by the following sign - Y. This can be illustrated below.

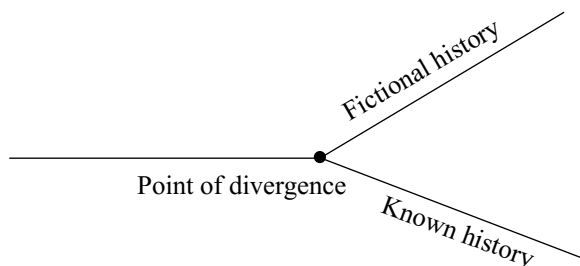


Figure 1.2.3 The illustration of the historical bifurcation

Based on the bifurcation diagram, the history of counterfactual historical fiction follows the same historical outline of the real world up to the point where divergence appears. Singles (2013:81) refers to the point of divergence by stating that “the fictional world of an alternate history diverges at a specified point from the normalized narrative of the real past.” In other words, it is a point in the history of the actual world from where the history of a possible world departs. For example, in *Fatherland* (1992), the point of divergence is Hitler winning WWII as opposed to the reality in which Hitler lost the war. According to Marra (2019:8), in pure uchronies, the divergence from actual history usually occurs relatively close to the present timeline of the story. This proximity is essential to avoid the challenge of constructing a world that does not unravel shortly after its inception and aligns with the outcomes of the counterfactual scenario.

The point of divergence mostly concerns wars, battles, and historical figures. The historical event of WWII is probably the most popular among writers of this genre (e.g., *The Man in the High Castle* by Philip Dick, 1962; *The Plot Against America* by Philip Roth, 2004; *In the Presence of Mine Enemies* by Harry Turtledove, 2003). Based on Henriët (2009:40), 31 per cent of 5000 counterfactual historical fiction analysed is about WWII. However, it is not restricted to a counterfactual victory of the Axis power in the war, and there are other historical events that received attention: what would have happened in Europe if the Roman Empire had survived to the present day (e.g., *Roma Eterna* by Robert Silverberg, 2003), if the Byzantine Empire had not suffered the Islamic invasion (e.g., *Count Belisarius* by Robert Graves, 1938), if the Ottoman Empire had overcome the Austrian obstacle and expanded and established itself in Central and Western Europe (e.g., *The Great Game: On Secret Service in High Asia* by Peter Hopkirk, 1990), if the French Revolution had not broken out (e.g., *For Want of a Nail: If Burgoyne Had Won at Saratoga* by Robert Sobel, 1973), if Napoleon had won at Waterloo (e.g., *The Two Georges* by Harry Turtledove and Richard Dreyfuss, 1995), if the course of the

Great War had been different (e.g., *The Great War: American Front* by Harry Turtledove, 1998), if Operation Valkyrie had succeeded (e.g., *Making History* by Stephen Fry, 1996); in America, if France had won the Seven Years War (e.g., *Lion's Blood* by Steven Barnes, 2002), if England had succeeded in suppressing the American insurgents at the end of the 18th century (e.g., *The Underground Railroad* by Colson Whitehead, 2016), if the Confederates had won the American War of Secession (e.g., *The Guns of the South* by Harry Turtledove, 1992). Furthermore, in Italian literature analysed by Marra (2019), a common counterfactual scenario is a victorious fascism of the WWII. Italian scholars use the term 'fantafascismo' to refer to such type of counterfactual historical fiction, depicting what would have happened if Italy had won WWII. For example, in Mario Farnetti's 2001-2006 trilogy, it is narrated a counterfactual consequence of Italy allying with the US, winning WWII, and celebrating Mussolini's Fascism. The same counterfactual thought experiment is found in the trilogy of Enrico Brizzi 2008-2012. According to Brioni (2015), whereas the former celebrates fascism, the latter mocks fascism. Thus, history in counterfactual historical fictions, as Singles (2013:48) suggested, is "culture- and time-specific construct".

According to Hassig (2001:65), the chosen historical event should be significant so that its alteration makes significant consequences: "If a cause is altered in a counterfactual, then the established effect should change, too, and if it does not, the 'cause' selected was not significant." It follows that history is perceived as a linear progressing sequence of events, the change in one significant event leads necessarily to the change in the other event (i.e., Rankean notion cf. Singles, 2013:57). Singles (2013:81) suggests that the point of divergence is mostly stable without the option of changing this divergence back to the original history: "this divergence is most typically permanent, i.e., there is no point of convergence." Beginning with the point in history that had been changed for creating counterfactual historical fiction, the cause of events follows in a different direction that, in fact, did not happen in the real past. Thus, the change is meaningful because it entails counterfactual consequences. In other words, whereas the point of divergence is based on the idea of contingency that events in history are not predetermined but are instead shaped by a combination of factors, choices, and chance occurrences, the rest of the narrative following the point of divergence is based on the idea of necessity that certain events in history are inevitable or unavoidable due to underlying factors, circumstances, or forces (cf. Singles, 2013:133).

Counterfactual historical fiction is a paradox of free will and determinism. Free will refers to the ability of individuals to make choices that are not determined by prior causes, implying autonomy and moral responsibility (Dennett, 2015). Determinism, on the other hand,

posits that all events, including human actions, are determined by preceding events in accordance with natural laws (Dennett, 2015). The debate between these concepts explores whether human actions are genuinely autonomous or if they are predestined. In the context of counterfactual historical fiction, the paradox of free will and determinism is explored through alternate historical outcomes based on different choices or events. This genre inherently questions determinism by presenting “what if” scenarios where key historical decisions or occurrences are changed, suggesting that individual actions can alter the course of history. It simultaneously acknowledges determinism by implying that these alternate realities are plausible within certain conditions, thus providing a nuanced examination of how free will and determinism can coexist and influence the unfolding of historical events. Free will and determinism can coexist through the concept of compatibilism, which asserts that even if all events are determined by preceding causes, individuals can still act freely if their actions align with their desires and intentions. In counterfactual historical fiction, this is illustrated by showing that while certain historical conditions and contexts set the stage (determinism), the choices made by individuals within those contexts (free will) can lead to different historical outcomes. Thus, compatibilism reconciles the two by suggesting that freedom lies in the capacity to act according to one’s motivations, even if those motivations are themselves shaped by prior events (Ferguson, 2008).

Duncan (2003:217) believes that while writing counterfactual historical fiction, the authors should make sure that readers can see a clear difference between the time of alternate history and the real past. That is why this type of genre deals with the prominent historical events that the majority of readers know. Although, it relies on the concept of the model reader that should know the history relevant to a specific piece of art, it is worthwhile to consider different readers that might have different levels of historical knowledge, as Raghunath (2017) proposed. She divides the readers into full knowledge, partial knowledge and zero knowledge. Based on the different levels of knowledge, readers might process the text differently. For example, if readers with full knowledge understand all the points of divergence, readers with partial knowledge comprehend only some, whereas readers with zero knowledge cannot make sense of the text. Despite the division seems to suggest a clear distinction between different types of readers, it is hard to operationalise to see a clear-cut difference between full and partial historical knowledge because probably only historians have full knowledge of history with all the details. Regarding non-historians, what level of knowledge is considered full remains unclear, and more so partial historical knowledge. It seems that the division should be more gradual rather than categorical. For example, if one knows significant events such as the years

of the wars but does not know about the destiny of historical figures, it is different from the one who knows both but does not know about specific operations during wars. If the categorical division is applied, then both readers are categorized as having partial knowledge, but it does not account for the difference within this category. The last category of zero knowledge does not seem to be the case at all because a reader who can read and probably has read before as well before grabbing a book on counterfactual historical fiction is assumed to be educated about history (even poorly) along with how to read, and therefore (s)he might have at least a minimal historical knowledge. Anyway, counterfactual historical fiction is most often written in a way that the main point of divergence is obvious enough for readers with full and partial knowledge focusing on well-known historical events. In addition, authors usually provide a brief clarification in the author's notes about the historical facts (e.g., *Fatherland* by Robert Harris, 1992; *The Plot Against America* by Philip Roth, 2004; *The Years of Rice and Salt* by Kim Stanley Robinson, 2002; *Jonathan Strange & Mr Norrell* by Susanna Clarke, 2004).

Regarding the relationship between our history and the history of counterfactual historical fiction, Singles (2013:72) proposes that it is “dialogic”, and the focus is on differences rather than similarities. Dannenberg (2008:62) also implies a dialogic nature of the text when he describes the genre “as a multiple-world text”. Here one world refers to the world where the real past is actualised and the other world of fiction with a different history. Both suggest that while reading counterfactual historical fiction, it is paramount to recall the knowledge of history. The same string of thought can be traced in Raghunath (2017). However, whereas Dannenberg (2012) highlights similarities between two histories applying Fauconnier and Turner's (1998) theory of conceptual integration, Raghunath (2017) focuses on differences in applying possible world framework. Alkon (1987) notes that readers should be attentive to the places of departure from the real past, thus highlighting the demand from readers' part. Singles (2013) believes that the cues make readers think about the differences between two contradicting histories and eventually agree with the persistent strain between the two that leads to defamiliarisation (see p. 158). I mostly agree with Singles' (2013) way of thinking regarding counterfactual historical fiction but disagree with her on one point. Unlike Dannenberg (2008), she sees the disnarrated as unrelated to counterfactual historical fiction by the argument that the former is hypothetical, and the latter is actual in the narrative. By doing so, she is omitting the counterfactual nature of the disnarrated and evaluating both from the fictional world as a point of reference. However, counterfactual historical fiction should be evaluated from our world as a point of reference. Likewise, the disnarrated contradicts the fictional world, the counterfactual historical fiction contradicts our world. Hence, both contradict the world be it

fictional or real. This can be best illustrated with the application of the possible world theory that permits multiple worlds.

1.3 The Possible Worlds Theory

So the sense of possibility could be defined outright as the ability to conceive of everything there might be just as well, and to attach no more importance to what is than to what is not.

Robert Musil, *The Man Without Qualities*

In the chapter “If there is a sense of reality” of *The Man Without Qualities* quoted above, Robert Musil (1930:1) writes that there is a sense of possibility that is a capability to understand that there are different possibilities available for us when we do not consider the reality more important than the possibility. Acknowledging possibility beautifully leads to consideration of possible worlds.

Before going into details of possible world theory, I would like to clarify the distinction between different terms that are interchangeably used. In literature, fictional worlds and possible worlds are somewhat intertwined and not disentangled. The purpose of this section is to disentangle the two concepts. Also, I will discuss text worlds. Dolezel identifies a fictional world as “a possible world constructed by a fictional text or other performative semiotic medium” (Dolezel 1998: 280, Kotatko, 2010). As Dolezel (1988) clarifies, the concept of a possible world was first introduced by Kripke (1963) to interpret the modal structure of modal logic. Later, Leibnizian interpretation of possible-world semantics was revealed, which led to the reformulation of the logic assuming that the actual world in which we live is surrounded by an indefinite set of possible worlds. According to Dolezel (1988), literary scholars used the concept of possible worlds to reform the theory of fictionality. Thanks to it, “fictional entities are treated as constituents of an “emergent” macrostructure, the fictional world” (Dolezel, 1998: 787). However, the fictional world of literature is not treated as an equivalent of a possible world of logic because “fictional worlds of literature are a specific kind of possible worlds” (Dolezel, 1998: 787). He further continues defining fictional worlds in terms of “artifacts produced by textual poesis and preserved and circulating in the medium of fictional texts” (Dolezel, 1998: 787). According to him, it encompasses different types of creative

composites such as “mythology and storytelling, painting and sculpting, dance and opera, theatre, cinema and television”. (Dolezel, 1998: 787) Thus, fictional worlds are necessarily possible worlds but not all possible worlds are necessarily fictional worlds.

1.3.1 Fictional Worlds verse Possible Worlds verse Text Worlds

The theory of possible worlds helped to give the sovereignty to fictional worlds; now, they are independent worlds with their own people, states and events that preserve ontological homogeneity, i.e., Dicken’s London is fictional no less than Carroll’s *Wonderland*. It also helped to address the problem of referentiality: “the name “Hamlet” refers to an individual of a fictional world” (Dolezel, 1998: 788). Dolezel (1998) states that the possible worlds semantics of fictionality contradicts with the view that assumes mimesis, i.e., imitation of actual world. In Dolezel’s terms, the fictional world is the product of “textual poiesis”, an act of writing; whereas possible worlds are products of “human productive activities”. Possible can be turned into fictional by authentication, i.e., performative with a particular illocutionary property. Textual poiesis, in other words, relies on Austin’s concept of performative speech acts, which are utterances that accomplish an action simply by being spoken. This means that the creation of text (poiesis) can be seen as an act that performs and brings about certain realities or states of affairs through the very process of writing. First, fictional text is created and only then authenticates the fictional world. In Dolezel’s view, the fictional texts are void of truth value. “A genuine fictional world is one that the creator fully understands is not real”, but readers adopt make-believe (Weisberg, 2016: 463).

From a linguistic perspective to literature, fictional worlds are “mental constructs created by readers when engaging with a text” (Neurohr and Stewart-Shaw, 2019:2). According to the Text World Theory (Werth 1999; Gavins 2007) that was inspired by world-building abilities of the text postulates that text creates worlds containing enactors, time, space, function and changes in time and space maps the world to another world, i.e., world-switch. Also, modal propositions such as characters’ desires and wishes can create another world that is accessed by world-switching. These modal-worlds can be epistemic (knowledge and beliefs), boulamaic (wishes and desires), deontic (obligation) (Neurohr and Stewart-Shaw, 2019). According to Gavins (2007), these modal worlds are ontologically different from the original text-world because of readers’ conceptualisation of both modal proposition and how the speaker views it. I would also consider counterfactual thoughts expressed by speakers of the narrative as a modal-world because it fulfils the requirement of the modal-world being ontologically distinct

and originates from the initial text-world where the modal proposition was uttered. The linguists who take the Text World Theory to analyse fictional worlds, see the language from embodied experience taking cognitive linguistic approach. It suggests that we perceive language through conceptual metaphors such as “life is a journey” when we ascribe meaning to the word “life” through our experience of the journey. In the same vein, when we tap into the fictional world, we perceive it through our own set of experiences. The experiential nature of narrativity is defined by Fludernik (1996:12) as “the quasi-mimetic evocation of ‘real-life experience’”. Gerrig (1993) couples transportation with experience, suggesting that mental transportation to the fictional world is the same as experiencing the fictional worlds directly. I agree with Gavins (2007) that all the conceptualisation of fictional texts that created different frameworks such as possible worlds (Ryan 1991), conceptual frames (Emmott, 1997), story worlds (Hermann 2002), text-worlds (Werth 1999, Gavins 2007) have the same aspiration of creating the accurate representation of ontological and cognitive complexity of communication between the reader and the text.

The difference between a fictional world and a text world is that the former is restricted to fiction, whereas the latter is more general, i.e., any text has worlds. Furthermore, the text world is more granular; a single text may constitute many atomic worlds, each world including enactors, time, space, function and switch between these worlds. For example, one page of text can encompass ten worlds, each time the worlds switch from one to another. In contrast, all the characters and events build one fictional world per fiction, e.g., the fictional world of *Harry Potter*. Thus, whereas linguists consider worlds with respect to the text *per se*, literary scholars consider worlds in terms of one unified narrative. Despite the Text World Theory (Gavins, 2007) being a useful tool in consideration of fictional texts, it is still comparatively young and needs further development in terms of modal worlds to address counterfactuals. Therefore, I will apply possible worlds theory that is apt for the issue of counterfactuals, thus taking a more literary perspective.

1.3.2 A review of the Possible Worlds Theory

The possible worlds theory was introduced by philosopher Leibniz who proposed that there is a multitude of different possible worlds that exist. He explains that God chose the best possible world for us to live in from all other possible worlds. Leibniz’s proposal of possible worlds is deemed useful for tackling the question of modality, such as necessity and possibility. Analytical philosophers used possible worlds to conceptualise the difference between the two.

If the proposition holds in all the possible worlds – it is necessary; if the proposition is true in at least one world – it is possible. However, for a possible world to be possible, it should obey the rules of logic, such as non-contradiction and the excluded middle, as introduced by Leibniz. This means that a possible world cannot be true and, at the same time, false (non-contradiction) and in between (excluded middle). Non-contradiction means, for example, that both Trump being a president and not being a president in the same world are not allowed. Excluded middle denotes, for example, that Trump being president is either true or false and there is no other option, such as being partially true or partially false. Lewis used it to check the truthfulness of counterfactual conditionals: if the antecedent is true in the nearest possible world where also the consequent is true, then the counterfactual is true. For example, the following counterfactual “if Trump had been the US president instead of Biden, America would not have supported Ukraine in the war against Russia” is true if in the possible world where Trump is president, America does not support Ukraine.

In line with Kripke (1980), the possibility can be considered as accessibility; that is, a possible world takes place provided it is accessible with respect to the central world of the system. For a possible world to be possible, it should be accessible from the reference world. In other words, everything possible in one world (w_1) provided it is obtained in minimum one world (w) that is accessible to w_1 (Ronen, 1994). The following model represents the accessibility of a possible world based on Kripke:

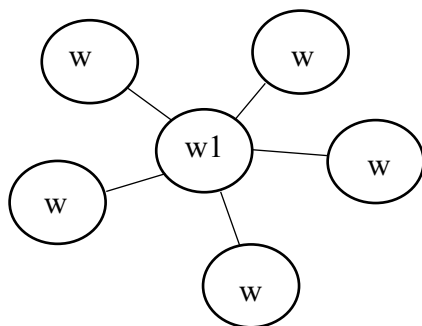


Figure 1.3.2 The visualisation of Kripke’s accessibility of a possible world

Notwithstanding the usefulness of possible worlds in modal logic, the question of actuality (reality)/ontology (existence) of these possible words became a debatable topic in philosophical discussions. Three views have been developed that see the actuality differently: modal realism, moderate realism, and ant-realism (Ronen, 1994).

According to the modal realism view (Lewis, 1973), all the possible worlds can be actual using indexical shifts. According to Lewis, the possible world is actual when we shift from *I*

and *here* to *(s)he* and *there*. In his view, all the possible worlds are realised on some planet of the universe. Thus, all the possible worlds are physically existing entities that share the same ontological status. The view has been extensively criticised and regarded as “extravagant” by Ronen (1994).

The second account is that there is no actual world, and all the worlds are possible including the world we inhabit because it is relative. Goodman (1978) believes that everyone has only some representation of the actual world in mind, but there is no objectively existing world. All the worlds, in his view, are subjective representations and, therefore, abstract mental constructs. Thus, all the worlds share the same ontological status. The view has been criticised by Kripke as she claims that the very essence of the possible world assumes the existence of the actual world because it is possible compared to the actual.

Based on moderate realism (Rescher, 1973), there is only one actual world that physically exists: the world that we inhabit. All the possible worlds are just abstract mental representations produced by the inhabitants of the actual world. The possible worlds can be hopes, dreams, and wishes. Thus, the actual world and set of possible worlds have different ontological statuses. The view has been developed by analytical philosophers such as Kripke and found to be the most rational view on the actuality and ontological status of worlds.

The first application of possible worlds to fiction was proposed among philosophers by Lewis (1978) who extended his truthfulness account designed for counterfactual conditionals to fiction. In his view, the proposition about fiction is true if the world in which fiction is told as a known fact and the proposition that is true is the most similar to the actual world. In other words, for a statement about fiction to be true, it should match the norms of the actual world. For example, we can accept Dorota from *Middlemarch* by Eliot as a ‘caring sister’ (even if it was not explicitly stated in the text) only if the fictional world of *Middlemarch* is similar to our world where we regard similar behaviour that Dorota showed as ‘caring’. Margolin (1990) puts it in the following way:

Rules of inference, especially of the mentalistic or psychological kind, can be borrowed from any actual world model of readers only if the text world coincides with it in its broader outline or is at least compatible with it.

Narrative worlds, Margolin, 1990, p.853

The possible worlds account in literary theory is used more broadly rather than in philosophical logic. If the latter is concerned with modality such as what is probable, necessary, and true, the

former, according to Ryan (1992), uses the framework to address the questions of fictionality (e.g., Pavel, 1975; Dolezel, 1976; Ryan, 1991), genre typology (e.g., Maitre, 1983; Triall, 1991), narrative semantics (Margolin, 1990; Eco, 1979) and postmodern poetics (e.g., McHale, 2003). Bell (2006), however, notes that the fourth type of application is misleading as readers' possible worlds that are primarily in the narrative semantics might be equally categorised under postmodern fiction. The note is important to consider as I will be dealing with the possible worlds of narrative semantics, that is, possible worlds of characters and readers, which can be applied to both postmodern and non-postmodern fiction. Before discussing the possible worlds of narrative semantics, let us delve into the general framework for possible worlds accepted in literature.

Pavel (1975), from literary scholars, first suggested the potential of possible world application to literature. He argues against Lewis' (1978) validation of textual propositions in relation to the actual world (as in the case of regular philosophical possible worlds). In contrast, Pavel (1975) proposes to validate the textual propositions only with respect to the fictional world because one adopts a new 'ontological perspective' while reading fiction, and therefore, fictional worlds have autonomous status. Dolezel (1998: 16) thinks in a similar vein when he acknowledges that fictional worlds are "a special kind of possible worlds", justified by such features as textual form and incompleteness as well as independence (Ronen, 1994) that philosophical possible worlds lack. Ronen (1994: 9) further shows the difference between the two by stating that whereas a possible world of logic deals with "what could have or could not have occurred in actuality", the fictional world talks about "what did occur and what could have occurred in fiction". This explanation by Ronen (1994) equates the fictional world to the philosophical actual world and its alternatives to the possible worlds of logic. Thus, the fictional world is not one of the possible worlds that surround the actual world but rather an independent point of reference that has its own actual world surrounded by the set of possible worlds.

Ryan (1991) proposes the textual universe of fiction by using possible worlds, and it is the most thorough consideration of the account in a literary context when it comes to the development of useful vocabulary and relation between the fictional world and the actual world. She suggests three modal systems such as (i) actual universe, (ii) textual universe, and (iii) textual referential universe. Whilst (i) refers to our universe where human beings live, (ii) and (iii) refer to the textual universe. Whereas the distinction between (i) and the other two is clear, the difference between (ii) and (iii) is not that straightforward. According to Ryan (1991), the textual referential universe is the prototype of the textual universe where all fictional events

take place and are projected into the textual universe. Thus, only the author has full access to the textual reference universe, whereas readers can access what is presented in the textual universe. Textual reference world might be interpreted by Dolezel as extensional, where all the objects exist, whilst the textual actual world as intensional which is referred by the text to these objects. Bell (2010) disregards the textual referential universe noting that it is identical to the textual universe. However, Charles (1995) suggests that the textual referential universe is what is imagined by a reader to complete the textual universe, and Cover (2014) limits the definition to what is inferred from the text. This discrepancy in the connotation of the textual reference universe draws attention to the gaps in Ryan's model that I will address in the revised model.

Each of the universe is composed of the actual world at the centre and a multitude of possible worlds. The actual world of the textual universe is known as the textual actual world, and its possible worlds as textual alternative possible worlds. In a similar vein, the actual world of the reference universe is termed a textual reference world, being "the centre of a system of reality comprising alternate possible worlds" (Ryan, 1991: 7). Textual alternative possible worlds constitute wishes, dreams, and imagination of characters that live in the textual actual world. Thus, the textual actual world is similar to our actual world in its composition. However, in the case of unreliable narrators, there might be a gap between the narratorial actual world and the textual actual world. By narratorial actual world, Ryan (1991) means what is presented by a narrator, which is a subjective view of the textual actual world.

Ryan (1991) also introduced authentic worlds, pretended worlds and F-universes. Authentic worlds are those that are sincere, whereas pretended are those that are made up to deceive. F-universe is a fantasy universe that is composed of characters' hallucinations, dreams, and fictional stories. Fantasy is the universe rather than world because it has its own actual world with inhabitants and events. Each of the authentic worlds, pretended worlds, and F-universes includes belief/knowledge worlds, obligation worlds, and wish worlds. Knowledge worlds represent what characters believe to be true; thus, characters' K-world (knowledge world). The obligation world represents what is allowed, obligatory, and prohibited. Wish worlds encompass characters' wishes and desires.

For a fictional world as a special kind of possible world to be accessible (possible) from the actual world, the relationship between the actual world and textual actual world must comply with the accessibility relations. Ryan (1991) proposed the following categories of accessibility relations to differentiate genres: the same properties of objects (identity of properties); objects (identity of inventory); members (compatibility of inventory); chronology (chronological compatibility); natural laws (physical compatibility); species with the same

properties (taxonomic compatibility); laws of logic (logical compatibility); analytical truth (analytical compatibility); language (linguistic compatibility). If a textual actual world has the same categories as the actual world, it is accessible for a reader from the actual world and, therefore, possible.

According to Ryan (1991), Rescher's moderate realism and Lewis' modal realism are somewhat complementary when it comes to the analysis of fiction. She claims that while moderate realism suggests objective knowledge about fictional worlds, the indexical shift of modal realism helps to locate readers into the fictional world. Ryan's position that considers both views helps to justify her division into actual and textual universes. It shows that whilst the actual universe is a physically existing entity, the textual universe is a mental construct that is an ontological position of moderate realism. At the same time, she states that we can shift from our actual world to the textual actual world using Lewis' indexical theory. However, what Ryan (1991) means, I suppose, is not a physical shift from one to another universe but a mental situation. It has been termed a "deictic shift" by cognitive linguists, and Filmore has extensively worked on deixis (e.g., 1975, 1982, 1997). Deixis can be spatial, temporal, and individual. Duchan, Bruder, and Hewitt (1995) explained the shift to the story world as a deictic shift. As a result, a reader's deictic centre is changed. Reading a story entails all three types of deictic shift because a reader recenters spatially and temporally to the context provided in the story and shifts his/her perspective to the perspective of the narrator. However, it seems perspective-taking does not always happen because the reader can make sense of the story world without necessarily adopting a narrator's or character's perspective. Thus, the story is experienced from the deictic centre, where a reader is put mentally. The deictic shift is interpreted as "our ability to shift our cognitive stance across deictic coordinates, such as those of other speakers in conversation or into a fictional world" (Gibbons and Whiteley, 2018: 164). According to Ryan, this is an advantageous position because it does not go to the extravagance of accepting fictional worlds as physically existing entities but also acknowledges a fictional world as a special kind of possible world that has its own universe. However, I will argue in the section on the ontological stance that such an approach blurs the ontological boundaries. Ryan (1991) treats the ontological position of a fictional world from a moderate realism perspective, acknowledging only one actual world, and which world is actual depends on Lewis' indexical theory. According to the latter, actuality can shift based on where we locate ourselves: from the actual universe, a fictional world is non-actualised but from the textual universe, a fictional world is actual. Ryan (1991: 21) calls it a "fictional recentring". She further states that when readers recentre themselves into fiction, or in Ryan's words, "once we become immersed in

fiction”, “the characters become real”, as well as “the world they live in momentarily takes the place of the actual world” (Ryan, 1991: 21). Here, I suppose, Ryan (1991) means not replacing the actual world with textual actual world in a physical sense, but rather becoming inattentive/forgetting the actual world while reading, which means mentally being in the textual actual world. In other words, a reader is immersed/absorbed/transported to the textual actual world. However, in her later work, Ryan (2010: 5) contradicts it by saying “while recentring is a logical operation which we deliberately perform whenever we read (or watch) a work of fiction, immersion is an experience created by artistic devices”. Thus, fictional recentring does not necessarily entail immersion and occurs each time when we read.

Furthermore, according to Ryan (1991), characters experience fictional recentring when they create alternative possible worlds within their universe in the form of dreams, wishes, fears, and hopes. When they do, readers shift to those alternatives from the textual actual world. This is an important point because I will be considering the textual alternative possible worlds. According to Ryan (1992), it is essential to include characters’ virtual events because, as Bremond and Todorov also mentioned, these events that have never been actualized propel characters’ actions. These virtual events are categorised into different modalities, such as obligatory, conditional, optative, and predictive, according to Todorov (1969). Dolezel (1976) developed systems of modalities such as alethic (necessary, possible, impossible), deontic (mandatory, prohibited, permitted), axiological (good, indifferent, bad) and epistemic (composing of knowledge, belief, and ignorance). He further distinguished different kinds of plots based on systems such as violation of laws resulting in punishment (deontic), search for what is desired (axiological), mysteries (epistemic), and varied laws of physics (alethic), as mentioned by Ryan (1992). Ryan (1992:545) stresses the importance of virtual events when she states that “the background of unrealized possibilities presents not only a cognitive importance but also an aesthetic value”. According to her, “a virtual embedded narrative may be an unrealized plan, a broken promise” among others (Ryan, 1992:545). This technique, in her view, makes narrative appealing, creating conflict and a variety of virtual domains.

Another important concept that Ryan (1991) suggests is known as the principle of minimal departure. The principle of minimal departure postulates that readers represent a textual universe as closely as possible to the actual world of the actual universe and make alterations that are explicitly stated in the text (Ryan, 1991:51): “We will project upon these worlds everything we know about reality, and we will make only the adjustments dictated by the text”. For example, when it is written that *a shark talked to a dolphin*, we represent shark and dolphin with all the properties that we know from the actual universe but alter the fact that they can talk

in the textual universe. The principle helps to address the issue of the incompleteness of fictional worlds, as it is impossible to write everything in such detail.

The possible world of philosophical concern and literary concern do not adhere to the same principles. Whereas for a possible world of modal logic, it is necessary to maintain the principle of non-contradiction and exclude the middle (discussed earlier), the possible world of a literary domain dismisses these principles. In a textual universe, for example, two contradicting events might be represented as actually developing in parallel, as in *Sliding Doors*. Pavel (1986) proposed to relax the principles of philosophical possible worlds to account for fiction and Eco (1989) proposed to dismiss those principles altogether. In contrast, Dolezel (1989) proposes to adhere to the logical laws of philosophical possible worlds, thus dismissing those fictional worlds that do not authenticate one actual world. However, Ronen (1994) and Bell (2010) argue against this view by suggesting that fictional worlds make sense without logical consistency. Ronen (1994) proposes to regard indeterminacies such as p and not p in terms of their separate ontic sphere, that is, two different subworlds. In other words, there is one textual actual world that is logically coherent and other subworlds that might contradict it. Bell (2010) argues against Ronen's (1994) proposal because accepting many subworlds would end up in forgetting what is actual. In contrast, she suggests what Pavel (1986) proposed, which is to accept the violation of the law of the excluded middle. According to Bell (2010), accepting two contradicting propositions in the same actual world makes readers unable to choose from two alternatives and try to work out which one is true, thus ultimately resembling readers' actual world experience. According to Ryan (1992: 534), "fiction should be defined in phenomenological terms: what is the act of producing or receiving fiction, what are the rules of the 'fictional game'?" rather than in a strictly logical sense.

As can be observed, possible worlds of philosophy and possible words of literature are not the same and have points of departure when it comes to the basic principles. However, it does not mean that one cannot use the possible world framework in the literary domain because of the departure from original proposals in philosophical discussions. Possible worlds framework in literary theory serves its purpose by helping to authenticate the worlds of fiction in the realm of textual universe. It makes a fictional world autonomous by creating its own universe and ontologically distinct from the actual universe.

Thus, the review of possible worlds theory provided in this section gives a holistic understanding of the account and shows the prospect that possible worlds framework might be useful in addressing cognitive engagement with fiction while reading. Before applying the possible worlds to counterfactuals, I would like to revise Ryan's (1991) model of possible

worlds to refine it for the purpose of the dissertation because, in its current form, it lacks the necessary vocabulary, clarification of ontological stance and explanation of fictional recentring as well as the principle of minimal departure. I argue that a cognitive approach is needed to shed light on the important concepts in the framework of possible worlds theory. Since the creation of a possible world as well as reading fiction is a mental activity, their interpretation ought to be explained from the cognitive perspective. I will explain fictional recentring and the principle of minimal departure, applying concepts from cognitive science such as schemas. Before that, in the following section, I will enhance the vocabulary by adding readers' possible worlds and the author's knowledge worlds.

1.3.3 A revised model of Ryan's possible worlds: Reader's possible worlds and Author's K-world

Ryan's (1991) model of possible worlds allows to separate the textual universe into actual and possible worlds and establish the link between these worlds. Her fictional recentring and the principle of minimal departure are effective concepts that show how readers engage cognitively with fictional texts. However, it has some limitations. It does not reflect readers' possible worlds that might be constructed because of their hopes and wishes for characters. To fill this gap, I will consider Eco's ([1979]1984) possible subworlds. According to him, fabula (a story skeleton) consists of three types of possible worlds: (i) narrator's imagination and assertion W_N which comprises an unlimited number of textual states W_{NS_i} ; (ii) characters' imagination, believes and wishes W_{Nc} ; (iii) Model Reader's imagination, believes and wishes W_R . As a Model Reader, Eco (1984) refers to the reader for whom the text is intended. For example, an academic article sees a Model Reader as an educated person who also knows the necessary terminology in the field. In our case, a Model Reader of fiction is not limited to any requirements but rather can be any person *per se*. As we see, Eco ([1979]1984) suggests that the creation of possible worlds is not exclusively reserved for a narrator/narrators and characters but also readers participate in this activity. According to him, the text defines its reader as well as the reader of the text. Therefore, I extend Ryan's terminology to RP-worlds, that is, a reader's possible worlds. Eco suggests that there might be different types of readers, such as dramatic, naive, and critical. Notwithstanding the impossibility of considering different kinds of readers, it must still be acknowledged that readers are from the actual universe, and they perceive the text from their subjective lenses of the actual-world experience. Ryan (2001) acknowledges the existence of multiple actual worlds, which are subjective representations of

the actual world. However, she does not explain what role it plays in the perception of fiction. For example, when one reads *John murdered Jane*, he or she evaluates it as “bad” because of moral convictions established in the actual world. And if it is written *John murdered Jane to save his child*; one might think that it is enough to justify sin for the purpose of good and therefore accept it as “not that bad”, whereas another may think that it is “still bad” because murdering cannot be justified. The difference might be subtle in this example, but there are other topics which might be interpreted as “bad” by one and “good” by the other (e.g., the legalisation of guns and drugs). Anyway, the purpose of the example is not to convince one that evaluation might be different depending on the reader but to acknowledge the fact that readers’ actual universe plays a role in the evaluation process. This is crucial as evaluation is an important component in the interpretation of counterfactuals in fiction.

Furthermore, Ryan (1991) defines K-world as what a character believes to be true in the textual actual world. Character in the possible worlds framework is regarded as an individual “with inner states, knowledge and belief sets, memories, attitudes and intentions” (Margolin, p.455). Characters might evaluate the situation in the textual actual world differently based on their own perspectives formed as a result of interaction with the textual actual world. Ryan (2006: 649) interchangeably uses the concepts “image of the actual world” and “the epistemic world of character” to refer to the K-world. Besides K-world, the “private worlds of characters” (Ryan, 1992:543) include W-worlds (wish), O-worlds (obligation), GP-worlds (goals and plans), and F-worlds (fantasy). Ryan regards the epistemic world as the representation of the actual world. Whilst she mostly interprets K-worlds in terms of characters, she does acknowledge the epistemic world of readers by the K-world of AW (actual world) in Ryan (1991). She also highlights the representation of the actual world by a reader in her later works (e.g., Ryan, 2001). Raghunath (2017) proposed to differentiate characters’ and readers’ K-worlds by using appropriate abbreviations such as CK-worlds and RK-worlds. According to Raghunath (2007:36), RK-world denotes “specific knowledge worlds that include a reader’s subjective representation of the actual world”. By “ontological superimposition”, Raghunath (2017) proposes that superimposition of the textual actual world over the actual world takes place for a moment of reading. According to her, readers’ knowledge of actual world history is evoked, and then textual actual world history is layered over it, but nevertheless, both are active while reading. By “reciprocal feedback”, Raghunath (2007) suggests that these two representations are constantly compared to make sense of both, and she elaborates on RK-worlds considering historical knowledge. However, besides historical knowledge, a reader’s subjective representation of the actual world also includes general knowledge and prior

experiences. I refer to them as schemas in Bartlett's term. Ryan later refers to CK-worlds when she writes, "belief worlds are representations of" the textual universe "and they mimic its structure" (Ryan, 1992: 543) and then writes "model world" of character (Ryan, 1992:543). It seems that Ryan refers to the model of the textual universe when she writes about modelling and mimicking the textual universe. She uses the textual universe rather than the textual actual world because characters can guess what other characters have in their mind, but this process can take place only if a character shifts from his/her CK-world to another character's CK-world. Once another CK-world is accessed by perspective taking, a character might form textual possible worlds regarding this character's wishes, hopes, obligations, and intentions. Although Ryan does not explicitly write about the author's K-world, I propose to extend the vocabulary to AK-worlds, the representation of the actual world by an author. It is important to include the notion of AK-worlds because it is a necessary addition for interpreting Ryan's recentable possible worlds, making the notion of TRW (textual reference world) meaningful, which will be shown in the following section.

Below, I am operationalising the key vocabulary borrowed from Ryan (1991) extended to RK-worlds by Raghunath (2017) with my addition of AK-worlds and Eco's RP-worlds (**in bold**).

Actual universe – the system that includes actual and possible worlds.

Actual world – physically existing world and the centre of the actual universe. It is the world where we live and where our judgements are formed.

Reader's K-world (RK-worlds) – the representation of the actual world in a reader's mind.

Possible worlds (PW) – mental constructs such as dreams, wishes, hopes, and fears imagined by people in the actual world.

Textual universe – the system that comprises the textual actual world and textual possible worlds.

Textual actual world (TAW) – the actual world of the fictional text and the centre of the textual universe. It is the world where the characters live.

Character's K-world (CK-worlds) – the representation of the textual actual world by a character.

Narratorial actual world (NAW) – what a narrator presents as the fact of TRW.

Textual alternative possible worlds (TAPW) – mental constructs such as dreams, wishes, hopes, and fears imagined by characters/narrator(s) of the textual actual world.

Reader's possible worlds (RP-worlds) - mental constructs emerging during reading, such as wishes, hopes, and fears imagined by a modal reader of the actual world.

Referential universe – the system that includes the textual reference world.

Textual reference world (TRW) – the prototype of the textual actual world where all information about the textual actual world is stored.

Author's K-world (AK-world) – the representation of the actual world in an author's mind.

By adding RP-worlds and AK-world to the vocabulary of possible worlds account, it can be more comprehensively understood how text maps to possible worlds and how a reader engages with the text. In the following section, I will use the above-mentioned vocabulary to give a holistic view of the relationship between author, reader and text, capturing the nuances of the fiction reading process.

1.3.4 Identifying the ontological stance and a revised model of Ryan's recenterable possible worlds

To apply the model of possible worlds and relevant concepts such as fictional recentring and the principle of minimal departure, one should deal with Ryan's ontological ambiguity. She does not take a clear side but fuses two opposing positions such as modal realism and moderate realism. Ryan does acknowledge in her writings that a fictional world is an imaginary world created in the mind of the reader, but her overreliance on Lewis' philosophical framework is based on the idea that all possible worlds are metaphysically existing entities (modal realism) makes her ontological position obscure or extravagant.

Rescher's position may account for what we know objectively about fictional worlds, but the indexical theory of David Lewis offers a much more accurate explanation of the way we relate to these worlds. Once we become immersed in a

fiction, the characters become real for us, and the world they live in momentarily takes the place of the actual world.

Ryan, 1991: 2

Moreover, she states that it is not necessary to take a stance because it does not affect the interpretation of fiction reading: “The narratological application of PW theory... is largely indifferent to the question of modal realism” (Ryan, 2006: 652). However, I argue that it does matter because if we adopt the ontological plurality and that all the possible worlds are real and exist in some universe, including a fictional world, then Ryan’s principle of minimal departure does not work. This is because, in these coexisting realities, the situation might be drastically different from ours. For example, horses might have eight legs instead of four, and if one reads a horse with wings (s), he represents a horse with four legs and wings based on the principle of minimal departure, but this representation is false in the coexisting universe because their horses have eight legs. As it is impossible to describe the actual state of affairs in the co-existing universe, a reader cannot conceive what is true in the fictional world, being always in the state of indeterminism. It follows that the representation of TAW is incomplete, and readers cannot use their representation of AW to complete it. Thus, accepting Lewis’ modal realism leads to the acceptance of incompleteness of readers’ representation of TAW and disqualifies Ryan’s principle of minimal departure. I do not deny the multiple ontology that is beyond my expertise, maybe there are such coexisting realities as Ryan (2006) advocated ontological plurality, but for the purpose of literary theory, one should adopt the moderate realism approach, according to which there is only one objective reality where we live, and all other possible worlds are mental constructs including a fictional world. Bell and Ryan (2019) highlight the philosophical framework of Lewis as beneficial for literary theory. It might be well justified because the root of Ryan’s fictional recentring comes from Lewis’ indexical shift. But fictional recentring functions without reliance on Lewis’ philosophical view. In the confines of moderate realism, a speaker can shift from his perspective to another speaker’s perspective or shift temporally and spatially in mind to conceive another possible world. This is known as a deictic shift in cognitive linguistics (e.g., Fillmore, 1975; 1982; 1997). Fictional recentring can be regarded as a deictic shift from AW to TAW in terms of recentring RK-worlds to TAW. Whilst recentring to the TAW is a unique procedure because we adopt a new model of state of affairs which centre is not AW as of usual philosophical possible worlds, the deictic shift can still be exemplified within a moderate realism approach as perspective taking, that is, when one

speaker takes a perspective of the other. In other words, when there is a deictic shift from one RK-world to another RK-world. For example, *I* adopt RK-world of *him* while indulging in a counterfactual thought that *if I were him, I would choose to play hockey instead of rugby*. In a similar vein, one can shift from RK-world to CK-world of *Harry Potter* and accept the proposition that *magic exists* as true for a moment of reading. Stepping aside from Lewis' philosophical framework and interpreting fiction reading in terms of shifting RK-world from AW to TAW would save us from critiques of “extravagant” or “obscure” ontological position.

The seeming realness of fictional worlds can still be explained within the confines of moderate realism. Ryan interprets it as readers entering a make-believe game, suspension of disbelief (the term “make-believe” is mentioned in Walton, 1990 and later used by Ryan, 1991), for the moment of reading, we pretend to believe that everything is true in TAW and characters are existing individuals. To explain how RK-worlds fit within the possible worlds framework, Goodman's (1978) proposal should accommodate moderate realism (previously shown by Raghunath, 2017). Raghunath (2017) found similarities between Ryan's ontological view with Goodman's subjective possible worlds. However, in Ryan's (2001:102) recenterable possible worlds model, Ryan uses “actual worlds” referring to RK-worlds and “objective reality” referring to the actual world. She also uses “actual worlds” to indicate CK-worlds and “objective reality”, referring to the textual reference world, but explains in the text that TRW is a mental construct. Despite terminological confusion in the model, Ryan does acknowledge one existing objective reality, which is our actual world and the individual representations of it (RK-worlds), as well as the textual actual world as the truth of fiction with its individual representations (CK-worlds). Thus, both Ryan and Goodman accept individual representations of the actual world (RK-worlds).

However, Goodman wrote that every person has a subjective representation of what is actual, and therefore, there is no objectively existing reality. He might be wrong in dismissing the objectively existing reality because, as Kripke noted, the existence of possible suggests the existence of actual. Also, we might agree that there is an objective reality that we all can see, hear, taste, and touch with our senses. The idea of subjective representations of the actual world can also be traced in Margolin's thoughts (1990:853) when she used the phrase “any actual world model of readers” to explain the rules of inference. The phrase presupposes that there is not one but rather a multitude of actual world models. Even if she neither developed the meaning of the phrase nor commented on the possibility of different representations (models) of the actual world, it shows us the existence of the idea that there are different kinds of representations of the actual world. Whereas RK-world is a mental representation of the actual

world, the actual world itself is a metaphysically existing one. Whilst this metaphysically existing actual world is only one, the subjective representations of it (RK-worlds) are numerous as there are hardly identical RK-worlds because every person experiences the world differently, influenced by factors such as socio-economics, culture, education, geography, family, etc. RK-worlds are influenced not only by those specific factors but also by the diverse experiences and psychology of each individual. A logical question would be how this RK-world is maintained, and it seems to be the mental imitation of the reality in mind adjusting it based on subjective lenses. By saying this, I mean that we project reality into our RK-worlds, all our interaction with the external world through subjective lenses. For example, epidemic situation can be the financial disaster for someone who owns a restaurant, but it might be a financial gain for another who sells masks, which in turn affects the perception of epidemic situation and its interpretation in RK-worlds.

The problem with Ryan's (2001:102) recenterable possible worlds model, except terminological confusion, is that it is not clear how a reader recenters into TAW to get a glimpse of TRW. I propose that AK-world and RK-world are crucial to connect Ryan's three universes and to show how a reader recenters himself/herself to TAW. Further, I am explaining a revised model of Ryan's recenterable possible worlds. The inclusion of AK-world and RK-world helps to connect all three universes. As we know, fiction creation and reading entails author, text, and reader. Here, Ryan's universes come in handy in explaining that the textual referential universe is what the author has in mind. In other words, the representation of the story with all plots, characters, and settings. As Ryan (1991:24) pointed out, the author "is always located in AW", whereas an implied speaker is situated in TRW. The textual referential universe is linked to the textual universe because the text is constructed by the author. In other words, the textual universe takes resources from the textual referential universe. But RK-worlds cannot access the referential world because a reader does not have access to the author's exact representation. RK-worlds can access TAW by fictional recentring. In other words, a reader mentally situates (him)herself in the settings (spatial deictic shift) and time (temporal deictic shift) described by the narrator. Also, RK can shift to CK (perspective deictic shift). As the RK-world that is centred around the actual world shifts to TAW, AW is pushed to the back of a reader's mind (thinner lines), and the TAW becomes the centre of attention (thicker lines). Now, while mentally in TAW, a reader uses his/her cognitive framework (schemas and mental processes such as memory, attention, comprehension, inference, integration, etc.) for representing the actual world in mind to represent the textual actual world in mind which involves the evocation of old schemas, their alteration as dictated by the text and activation of cognitive processes for

their processing. This also implies that whenever needed, when there is a lack of description, a relevant schema is retrieved from the representation of the actual world (thus complies with Ryan's principle of minimal departure).

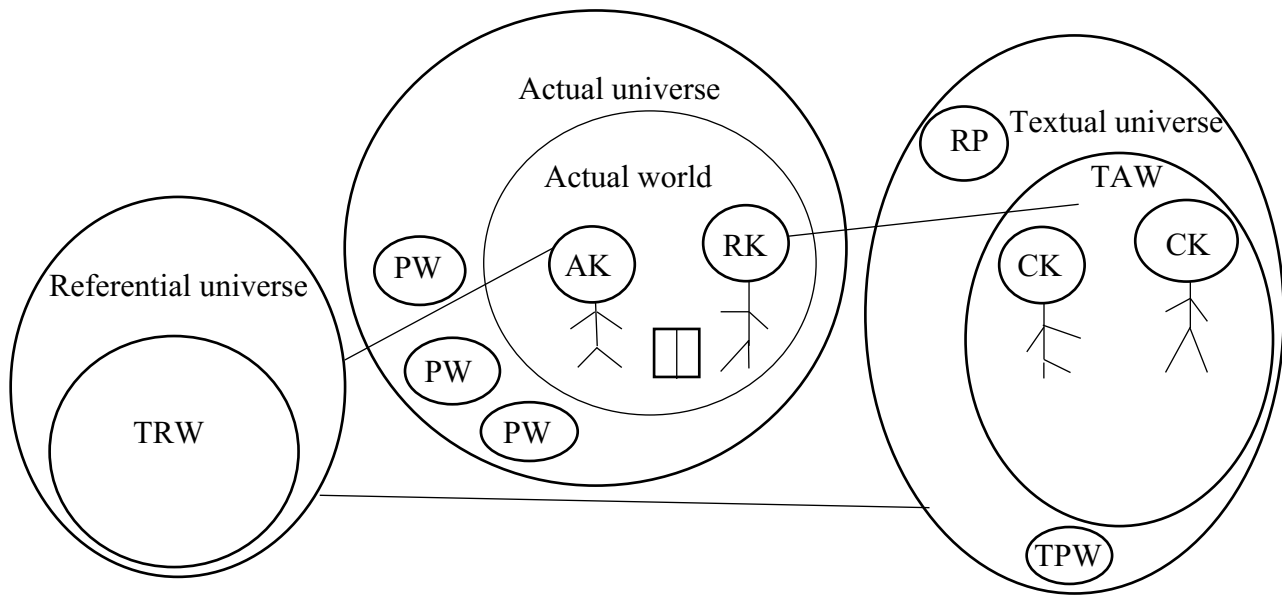


Figure 1.3.4 A revised model of Ryan's recenterable possible worlds (proposed by Ainur Kakimova)

Figure 1.3.4 shows that both the author and reader, as well as the text, belong to the physically existing actual world. The author mentally creates the textual referential universe where (s)he establishes a textual reference world. This textual reference world is projected to the textual actual world (TAW) and textual possible worlds (TPW) suggested by the author in the form of the narrator's or character's wishes/dreams/hopes, etc. It is essential to note that the textual universe is created as a result of interrelation between AK-world and RK-world. While the referential universe is influenced by the author's subjective representation of the actual world (to some extent but controlled), the interpretation of the text is influenced by the reader's subjective representation of the actual world. In addition, readers can construct their own reader's possible worlds (RP-worlds) inside of the textual universe by imagining hopes/wishes/fears for characters.

According to Eco's (1984) view of narrative semantics, actuality is interpreted in terms of Stalnaker's (1976) view of indexical actuality, according to which the world is actual if an inhabitant refers to the world (s)he lives. Thus, it can be changed based on which inhabitant's perspective we consider. From a reader's perspective, the textual actual world is not actual, but from a character's perspective, it is. It is in line with Lewis's (1973) indexical shift, although

actuality interpreted by Eco does not mean metaphysically existing one but rather interpreted as “a linguistic device like /I/ or /this/” and he further states that “accessibility as conceivability can be maintained as a mere metaphor” (Eco, 1984:224). Hence, in Eco’s view, perspective-taking is important to perceive the textual actual world as actual, metaphorically speaking, and actuality can be interpreted as centrality. In other words, applying the revised model, when a reader shifts from RK-world to CK-world, the textual actual world becomes the central world of reference in accordance with which all the other possible worlds are judged. However, it is not necessary to adopt a character’s CK-world because there might be different characters with different CK-worlds, and it remains a reader’s choice whether to adopt or not. However, it is essential to recentre RK-world from AW to TAW for a successful fictional recentring. A reader can conceive TAW using NAW (narratorial actual world – third-person narrative). Although, in the case of first-person narrative a reader is inclined to adopt CK-world with the reservation of questioning its validity based on established facts of TAW.

According to Eco, the text includes fabula, textual states (what is imagined by the author); worlds of characters such as their beliefs, wishes, fears and hopes (textual possible worlds); and possible words of a Model reader, that is, what a Model reader imagines, believes or wishes (RP-worlds). In the framework of the revised model, fabula is influenced one way or another by AK-world, textual possible worlds are influenced by CK-worlds, and a Model reader’s possible worlds is influenced by a Model RK-world. Although, it should be noted that the influence of AK-world on the referential universe is controlled by the author because (s)he can make-up worlds that drastically differ from what (s)he perceives to be the actual world. In contrast, the influence of RK-world on the perception of the textual actual world is more pronounced even if (s)he can adopt CK-world during reading, (s)he evokes the old schemas from RK-world to understand the text and temporarily change these schemas based on what is told to be true in the text. In other words, readers’ prior experiences contribute to their knowledge base (‘schemas’ Bartlett, 1932) and have a constant flex and dynamic impact on how one perceives the text. For example, reading the same text by the same person as a child and a mature adult would not be the same. Furthermore, as Eco ([1976]1984) proposed, a reader can participate in the co-creation of the textual universe by constructing a reader’s possible world (RP-worlds). He exemplified *Un Drame bien parisien* by Alphonse Allais (1890) to show how the text reflects a reader’s possible world imagined by a naïve reader at the expense of its logical coherence.

Thus, the revised Ryan’s model (Figure 1.3.4) refines the interpretation of the fiction reading process, addressing the indeterminacy of ontological status and acknowledging the role

of the reader in co-creating the textual universe. In addition, it gives meaning to the role of the referential textual universe. The revised model addresses some controversial issues in the use of possible worlds in fiction. First, it retains that the textual universe is a special kind of possible world, not the same as a possible world of modal logic (PW). The difference lies in that fiction is a more elaborate and complex mental construct because it has been thought carefully by the author, creating a separate referential system and then processed again when it gained textual form. Second, it respects fiction as an autonomous possible world with its own actual world at the centre and the set of possible worlds created by both author and reader. Third, it identifies the ontological status of fiction as a mental construct and also RK-world, with the help of which we can mentally represent the textual universe as a mental construct. Nevertheless, both author and reader remain in the physically tangible actual world. It also addresses the issue of the incompleteness of fictional worlds and of characters because when RK-world recentres from AW to TAW during reading, the gap in TAW is filled in with schemas from RK-world (Ryan's principle of minimal departure is retained). It will be further elaborated in the following section.

1.3.5 The interpretation of Ryan's principle of minimal departure through Bartlett's schemas

A reader views the world of fiction with the eyes of either characters or narrator, but if there is indeterminacy of some facts about characters or state of affairs, a reader adopts them from RK-world. For example, if the text proposes that *she was beautiful* but does not specify how she looked in details such as having a symmetric face, being tall, etc., then a reader adopts the model of a beautiful girl from her/his RK-world, which might vary across different individuals, e.g., for some people a girl is beautiful if she is blond with blue eyes whereas for some others if she has dark hair and green eyes. The concept of RK-world is vital in interpreting how a reader experiences the textual actual world. When one reads, (s)he activates the schemas that are derived by experiencing the actual world and stored in our RK-world. As it is in RK-world (subjective representation of the actual world), representation of the same event/object might differ across different readers. For example, the dog that I imagine might be different from another person's. By textual clues, we activate these representations and not only might have pictorial representations but also hear, touch and taste mentally. For example, if one reads *the food was so salty that it was unbearable to eat*, (s)he might recall his/her own experience of eating salty food. It is the reproduction of the representation of salty food or, rather, imitation of eating salty food. Even in this example, the degree of saltiness would differ across readers

based on what they experienced in life. By providing these examples, I view language as embodied cognition. This is not a new approach because the role of readers' actual world experiences in understanding and experiencing fiction was noted by some other literary scholars (e.g., Marco Caracciolo, 2019; Jan Alber, 2019). From a narratological perspective, it has been previously mentioned by Fludernik (1996:12), who acknowledged that the experiential nature of narrativity is "the quasi-mimetic evocation of real-life experience". This implies that whenever one reads, (s)he activates his/her own experience gained in the actual world. It also follows that readers experience literature by mental simulation (for an overview, see Mak and Willems, 2021; for differences in different kinds of simulation, such as motor and perceptual, see Mak and Willems, 2019). Ryan (2001) also acknowledges the role of RK-world in the fiction reading process by writing the following:

The idea of textual world presupposes that the reader constructs in imagination a set of language-independent objects, using as a guide the textual declarations, but building this always incomplete image into a more vivid representation through the import of information provided by internalized cognitive models, inferential mechanisms, real-life experience, and cultural knowledge, including knowledge derived from other texts.

Ryan, 2001: 91

She highlights the importance of RK-world, but the text has dominance over how the representation of TAW will be by writing that "readers may import knowledge from life experience into the textual world, but the text has the last word in specifying the rules that guide the construction of a valid reality model." (Ryan, 2001:94) According to her, while being mentally in TAW, a reader is unaware of AW because mental engagement with TAW makes it "disappear from consciousness" (Ryan, 2001: 94).

In the framework of embodied cognition, it is assumed that the physical experiences and interactions with the environment influence RK-world. The schemas can explain the experiential nature of fiction reading if applied to RK-world, the representation of the actual world. Bartlett's schema theory (1932) from cognitive science provides a framework for understanding how individuals' experiences, interpretations, and perspectives contribute to their RK-worlds. Schema theory suggests that individuals organize their knowledge into mental frameworks called schemas, which help them interpret and understand new information. These schemas are influenced by a variety of factors, including past experiences, cultural background,

and personal beliefs. These schemas shape how individuals perceive and interpret new information. According to Bartlett (1932:201), a schema is “an active organization of past reactions, or of past experience, which must always be supposed to be operating in any well-adapted organic response”. Schemata that comprise schemas are active, but an individual is unconscious of these mental processes (Bartlett, 1932:200). Literary researchers who incorporate knowledge from cognitive science, such as Klomberg et al. (2022), highlight the work of Bartlett as a conceptual framework for understanding how readers might have different representations while reading. Their empirical study suggests that participants’ representation of the story, which was drawn after reading, varied.

The realness of TAW can be explained by the experiential nature of reading. For example, when one experiences fiction through their RK-worlds that are composed of already existing schemas obtained as the result of contact with the external world, a reader activates his/her real-life schemas, (s)he feels like fiction is real. By recentring his/her cognitive framework that forms RK-world and sorts out the reception of the actual world that objectively exists to the textual actual world that is mentally represented, (s)he can perceive the propositions being true in terms of the fictional world. In other words, a cognitive framework for mentally representing the actual world shifts from the actual world to the textual actual world, and therefore, the same cognitive framework is used to mentally represent the textual actual world for the moment of reading. This implies that the schemas of the textual actual world are understood in terms of the actual world because the old schema is evoked and can be altered if explicitly stated by the text. This cognitively explains Ryan’s principle of minimal departure.

Further, I will apply the proposed model (Figure 1.3.4) to show how readers cognitively engage with counterfactuals embedded in a literary text. The revision of Ryan’s model of possible worlds and fictional recentering with the clarification of the ontological stance as well as the elaboration on the principle of minimal departure through schemas, was necessary to give a reliable holistic and ontologically sound explanation of the cognitive engagement with fiction to further visualise the model for cognitive engagement with embedded counterfactuals in fiction.

1.4 The application of possible worlds to counterfactuals

An improved model of possible worlds will be applied to conceptualize the processing of literary counterfactuals. First, the possible worlds framework will be used to theorize cognitive engagement with embedded counterfactuals, i.e., counterfactuals at the micro level. To validate the model, it will be applied to an analysis of Ernest Hemingway's *The Snows of Kilimanjaro* (1936). The selection of this text for the case study is justified by its prominent use of counterfactuals, which makes it particularly relevant to the model's application. Hemingway's short story emphasizes the theme of counterfactuals, rendering it distinctive and suitable for analysis. Following the application of the proposed model to the disnarrated elements, it will be extended to analyze counterfactuals at the macro level, specifically counterfactual historical fiction. This extended model will then be applied to Robert Harris's *Fatherland* (1992), a representative work of alternate reality or counterfactual historical fiction. Set in a world where the Nazis won World War II, the novel presents a history that diverges from actual events. By demonstrating the model's applicability to both texts, it will be shown that it effectively captures cognitive engagement with literary counterfactuals at two distinct levels.

1.4.1 A model of possible worlds for cognitive engagement with embedded counterfactuals

In this section, I will show that the possible worlds account is the most useful for illustration of readers' cognitive processes while reading embedded counterfactuals. Despite the application of possible worlds theory to the analysis of counterfactual historical fiction (e.g., Raghunath, 2017), the theoretical framework has not been used (to the best of my knowledge) for the analysis of embedded counterfactuals.

Counterfactuals fall under the category of textual alternative possible worlds introduced by either third-person narrator or first-person narrator/character. However, to analyze counterfactuals taking a revised model of Ryan's possible worlds as a blueprint, I must consider some details of the textual actual world. To make counterfactuals, the author chooses an event, e.g., near misses or opportunities, from the textual actual world and alters its outcome by imagining how it could have been otherwise. It follows that it is crucial to distinguish the chronology of events or the structure of the story. Eco's (1984) *fabula* is handy for this purpose. Eco (1984: 23) defines *fabula* as "a possible world W_N which encompasses its successive states". $W_N S_i$ stands for textual states of the fictional world (i -denoting $1, \dots, n$). To create a counterfactual, the author chooses one of those states and contradicts it. This I propose to term as $AW_N S_i$ (alternative textual state of the textual actual world). If we add these textual states to

the diagram (Figure 1.3.4), it can be better visualised what event is chosen and altered from the TAW. The following diagram illustrates the visualisation (Figure 1.4.1.1).

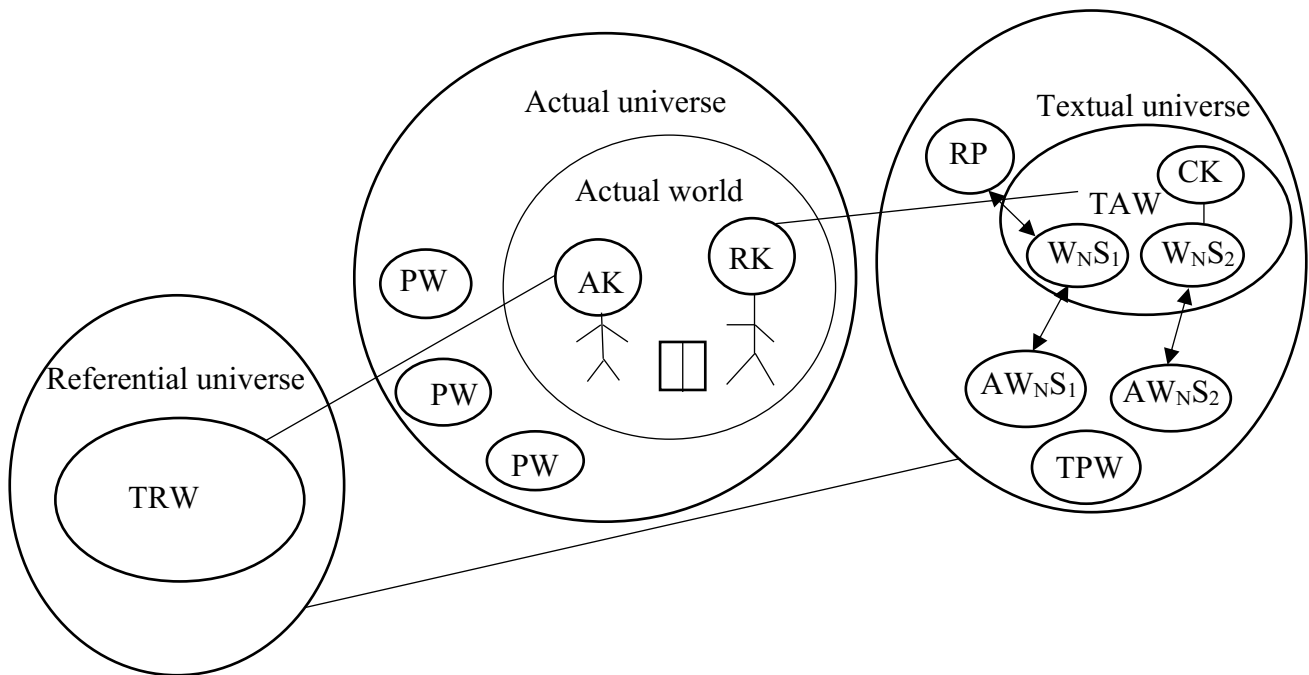


Figure 1.4.1.1 A revised model of Ryan's possible worlds and a revised model of Eco's ([1976]1984) textual states (proposed by Ainur Kakimova)

In the diagram (Figure 1.4.1.1), there are two illustrations of counterfactuals. The first type is introduced by the third-person (omniscient) narrator, who alters the first textual state (W_{NS1}) and imagines its alternative state (AW_{NS1}). The second type is when the counterfactual is introduced by the character or first-person narrator who has limited access to the textual actual world. (S)he chooses the state (W_{NS2}) and contradicts it with its alternative (AW_{NS2}). Furthermore, RP-world (W_R according to Eco) can be counterfactual to the textual actual world state, a reader imagining the alternative what is expected to happen or an implied author's visualisation of what a Model reader expects to happen that is counterfactual to what happened as in the case with *Un dame bien parisien* by Alphonse Allais (1890). In all three cases, counterfactuals are processed in a similar way by a reader. As the diagram shows, a reader compares between the actual state and counterfactual state. (S)he evaluates the actual state, whether it is better or worse in comparison to the counterfactual state. Readers' evaluation is based on his/her RK-world. However, as readers have access to CK (character's knowledge world), (s)he can evaluate the situation from a character's perspective or even from the third-

person narrator's perspective. In each case, a reader judges the actual event that happened in the textual actual world.

Readers might also emotionally respond to counterfactuals. If (s)he finds the actual state better, then (s)he is satisfied and relieved. In the reverse case, (s)he is disappointed. The former is known as a downward counterfactual, and the latter as an upward counterfactual. Whereas downward counterfactuals communicate what could have been worse, upward counterfactuals communicate what could have been better. For example, "if Hitler had won the war, the consequences would have been fatal to European democracy" is downward counterfactual. This type of counterfactual conveys that what happened was good because it could have been worse. In contrast, the following example, "if Putin had not launched the war against Ukraine, its sovereignty would not have been threatened", is an upward counterfactual. This type of counterfactual conveys that what happened was bad because it could have been better.

According to cognitive science, counterfactuals are associated with such emotions as regret, guilt, shame, relief, satisfaction, and sympathy due to comparison (Kahneman and Miller, 1986; Byrne, 2016). Relief is experienced when people imagine near misses using counterfactual comparisons (Sweeny and Vohs 2012; Larsen et al. 2004). However, it is more often that people tend to think of upward counterfactuals, i.e., how things could have been better (e.g., Sanna and Turley, 1996; De Brigard et al., 2013; Rim and Summerville, 2014). At the age of 5 and 7 years old, human beings develop the emotion of regret (e.g., O'Connor et al., 2014; Weisberg and Beck, 2010). Downward counterfactuals, how things could have been worse, make people feel better, although the learning outcome is mostly observed from upward counterfactuals (e.g., Epstude and Roese 2008; McMullen and Markman 2000). Based on the functional theory of counterfactual thinking discussed previously, counterfactuals are useful for behaviour regulation (Epstude and Roese, 2008; Byrne, 2016). Thus, upward counterfactuals are associated with regret and disappointment, whereas downward counterfactuals are associated with relief and satisfaction.

Readers' emotional response relates to the cognitive involvement with the inhabitants of the textual actual world. As Ryan (1991) suggests, "the characters become real" because of fictional recentring, and therefore their losses and regrets as well as wins and satisfaction become also real and important for the reader. Counterfactuals, in a sense, can help to make characters rounder (in Danziger Johnson's (1961) term) because it shows that they are also as real people make choices in their textual actual world and see the consequences of these choices

made in the past rather than being simply put into the textual actual world as dolls in a theatre (flat characters).

While evaluating counterfactuals, a reader can take the perspective of a character or a narrator. But whether (s)he agrees with the perspective depends on the reader's opinion formed in the actual world. A reader can also assess the truth value of a counterfactual course of events by thinking about whether the consequent maintains when the antecedent holds. A sceptical reader might be sceptical of the consequent given the antecedent based on the representation of the actual world. An agreeable reader might agree with what is offered by the fictional text as a logical course-and-effect relationship. The evaluation of counterfactuals highlights the actual event that happened in the textual actual world, making it important for the development of the plot in a particular direction. It might enhance tellability. By counterfactuals, an author singles out an important event of a character and shows that the exact course of the event is worth happening because otherwise, it would not be worthwhile to tell. As discussed so far; to cognitively process the counterfactuals, a reader must engage in such cognitive processes as comparison, evaluation and emotion, as the following diagram shows:

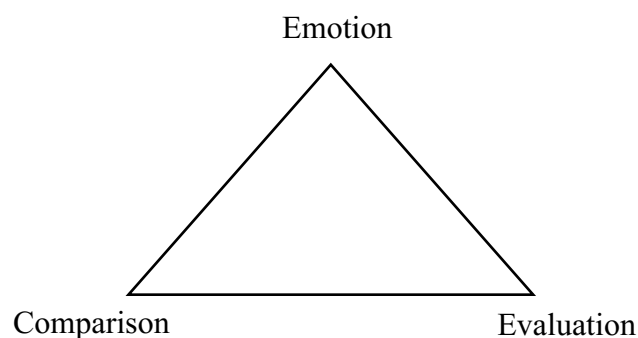


Figure 1.4.1.2 The model of the cognitive processing of counterfactuals (based on literature)

Figure 1.4.1.2 is not sufficient for explaining how readers engage in the cognitive processing of counterfactuals. For example, Orenes et al. (2019) showed the imagination as an important element of counterfactual thinking. In the literary field especially, imagination is of special importance in the case of literary texts because the textual actual world is an imagined world, and to comprehend a counterfactual, one needs to create another imagined world in which the alternative is actualised. Without imagination, we can access neither the textual actual world nor the alternative textual state. Thus, it is a prerequisite for understanding counterfactuals in fiction. I would visualise the steps of the cognitive processing of counterfactuals in the following way (Figure 1.4.1.3):

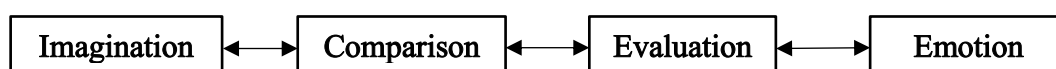


Figure 1.4.1.3 The improved model of cognitive processing of counterfactuals (based on literature)

Figure 1.4.1.3 shows that first, readers imagine two possible worlds and then compare these two with each other, reinforcing imagination. During the evaluation process, they evaluate whether the textual actual state is better or worse than its alternative, reinforcing comparison. This, in turn, leads to an emotional response.

However, Figure 1.4.1.3 is not enough because fiction reading requires fictional recentring and the interaction between the actual universe and the textual universe. The revised model applied to counterfactuals (Figure 1.4.1.1) effectively tackles these questions. And therefore, bearing in mind all that has been discussed so far, I am proposing a new model of cognitive engagement with embedded counterfactuals in Figure 1.4.1.4.

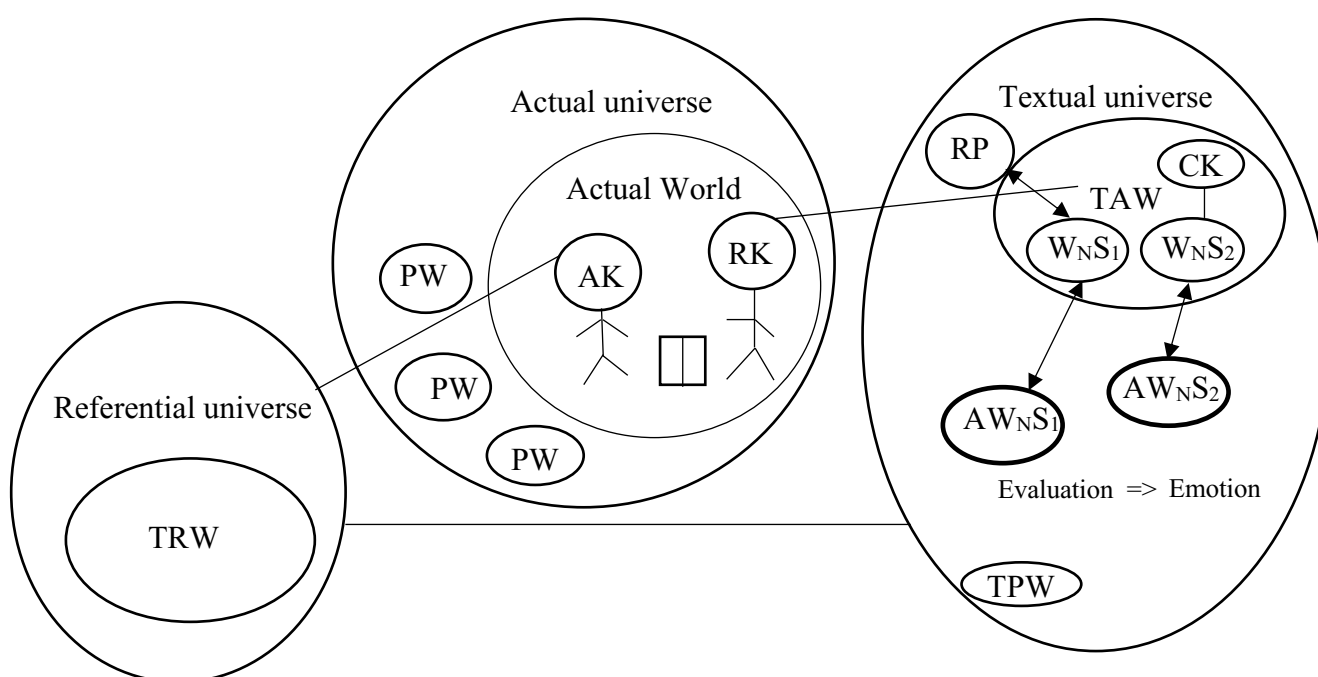


Figure 1.4.1.4 Readers' cognitive engagement with embedded counterfactuals based on possible worlds (proposed by Ainur Kakimova)

The model shown in Figure 1.4.1.4 is advantageous because it captures the key aspects of

fiction reading and engagement with counterfactuals. First, it shows how a reader cognitively shifts to the textual universe from the actual universe. For a moment of reading, s(he) is mentally in the textual actual world (TAW), and s(he) introduces her/himself with its facts and consequent states using his/her imagination. When a reader encounters (non-actualised textual alternative possible world in Ryan's words) an alternative textual state (AW_{NS2}), (s)he experiences defamiliarization because of access to a new possible world through imagination that lies outside of the textual actual world. This alternative state is compared to the textual state within the textual actual world (W_{NS2}). As it is communicated through the voice of the character (CK), a reader can take for a moment his/her perspective to evaluate the event that happened in the textual actual world. Or a reader might judge a character's point of view from his/her own subjective perspective, which has been formed in the actual universe, whether (W_{NS2}) is good/bad for the character. In a similar vein, a reader experiences defamiliarization when his/her wish for the alternative to the textual state (W_{NS1}) is projected to the textual universe by the implied author. Despite in the diagram, it is the first textual state, in literary texts, it is usually the last textual state, the ending is altered (e.g., Hemingway's *The Snows of Kilimanjaro*). Whereas imagination is shown as an installation of possible worlds, the comparison is illustrated with two-sided arrows. The comparison of the textual actual world state with the textual alternative state leads to evaluation, which in turn results in an emotional response (Evaluation $\Rightarrow$ Emotion). If what happened made a character suffer or happier, a reader might respond emotionally because for a moment of reading, characters seem to be real due to the recentring of RK-world from the actual world to the textual actual world. In addition, we enter make-believe while reading fiction, as Ryan (1991) would put it. Moreover, Ryan described that characters experience fictional recentring when they create alternative possible worlds within their universe in the form of dreams, wishes, fears, and hopes. When they do, readers shift to those alternatives from the textual actual world. Hence, while processing embedded counterfactuals, RK-world recentres from the textual actual world state to the alternative state, and therefore the alternative textual state is more pronounced as marked with thicker solid lines. Also, a sceptical reader might question the validity of the counterfactual: in a possible world that is the most similar to the TAW, does q hold if p takes place? To make such judgements, a reader completes the textual actual world (whenever it is needed) using a reader's RK-world evoking necessary schemas.

The model of readers' cognitive engagement with embedded counterfactuals that is based on possible worlds will be further applied to the analysis of *The Snows of Kilimanjaro* in the subsequent section.

1.4.2 Applying the proposed model to *The Snows of Kilimanjaro* (1936) by Ernest Hemingway

I will further consider the short story *The Snows of Kilimanjaro* by Ernest Hemingway. The choice of this literary text is justified by the author's use of embedded counterfactuals. First, I will give a summary of the plot and characters and define the setting. Second, I will divide the fabula into textual states to distinguish to what state the counterfactual is used. Third, I will interpret a model reader's cognitive engagement with counterfactuals. The distinction between the model reader and the actual (empirical) reader is crucial. The model reader is not a real person but an abstract, idealized recipient embedded within the text itself, representing a "perfect" reader who fully grasps the intended meaning. In contrast, empirical readers are real individuals, often participants in studies whose interpretations may vary and who do not necessarily align with the model reader's ideal understanding. As the last step, I will discuss the value of counterfactuals for the appreciation of a given text.

The setting of the fiction is in the mountains of Africa. The main characters, Harry and Helen, travel to Africa with two different purposes in mind. Whilst Harry wants to get back to his former habit of writing before he got accustomed to the rich and lazy lifestyle, Helen wants fun. Their trip to Africa is not the usual luxurious one, but he tried to make this trip with "minimal comfort". Interestingly, their "minimal comfort" means that they have several African people at their disposal to take care of routine activities such as cooking and setting up a tent. While trying to take a photo of waterbuck two weeks ago, the thorn scratched Harry's knee and started the gangrene. The situation is complicated by a broken truck, and as a result, they are stuck in the mountain and waiting for a plane which would bring them to the hospital to treat his gangrene properly. While lying in a cot restrained from physical movement, the protagonist, Harry, thinks of his regrets. Both Helen and Harry think of their own regrets, which are introduced as counterfactual scenarios. As Harry is the central focus of the narrative, Helen's regret is tied up to the present situation of Harry. Harry is suffering. It is not about physical pain; he does not feel pain as it is "painless", but he suffers from remorse that he traded his talent. He stopped writing as he married this fine and affluent woman who could buy anything for him. He got accustomed to a comfortable life with limitless opportunities for leisure activities and procrastinated writing stories that he could have written. And at this moment, when he was near death, he started to recall all the stories he could have written but never did. The story ends with a counterfactual twist: one counterfactual scenario showing that

the plane arrived and the other actual scenario that it did not.

The style of writing is Hemingway's style, with short sentences followed by lengthy counterfactual stories of Harry that are written as italicized vignettes. At first, literary critics found that the story lacked coherence and, therefore, was Hemingway's fiasco (e.g., Allen Tate as mentioned in Harding, 2004). However, later literary critics came to the conclusion that fragmentation is united into the whole as showing the protagonist's decline as a writer, also projecting Hemingway's professional declaration with references to his personal life events (e.g., Dussinger, Santangelo; Harding, 2004).

The story can be better appreciated if to consider its artistic dimension achieved using counterfactuals. It has been previously considered by Harding (2004) and Tucan (2015). Whereas Harding focused on the evaluation of counterfactuals, Tucan focused on conceptual journeys. However, both overlook the importance of the reader in creating the textual universe and the potential of possible worlds framework to interpret the text more comprehensively. Before going into details on how counterfactuals are used in the text, let me first single out the textual states of the textual actual world. The purpose of identifying textual states is two-fold: (i) to establish the causal link between events and (ii) to understand to which events the counterfactuals are created both by characters and readers. The story is narrated by the third-person omniscient narrator who has access to both Harry's and Helen's minds, although he is preoccupied with Harry's mind.

The textual actual world of *The Snows of Kilimanjaro*:

W_{NS1} – a poor writer Harry married rich Helen.

W_{NS2} – Harry stopped writing.

W_{NS3} – Harry and Helen went to Africa.

W_{NS4} – They hired a bad driver.

W_{NS5} – Harry's knee was scratched by the thorn.

W_{NS6} – Harry did not put iodine on the scratch.

W_{NS7} – Harry's scratch was worsened.

W_{NS8} – Harry put weak carbolic solution on the scratch.

W_{NS9} – Gangrene started in Harry's knee.

W_{NS10} – A driver burned out the bearing in the truck.

W_{NS11} – Harry's condition is worsening.

W_{NS12} – Plane arrives, and Harry is saved.

W_{NS13} – Plane does not arrive, and Harry is dead.

The skeleton of the story shows the eventual sequence in the textual actual world. The story is narrated from the textual state W_{NS11} (Harry's condition is worsening) with flashbacks. To add flesh to this skeleton, more details should be added. The narrator provides some insights about the characters. Helen had been married and had two children, but, unfortunately, her husband died, and after one of her children died, she met Harris and fell in love with him. Harry, in the pursuit of money and comfort, married her. However, before marrying her, he had his own story about the woman whom he loved and the one who left her because "he had loved too much, demanded too much" (14), whom he loved the most. And now, as a couple, Harry and Helen are in the mountains of Africa in a terrible predicament as Harry's condition is worsening.

The narrator begins with a dialogue between the two. They start quarrelling as Harry gets irritated by Helen's optimistic hope that he will survive. Helen utters counterfactuals using X-marking as exemplified below:

"I wish we'd never come," the woman said. She was looking at him holding the glass and biting her lip. "You never would have gotten anything like this in Paris. You always said you loved Paris. We could have stayed in Paris or gone anywhere. I'd have gone anywhere. I said I'd go anywhere you wanted. If you wanted to shoot we could have gone shooting in Hungary and been comfortable."

Hemingway (1936: 5)

Helen expresses her regret that they came to Africa in the following sentence: "I wish we'd never come" (5). By introducing her counterfactual wish, she acknowledges her want for an alternative of the textual state W_{NS3} (Harry and Helen went to Africa). She further explores the other possibilities that could have been instead of W_{NS3} (Harry and Helen went to Africa). She imagines that Paris would be a good alternative by saying: "You never would have gotten anything like this in Paris." (5) The consequent suggests the antecedent that if they had gone to Paris instead of Africa. Further, Helen blames Harris that the choice of traveling to Africa was made by him as she says: "You always said you loved Paris. We could have stayed in Paris or gone anywhere. I'd have gone anywhere. I said I'd go anywhere you wanted." (5) The use of linguistic cues such as "could have stayed", "could have gone" and "would have gone" convey the counterfactual meaning that they in fact did not go to Paris or anywhere else but

they are in Africa. Helen thinks that there are many other possibilities besides Paris that could have been chosen instead of Africa, and given the fact that they came to Africa because Harris wanted to shoot, as Helen declares, she says that “If you wanted to shoot we could have gone shooting in Hungary and been comfortable” (5). The consequent carries the meaning that they did not go shooting in Hungary, and as a result, they are not comfortable. In other words, it could be stated that *if they could have gone shooting in Hungary, they could have been comfortable*. Helen’s counterfactual imagination shows that she would have gone anywhere else but not Africa, and therefore, the cause of Harry’s condition is Africa. In other words, if they had not come to Africa, Harry would have been all right. By stating the counterfactual, Helen suggests that the cause of W_{NS5} (Harry’s knee was scratched by the thorn) is W_{NS3} (Harry and Helen went to Africa).

Harry admits neither his sole responsibility for choosing Africa nor the causal link proposed by Helen that the predicament is caused by coming to Africa. Harry despises her counterfactual alternatives that suggest limitless possibilities of going somewhere else, such as Paris and Hungary, that could have been easily realised by her money by saying: “Your bloody money” (5). He defends himself by saying that she also participated in making this choice: “You said you loved it” (5). After persuading her that it was not only his decision, he provides different causal links. He first states that the cause of W_{NS7} (Harry’s scratch was worsened) is the result of W_{NS6} (Harry did not put iodine on the scratch): “I suppose what I did was to forget to put iodine on it when I first scratched it.” (6) His utterance suggests another counterfactual made by readers that *if Harry had put iodine, his scratch would not have worsened*. Harry continues his causal link by saying that W_{NS9} (Gangrene started in Harry’s knee) was caused by W_{NS8} (Harry put weak carbolic solution on the scratch): “Then, later, when it got bad, it was probably using that weak carbolic solution when the other antiseptics ran out that paralyzed the minute blood vessels and started the gangrene.” (6) His causal link prompts counterfactual created by a reader that *if Harry had not used that weak carbolic solution that paralyzed the minute blood vessels, his gangrene would not have started*. Harry continues the chain of causal links and says that W_{NS4} (They hired a bad driver) caused W_{NS10} (A driver burned out the bearing in the truck) by his counterfactual statement: “If we would have hired a good mechanic instead of a half baked kikuyu driver, he would have checked the oil and never burned out that bearing in the truck.” (6) He suggests that a good mechanic instead of a bad driver would be a better choice.

As Helen does not indulge in his proposed causal links, Harry goes on with another counterfactual: “If you hadn’t left your own people, your goddamned Old Westbury, Saratoga,

Palm Beach people to take me on” (6) Harry’s antecedent entails the consequent that Harry would have been all right. It implies that W_{NS1} (a poor writer Harry married rich Helen) caused W_{NS11} (Harry’s condition is worsening). Afterwards, Harry starts his solo counterfactual imagination “in his mind” (6) about the stories that he could have written: “That was one of the things he had saved to write” (6). He imagines that he could have written about snow and gambling, war, and winters in Austria. Harry’s voice echoes with the narrator’s voice in the following utterance: “But he had never written a line of that...” (7).

Interrupted from his “what could have been written” story, Harry starts again, blaming the union with Helen and specifically her money as the cause of his state by saying, “your damned money” (7). Thus, a reader constructs a counterfactual that *if it had not been Helen’s money, Harry would have been all right*. But after some consideration, he admits that it is not her fault by convincing himself in a counterfactual thought that “If it had not been she, it would have been another”. The counterfactual thought makes Harry take the blame off from Helen and instead put it on himself: “He had destroyed his talent himself.” (10) A narrator further describes how he destroyed his talent. Harris led a miserable lifestyle because first he betrayed his promise of writing stories that according to him were worth writing. He lied to women that he loves them to get money, security, and comfort: “It was strange, too, wasn’t it, that when he fell in love with another woman, that woman should always have more money than the last one?” (10). He also drank too much and became lazy and slow. As an influence of money and social status, Harris boosted his snobbery and pride but, at the same time, despised rich people. He became influenced by rich people who surrounded him, who preferred him not to work, and was involved in limitless entertainment activities that kept his interest.

The narrator communicates Harry’s mind that it was Harry’s choice, after all, to live this kind of life by referring to a counterfactual possibility that he could have done much more had he chosen to make his living with “a pen or a pencil”: “It was never what he had done, but always what he could do.” (10) Throughout the text we can trace a counterfactual thought that he should have written, but now he would never write his stories, e.g., “he would never write that”, “he would not write that, although it was well worth writing” (11), “he had never written about Paris” (19), “but what about the rest he had never written?” He traded his good old life for her money, as suggested by the consequent: “She would have bought him anything he wanted” (12). After a long consideration of Helen and what a nice woman she is, he realizes that he was unjust towards her and stops quarrelling.

Harry begins his second counterfactual story about what he could have written. He jumps from one story to another in his mind as if it is the last chance to recollect all his stories,

and “there was so much to write” (15). He thinks of his first love, Paris, fighting Turks, again Paris, poet Tristan Tzara and then regrets that “he had never written any of that” (15). Harry failed his talent: “he had seen the world change” (15), observed the people and noticed subtle changes. The narrator intensifies his regret by writing that “...it was his duty to write of it, but now he never would”. (16)

At the realization that he might die tonight, Harry started to recollect his next story in his mind, the lengthiest story of all that could have been written. It begins with Harry’s former family house that burned down and how his grandfather kept burning guns and then how the situation looked like after the war, about inflation and poor neighbours, and then where he stayed while he wrote in Paris, sold wine, the drunk and shouting neighbours. The story seems to be picked up from different parts of the memories rather than being one coherent story.

After a small quarrel with Helen about whether he should drink whiskey-soda, he starts again recollecting his fourth story that he could have written. It is about a boy at the ranch who killed an old man thinking that he did his duty and was shocked when the sheriff came after him. “That was one story he had saved to write.” (20), and “he knew at least twenty good stories from out there and he had never written one.” (20) Then he contemplates what he would not write: “But if he lived he would never write about her...” (20) and not about rich people as “poor Julian” did, the reference probably to Scott Fitzgerald (e.g., Harding 2004).

Harry’s last story is about Officer Williamson, who was caught in the wire and suffered from unbearable pain as “his bowels spilled out into the wire” (21), and he begged everyone to shoot him, but no one did. Harry gave him his morphine tablets to rescue him from the pain. The last story is the most coherent of them all, and this one he managed to put into paper as his following utterance suggests: “I’ve been writing” and adds “but I got tired.” (21)

After that, he fell asleep, and the narrator describes a dual ending. According to the first ending, the plane that they were waiting for arrived, and Harry was saved. According to the second ending, Helen woke up and discovered that Harry is dead, and he managed to cut his leg before dying. The interpretation of dual ending posed difficulty for literary critics as the narrator does not give any linguistic cues that the first ending is not true. Instead, the narrator gives the readers to understand that it was not Helen’s dream because “in her dream she was at the house on Long Island and it was the night before her daughter’s debut” (24). The order of these two endings gives us to understand that the second ending is the true one. Symbolically, the second ending is more plausible because the hyena makes a sound, the animal that symbolises death and appears throughout the text. And therefore, the first ending can be interpreted as Harry’s dream like fantasy before he died. However, literary critics do not

understand why the narrator included the dual ending without a clear distinction of which one is true. In the following paragraph, I interpret *why* based on the proposed model.

According to the proposed model, a model reader also participates in the textual universe and can create possible worlds. A model reader who sympathises with Harry and wishes for the plane to arrive to save his life so that he can write up all his stories creates an alternative world that contradicts the textual actual world. Because by this time, a reader already senses that the text is leading to his ultimate death, but still hopes to save his life. A narrator and implied author project into the textual universe the counterfactual world created by a model reader so that (s)he can read what (s)he wishes for Harry. This explains why there is such an ambiguous dual ending. The application of the model shows that the narrator and implied author reciprocate with the protagonist by reproaching that “he should have written”. Consequently, as he was critical of the wasted talent of Harris, an implied author wanted to punish him for his desire for comfort, and therefore actualizing the second ending. Although one might think it is also possible that an implied author projected to the textual universe the possible world created by a naïve reader who believes in the conventional happy ending, I am inclined to think that the first interpretation is the case because the text hints to the second ending by symbolising death both by snow and hyena that are constantly mentioned throughout the text. And therefore, by this time a critical reader is convinced that the end is going to be not a happy one. Thus, the interpretation of the dual ending might be different depending on the type of reader (naïve and critical).

An implied author justifies the actualization of the second ending, suggesting that even if he survived, he would not be able to discipline himself to write. He implies it because even if he came to Africa with the mind to become more disciplined, with his behaviour he shows that he is deceiving himself. For example, during two weeks in Africa, he did not write, but he could and should have written. Another argument is that he wanted to be in a condition of less comfort to train himself, but in fact, they had local servants and plenty and variety of food and leisure activities. Only at the altar of the death did he manage to write a small paragraph about Officer Williamson that, with discipline and consistency, could have been part of the book about his war experience. Counterfactual is the main theme essential for the interpretation of the text because it depicts the closed possibility that Harris faced whereas his lifestyle showed the limitless open possibilities. The actualization of the second ending is necessary to convey the message that one should not delay until tomorrow as tomorrow may not come. Besides, the whole narrative communicates the message that without discipline, talent is nothing but a mere counterfactual of *what might have been*.

So far, I have shown the use of counterfactuals in the text, and I list below the counterfactuals created by characters and a model reader:

Helen: if they had gone to Paris, Harry would have been all right; if they had gone to Hungary, Harry would have been all right; if they had gone anywhere instead of Africa, Harry would have been all right. Thus, according to Helen, $W_N S_3$ (Harry and Helen went to Africa) causes $W_N S_{11}$ (Harry's condition is worsening). In other words (the sign $\neg$ stands for negation):

$$W_N S_3 \rightarrow W_N S_{11}$$

$$\neg W_N S_{11} = \neg W_N S_3: \text{Paris, Hungary, anywhere.}$$

The above illustration denotes that Helen mentally undoes $W_N S_{11}$ (Harry's condition is worsening) by mentally undoing $W_N S_3$ (Harry and Helen went to Africa) and proposes counterfactual alternatives such as Paris, Hungary, and anywhere else instead of Africa. In other words, according to Helen's CK (character's K-world), if they had gone to Paris, Hungary or anywhere else, $W_N S_{11}$ (Harry's condition is worsening) would not be the case.

Harry: if he had put iodine on the scratch ($\neg W_N S_6$), Harry's scratch would not have been worsened ($\neg W_N S_7$); if he had not put weak carbolic solution ($\neg W_N S_8$), gangrene would not have started ($\neg W_N S_9$); if they had hired a good mechanic ($\neg W_N S_4$), he would not have burned out the bearing in the truck ($\neg W_N S_{10}$). According to Harris, the cause of his present situation is the sum of all small choices and not because of Africa. In other words:

$$W_N S_4 + W_N S_6 + W_N S_8 \rightarrow W_N S_{11}$$

$$\neg W_N S_{11} = \neg (W_N S_4 + W_N S_6 + W_N S_8): \text{putting iodine, not using a carbolic solution, a good mechanic.}$$

The above formula shows that Harry mentally undoes $W_N S_{11}$ (Harry's condition is worsening) by mentally undoing $W_N S_4$ (they hired a bad driver) and $W_N S_6$ (he did not put iodine) and $W_N S_8$ (he used a weak carbolic solution) and proposes counterfactual alternatives such as putting iodine, not using a carbolic solution, and hiring a good mechanic instead of a bad driver. According to Harry's world (CK), if they had hired a good mechanic, he had put iodine and not used a weak carbolic solution, but something stronger, $W_N S_{11}$ (Harry's condition is worsening) would not be the case. Whereas the first two choices could have been changed, the last choice could not because they ran out of other antiseptics.

Harry: if he had not married Helen ($\neg W_N S_1$), Harry would have been all right ($\neg W_N S_{11}$). In other words:

$$W_N S_1 \rightarrow W_N S_{11}$$

$$\neg W_N S_{11} = \neg W_N S_1: \text{not marrying Helen}$$

The above shows that Harry mentally undoes $W_N S_{11}$ (Harry's condition is worsening) by mentally undoing $W_N S_1$ (Harry married Helen) and proposing a counterfactual alternative that he did not marry Helen. According to Harry's world (CK), if he had not married Helen, $W_N S_{11}$ (Harry's condition is worsening) would not be the case.

Harry: if he had not married Helen ($\neg W_N S_1$), he would not have stopped writing ($\neg W_N S_2$).

In other words:

$$W_N S_1 \rightarrow W_N S_2$$

$$\neg W_N S_2 = \neg W_N S_1: \text{not marrying Helen}$$

The above shows that Harry mentally undoes his biggest regret $W_N S_2$ (Harry stopped writing) by mentally undoing $W_N S_1$ (Harry married Helen) and proposing a counterfactual alternative that he did not marry Helen. According to Harry's world (CK), if he had not married Helen, $W_N S_2$ (Harry stopped writing) would not be the case. However, later, he disagrees with this counterfactual thought, indulging in other counterfactual thought that if it had not been Helen, it would have been another one. Thus, his marrying a rich woman is inevitable:

$$\neg W_N S_2 = \neg W_N S_1: \text{not marrying Helen, marrying another one} \rightarrow \neg W_N S_2 \neq \neg W_N S_1$$

The above formula shows that if Harry had not married Helen, he would have married another one, and therefore negating $W_N S_2$ (Harry stopped writing) is not equal to negating $W_N S_1$ (Harry married Helen).

Reader: if the plane had arrived, Harry's life would have been saved. ($W_N S_{12}$)

$$\neg W_N S_{13} = W_N S_{12}: \text{plane arrived}$$

The above shows that a reader negates $W_N S_{13}$ (plane did not arrive and Harry is dead) by proposing a counterfactual alternative that $W_N S_{12}$ (plane arrived and Harry is saved). The counterfactual alternative imagined by a model reader (an ideal reader; not an empirical reader who may not read the text as the author wishes) is projected into the textual universe by the narrator and implied author.

The causal links suggested by Helen and Harris show different causes for the same outcome. A reader might evaluate the truth value of these causal links by imagining the possible worlds in which the counterfactual propositions are actualized. In a possible world most similar to the textual actual world where a couple goes to another country like Paris and Hungary, it might not happen. However, the evaluation might be different based on RK-world. For example, one might think that it could have happened also in Paris if (s)he had some bad experience there. In a possible world, most like the textual actual world where Harry puts iodine on due time and not carbolic solution later, and they hire a good mechanic, they can avoid

Harry's terrible condition. However, the truth value of counterfactual that if Harry had not married Helen, his condition would have been better can be doubted because, in a possible world where Harry does not marry Helen, he marries another one, as Harry tells us: "if it had not been she it would have been another" (10). In a similar vein, it rejects the counterfactual that if he had not married Helen, Harry would have written. As the text communicates, it is the comfort that destroyed his discipline to write, and if he had not married Helen, he would have married another rich woman, and he would still have had that comfort. The use of counterfactuals acknowledges free will that people can make decisions and choose their lives. The causal link is essential for the purpose of identifying the counterfactual worlds inside of the textual universe. Further, I illustrate counterfactual worlds inside the textual universe by applying the proposed model (Figure 1.4.2).

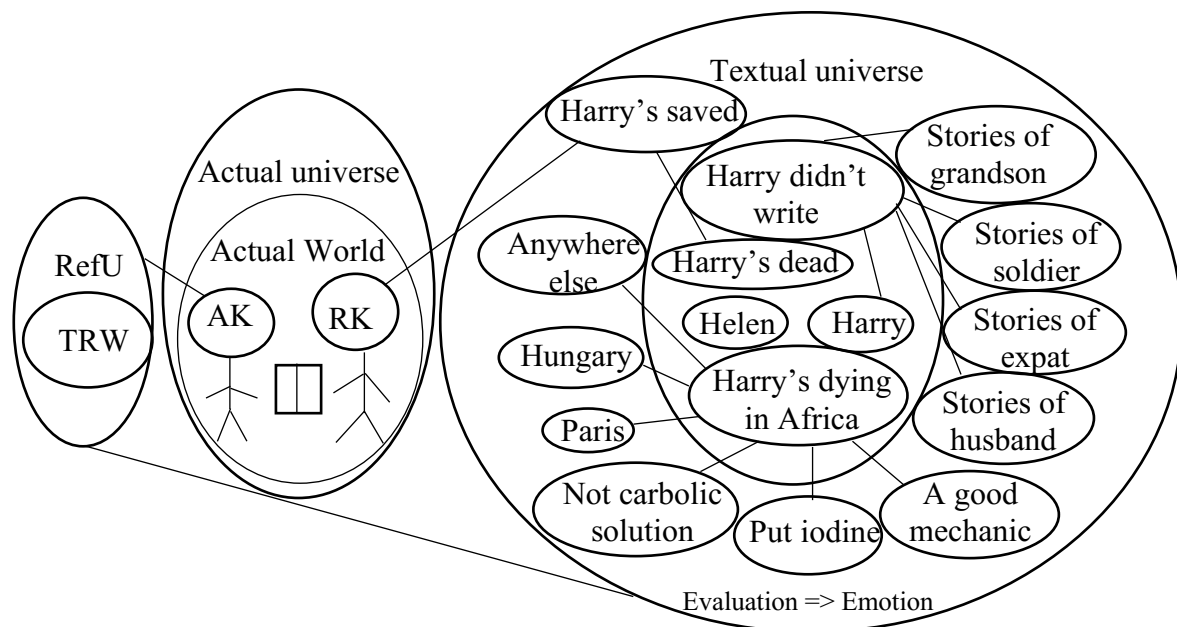


Figure 1.4.2 Applying the model to *The Snows of Kilimanjaro* (1936) by Ernest Hemingway (proposed by Ainur Kakimova)

From Figure 1.4.2, one can see how *The Snows of Kilimanjaro* maps to counterfactuals. A model reader takes first Helen's perspective to viewing the cause of Harry's death in Africa and imagines their counterfactual journey to Paris, Hungary and anywhere else but not Africa. Readers shift attention from the textual actual world, where they are in Africa, to the textual alternative states, where they are in Paris and then in Hungary and then anywhere else, while imagining counterfactuals and then comparing the latter to the former. By comparing the textual actual world to the upward counterfactual worlds, a reader can understand Helen's

regret of coming to Africa. Furthermore, a reader takes Harris' perspective on why Harry is dying in Africa and imagining counterfactuals that he put iodine on time, did not use weak carbolic solution later and hired a good mechanic who did not burn out the bearing in the truck. The comparison of these upward counterfactuals to the textual actual world helps a reader to understand his regret. However, the biggest regret of all is that Harry could have written but did not. By comparing counterfactual worlds in which Harry wrote the stories of his past (stories of grandson, soldier, expat, and husband) to the textual actual world, and evaluating his procrastination in writing as a waste of talent, readers sympathize with Harry and wish his survival so that he could write up all his stories in the textual actual world. Their wish is projected as a counterfactual world to the textual universe by the implied author. The comparison of what they wished for Harry with what actually happened and evaluating the textual actual world as a worse version makes readers even more emotional and sympathetic towards the protagonist. From the application of the proposed model to the literary text, it can be seen that imagination, comparison, evaluation, and emotion are the essential cognitive processes that readers are engaged in while reading embedded counterfactuals.

As illustrated in the model, defamiliarization is achieved by counterfactuals mapping the textual actual world to the textual alternative possible worlds. According to Shklovsky (1917), defamiliarization is the disruption of habitual perception, compelling readers to engage more deeply and perceive the world in a fresh, unfamiliar way. It advances the imaginative dimension of the literary text. The use of counterfactuals highlights the main events of the story, i.e., Harry stopped writing, he is dying in Africa and finally dies. As a result of comparison and evaluation, the emotionality of the literary text is increased. By emotionality, I refer both to the emotions of characters, such as regret yielded from upward counterfactuals and the emotions of a reader, such as sympathy. In the given story, both Helen and Harry share their regret with a reader, although Harry's regret is central to the story. Counterfactuals show characters' minds, their way of thinking and how they see the world. In other words, it opens characters' K-world (CK). With the help of perspective-taking, readers can get insights about the underlying causes of the characters' emotional states. The protagonist's poignant regret makes a model reader sympathize with Harry. This, in turn, makes the protagonist rounder (well-developed) and real. Emotional depth and a well-developed protagonist increase the tellability of the story. The fragmentations of the text are united by the theme of counterfactuals. As *what might have been* is better than *what it is*, it evokes a strong feeling of regret that can be traced throughout the story. I think it is Hemingway's great success in delivering poignant emotions of characters using counterfactuals as a literary device.

Furthermore, the theme of counterfactuals contributes to the communication of the message. An implied author conveys a moral lesson that talent without self-discipline is just *what could have been*. The story also shows the distractive power of money, comfort and taking tomorrow for granted. Counterfactuals are the main theme that contributes to the message because if there had been no counterfactuals, the short story would have been void of significance. For instance, suppose that a couple came to Africa, Harry's knee was scratched by a thorn, and he died from gangrene, and there are neither counterfactual thoughts about how they could escape Harry's condition nor Harry's counterfactual stories about what has been written, and nor the dual ending. It would carry no moral value, not to mention the loss of imaginative dimension and emotional depth. However, whether a reader is fully persuaded by the moral lesson may depend on his/her own personal beliefs and philosophical perspectives, i.e., RK-worlds. Nevertheless, readers receive a new insight into their own actual world. Thus, refamiliarizing is achieved. It encourages self-reflection and may foster behaviour regulation based on a learning outcome. A reader might revise his/her behaviour and decide to become more disciplined in the implementation of his/her talent and goals.

1.4.3 Extending the model to counterfactual historical fiction

So far, I have described the model of cognitive engagement with embedded counterfactuals, i.e., the counterfactual worlds embedded inside the fictional world. Furthermore, the proposed model can be extended to the counterfactual historical fiction, i.e., a fictional world as a counterfactual of our real world. Whilst in the former, one compares the textual alternative possible world with the textual actual world, in the latter, the textual actual world is compared to our actual world. The following diagram shows how readers engage cognitively with counterfactual historical fiction (Figure 1.4.3).

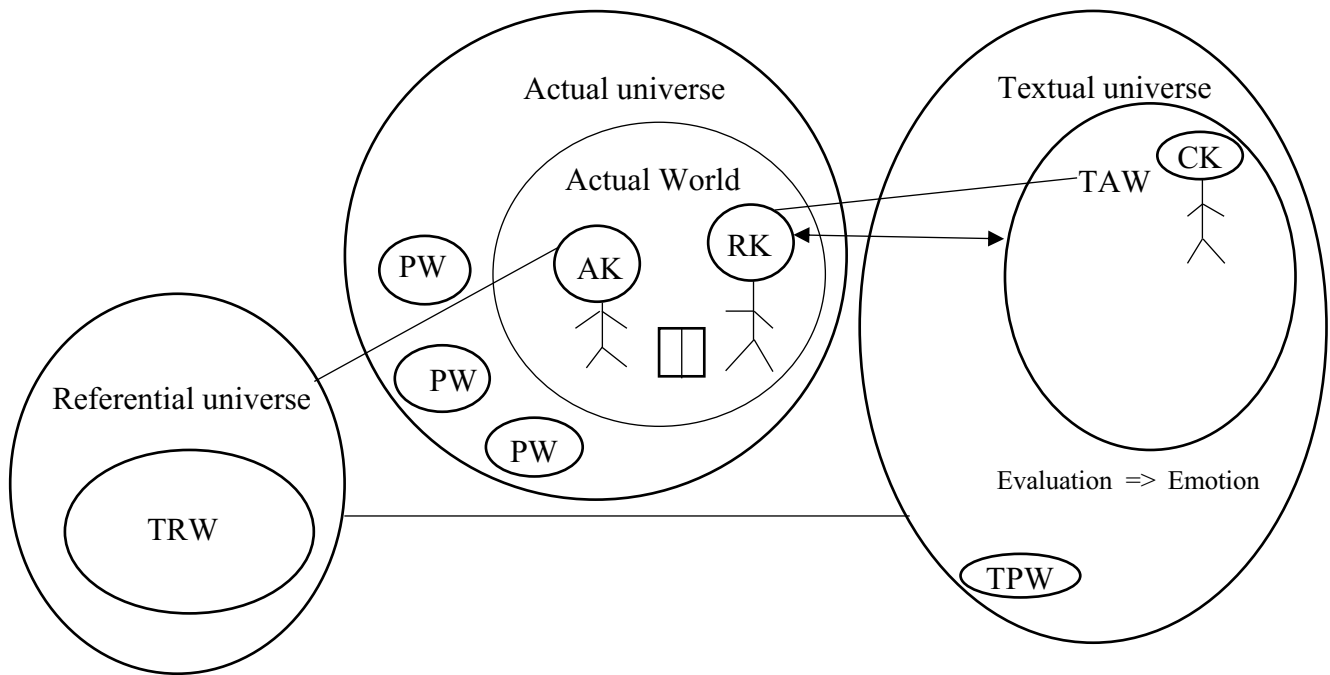


Figure 1.4.3 Readers' cognitive engagement with the counterfactual historical fiction based on possible worlds (proposed by Ainur Kakimova)

Based on the proposed model, a reader recentres himself/herself to the textual actual world and plays make-believe, accepting the counterfactual history as temporary true, suspending contradictory knowledge. However, at the beginning of encountering the first point of divergence, a reader compares the history of the textual actual world to the actual world history that (s)he knows (RK-world) because the text contradicts the real-world knowledge (a retrieved schema from RK-world) which induces a contrast effect. As a result of this comparison, a reader evaluates the actual world as better/worse than the textual actual world as well as the textual actual world as worse/better than the actual world. If the actual world is better, then a reader might have a feeling of relief thinking that the actual world history was the best possible scenario. If the actual world is worse, then a reader might have a feeling of disappointment that the actual world history was the worst possible scenario. This might lead to an emotional response to the outcome of the evaluation in the form of relief if the actual world is better (downward counterfactual) or disappointment if the actual world is worse (upward counterfactual). The cycle might be repeated after the exposure to the narrative at the post-reading phase because two world models are accessible for further comparison. Thus, the processing of both embedded counterfactuals and counterfactual historical fiction follows the

same cognitive strategy: imagination, comparison inducing contradiction, evaluation and emotion.

Besides similar strategies of counterfactuals processing employed for engaging in this type of fiction, it follows the fictional recentring and make-believe that is paramount for engagement with any kind of fiction. Whereas processing embedded counterfactuals, one can recentre to the alternative textual state from the textual state, while processing counterfactual historical fiction, readers recentre to the alternative reality from the actual reality.

Moreover, fictional recentring might have an additional impact on the re-evaluation of the RK-world. This can be explained by the principle of minimal departure interpreted through Bartlett's schemas. For creating a new imaginary world, a reader takes his/her RK-world as a template preloaded with schemas that are generalised representations of ideas, objects and actions and so on. For efficiency, all the experiences related to one concept are compressed for an abstract schema, as has been discussed before. For example, the schema of going to a restaurant is compressed into ordering, eating and paying. To make sense of the text, a reader activates these compressed schemas or sometimes individual experiences if the event is not habitual. During fictional recentring, these schemas take a new shape filled with the information provided by the text and remembered as the narrative of a certain fictional world. The access to this novel fictional world might induce a subsequent comparison with the RK-world stimulating questions such as "is it truly possible to survive in the actual world if left alone in the island as Robinson Crusoe?". A reader might compare such a possibility, evaluating the chances and/or recalling whether (s)he heard about such instances (e.g., Alexander Selkirk, who survived four years and four months on an uninhabited island). If one thought that it was impossible before, after reading that fictional world, (s)he might come up with some evidence suggesting such a possibility, altering slightly the perception of the RK world. Another example is a reader who has far-right nationalistic views might question his/her ideological beliefs after reading *Fatherland* (1992) by Robert Harris conceiving how it might lead to terrifying conditions if practised out of proportion. This, in turn, might lead to a re-evaluation of one's views towards the RK-world. The more the textual actual world contradicts the actual world, the more it is likely to induce comparison and subsequent evaluation and emotional response. Since the distance between the textual actual world and the actual world is close, the former can be perceived as realistic, and there is no need to alter available schemas for constructing the textual actual world at the degree that would evoke a contrast effect.

To understand the cognitive processing of counterfactual historical fiction, it is essential to consider the points of divergence. If it was previously defined as a nexus point in history

that has been altered, i.e., the main historical event, now I would like to extend this notion to refer to all instances that suggest counter-factuality – linguistic cues that contradict history that we know. In the broadest definition, it is a part of the text (e.g., historical figures, phrases and dates) that shows the difference between the histories of the actual world and the textual actual world. For example, the word “Führer” is a point of divergence in the following passage taken from *Fatherland* (1992) by Robert Harris because it suggests that Nazi Germany won WWII and Hitler was alive in 1950:

Construction of the Arch of Triumph was commenced in 1946 and work was completed in time for the Day of National Reawakening in 1950. The inspiration for the design came from the Führer and is based upon original drawings made by him during the Years of Struggle.

Fatherland, Robert Harris, 1992: 30

The points of divergence help to understand the difference between the RK-world and the TAW and set a different historical outline for the textual actual world that diverges from the historical outline of the actual world. The insert of the historical figure Führer in the background of victory in 1946 and 1950 suggests a counterfactual world because readers compare with their factual knowledge, according to which he made suicide in 1945. The first cue suggesting counter-factuality is essential in setting the textual actual world with a different history. However, it is cognitively challenging to keep two contradictory models for the whole period of reading such as being in the state of cognitive dissonance. And therefore, to save cognitive resources, a reader might temporarily accept the textual actual world as true. This helps to reduce cognitive tension, optimizing the efficiency of processing the incoming textual input. In other words, the textual actual world wins the supremacy dictating the rules that operate in the textual universe. The actual world knowledge is the basis for constructing any world but in the case of counterfactuals, the contradicting information of the real world is thrown back of the head beyond the spectrum of the immediate concern. After reading, however, an empirical reader might reflect on discrepancies between the two worlds inducing re-evaluation of the RK-world.

In addition, it is also worth mentioning that the historical figures described in the text are not real people from the actual world but the characters living in the referential universe. In the textual universe, these characters have their own CK-worlds. While building the identity of the historical figures in his/her mind, a reader uses RK-world but alters it based on the textual

information. For example, if one reads *Führer was a loving husband*, a reader ascribes all the properties of a historical figure Führer, such as a murderer from RK-world and adds that he was a loving husband. This assumes that the proper name 'Führer' invokes the properties of Hitler from the RK-world. It supports Pavel's (1979) theory of rigid designation, according to which a specific individual is evoked by the proper name, notwithstanding the differences in the properties from the actual world individual. Moreover, it supports Ryan's (1991) principle of minimal departure because the Führer of the textual actual world is constructed based on the actual world, but it is altered in accordance with the text. The model does not support Lewis' (1986) counterpart theory, according to which the Führer of the textual actual world would be a counterpart of the Führer of the actual world, i.e., another individual as a concrete person living on a concrete planet that might have some essential properties such as ruling the country shared with Führer of the actual world but different accidental properties such as three hands instead of two. Kripke's (1972) Transworld identity is a robust account assuming that the Führer of the textual actual world refers to the Führer of the actual world and defines both as the same individual, although it does not account for the variations in the properties as the combination of Pavel's theory of rigid designation and Ryan's principle of minimal departure does.

Thus, the model of cognitive engagement with counterfactuals at the micro-level and macro-level resembles maintaining similarity in such cognitive processes as imagination, contrast effect, evaluation and emotional response. While processing counterfactuals inside the textual universe, one recentres from the actual world to the textual actual world and from that to the textual alternative possible world. And whilst processing a counterfactual as a textual universe, one recentres from the actual world to the textual actual world. At the level of the genre, the cognitive engagement with counterfactuals requires make-believe suspending contradicting information to successfully recentre to the textual actual world. In the following section, I will show how it is implemented in practice in the example of *Fatherland*.

1.4.4 Applying the proposed model to *Fatherland* (1992) by Robert Harris

As the counter-factuality in the case of counterfactual historical fiction is featured in the historical outline of the textual actual world rather than in the imaginary events actualised as textual alternative possible worlds in the textual universe as in the case of embedded counterfactuals, the focus of a brief synopsis for *Fatherland* (1992) by Robert Harris will be made on the historical facts of the textual actual world rather than the development of the plot.

The textual actual world of *Fatherland* contradicts historiography: it is set in an imaginary, counterfactual 1964 after Nazi Germany emerged victorious in World War II, extending its reach across Europe and into the East, where a prolonged conflict with the Soviets ensues - “the seemingly endless struggle against the American-backed Soviet guerrillas, which had been grinding on east of the Urals for twenty years.” (p.23) Under the iron grip of the Third Reich, conquered nations like Poland are subjected to harsh occupation, with citizens relegated to servitude based on their ethnicity. Meanwhile, Switzerland serves as a neutral ground for clandestine political dealings and illicit financial transactions, thriving on the wealth taken from Nazi corruption. In this totalitarian state, dissent is swiftly crushed, and citizens are indoctrinated to unquestioningly venerate Hitler and the Party, with any deviation risking imprisonment or worse.

Against this backdrop, the narrative follows Xavier March, a jaded detective in the Kripo, as he becomes embroiled in a high-stakes investigation. Tasked with probing the suspicious deaths of high-ranking Nazi officials, March defies orders to hand over the case to the secret police, instead pursuing leads that lead him to uncover a horrifying truth. As March delves deeper, aided by an American journalist named Charlie, he uncovers evidence of a mass genocide hidden within state secrets. Racing against time, March and Charlie risk everything to expose the conspiracy, facing betrayal and danger at every turn. “In six days’ time it would be Adolf Hitler’s birthday - the Führertag, a public holiday – and every band in the Reich would be on parade.” (p.13) Amidst the preparations for Hitler’s 100th birthday and the arrival of American president Kennedy as Nazi Germany decides to strengthen its ties with America due to the complications in the east and hides the truth about Holocaust at any cost, March’s quest for justice becomes a desperate struggle for survival in a world where truth is a rare commodity, and loyalty comes at a steep price.

The main point of divergence is the outcome of the operation “Blue” during WWII. In the textual actual world, Nazi Germany succeeded in this operation which led to their overall success: “July 1942. On the Eastern Front, the Wehrmacht has launched Operation ‘Blue’: the offensive which will eventually win Germany the war.” (p.305). From actual world history, on the other hand, one knows that Nazi Germany failed in Operation “Blue”, which led to their defeat in WWII. Starting from this historical moment, the history of the textual actual world follows a different path that is maintained through other points of divergence from actual world history such as “victory over Russia in the spring of ’43” (p.112), “peace with the British in ’44” (p.112), “peace with the Americans in ’46” (p.112), “...1948 Reich Civil Defense Law...”(p.147), “in the 1950s,...Omsk, the capital of what was left of Russia” (p.272). A

different historical path also affected the lives of historical figures such as Goering dying in 1951 instead of 1945, Himmler being killed in an aircraft explosion in 1962 instead of committing suicide in 1945, Nebe being alive in 1954 instead of being executed in 1945, Churchill and the Queen living in Canada instead of England, and Adolf Hitler being alive in 1964 instead of committing suicide in 1945.

The counterfactual world of *Fatherland* (1992) is set up on the first pages of the book with the help of visual aids showing Hitler's project of reconstructing Berlin in 1964 and the counterfactual The Greater German Reich of 1964. Thus, the author prepares readers for counter-factuality before the text appears and from the beginning of each part (e.g., SS oath dated 14 April 1964). Later it is sustained using counterfactual historical sentences and/or whole passages in the text. The combination of all the other quotations from the real world and the date 1964 suggest the continuation of the Nazi regime. All the words referring to Reich, SS, Führer, NS, Gestapo, U-boat, and Propaganda Ministry are the elements of the text that maintain the counterfactual world set in 1964. The following diagram shows readers' cognitive engagement with *Fatherland* (Figure 1.4.4).

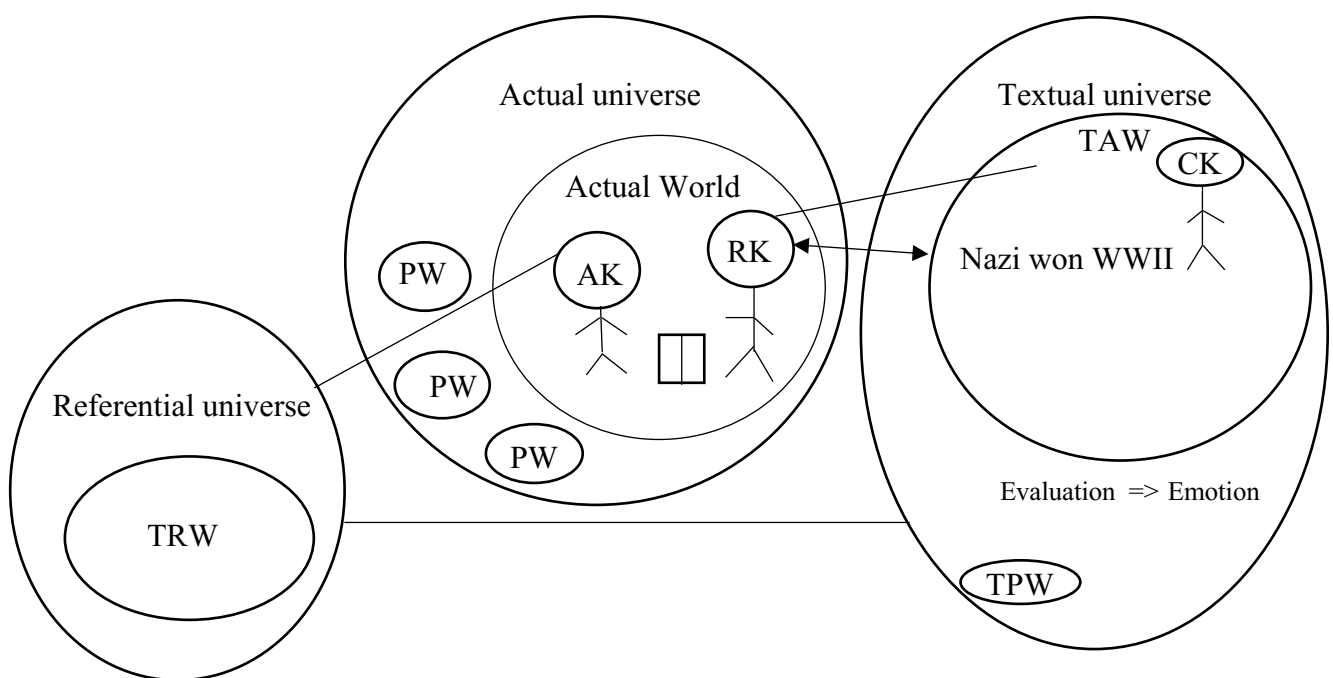


Figure 1.4.4 Applying the model to *Fatherland* (1992) by Robert Harris (proposed by Ainur Kakimova)

As shown in the diagram, whilst imagining the textual actual world, its history is contrasted with the historical information from the RK-world. However, a fictional recentring to the

textual actual world entails conscious make-believe, and therefore a reader suspends his/her historical knowledge of the actual world (Nazi losing WWII) and adopts the historical fact of the textual actual world (Nazi winning WWII) for the moment of reading. It is not strictly in line with Raghunath (2017), who proposes a constant comparison between the actual world and the textual actual world to make sense of both, i.e., reciprocal feedback. It is not also the same as the ontological superimposition of Raghunath (2017), according to which one superimposes the textual actual world over the actual world, which suggests that both worlds are active during reading. It would be cognitively too costly to maintain both world histories throughout reading several pages not mentioning the whole book. And therefore, to optimize the cognitive resources, a reader might use only essential schemas from the RK-world to comprehend the textual actual world, such as Nazi Germany, Hitler, and dictatorship, amongst others. The schemas of the RK-world are altered as dictated by the text to maintain the coherence of the textual actual world. Evaluation takes place because of a contrast effect between the textual actual world and the actual world after comparison in the initial stage of deducing counterfactuality and also at the post-reading phase, as two worlds are available for further comparison. Imagining Nazi Germany in 1964 makes a reader evaluate the actual world history as better and the textual actual world history as worse. The positive evaluation of the actual world stimulates a positive emotion, such as relief.

In addition to the contrast effect induced by the counter-factuality, an additional effect might be yielded from the exposure to the fictional reality because it creates a new possible world that is stored in mind and can be accessed for comparison with the actual world that might, in turn, affect the RK-world by re-evaluating it in the background of a new perspective projected into the textual universe by the AK-world. For example, after reading *Fatherland*, one might compare the world where the Nazi regime reigns to a democratic world and perceive the RK-world in a more positive light. However, it also depends on the individual RK-world as one from a totalitarian regime might perceive the RK-world even more frightening after taking a harsh look into the reality and finding similarities between the two worlds. This cross reference might not only influence the perception and evaluation of the RK-world but also affect the attitude and behaviour. If a reader believes that nationalism is good and one must safeguard it at any cost at the expense of killing the people of other nations in the war for the country, after reading a counterfactual that depicts war as an irrational struggle of a dictator to conquer the world, (s)he might start opposing his/her beliefs and treat those who do not fall under the category of one's own nation with more tolerance and understanding.

1.5 Summary

To summarize this lengthiest chapter, I am going to delve into each section and recap the important points. First, I started with a question of why the mind creates imaginary worlds that are not facts. Pleasure derived from fiction reading has been explained from the evolutionary aesthetics perspective that posits the usefulness of fiction in enhancing the genetic fit of natural selection and improving the chances for survival by serving adaptive function. Fiction helps people to organise the world in structures; simulate different social and risk-associated scenarios in a safe zone providing a test run for activities; transfer knowledge, cultural norms and values, uniting people and strengthening social bonds; take different perspectives and understand various minds enabling people to understand and predict the behaviour of others; understand himself/herself better by imaginatively putting oneself in a character's shoes; regulate his/her own emotions and boost the mood and psychological well-being. After acknowledging the usefulness of fiction as an adaptive function in a complex society, I drew attention to counterfactuals as an adaptive function. Counterfactuals serve the same adaptive functions as fiction does, with the addition of a performative function that improves goal-oriented behaviour by learning from past experiences. Based on the evolutionary aesthetics perspective, I underscored the importance of studying counterfactuals.

In the following section, I defined the topic of the dissertation identifying counterfactuals as a type of conditionals. First, conditionals were defined as conceptual primitives consisting of antecedent and consequent that show causal inference (*modus ponens* and *modus tollens*). Factual and suppositional continuum based on conceptual primitives *KNOW* and *THINK* in the spirit of Wierzbicka (1997) mentioned in Kakimova (2022) was chosen as the most appropriate for the scope of the dissertation to differentiate between conditionals as it highlights that counterfactuals convey dual meaning: supposition and factual inference. Whereas supposition is what we entertain in our mind, factual inference is what is deduced from the proposition. Counterfactuals were defined as conditionals that depict what might have been as opposed to what it is. I further studied counterfactuals in a literary context as *disnarrated* and *counterfactual historical fiction*. It has been discussed that counterfactuals are categorised into *disnarrated*, a general term used to denote negative and hypothetical modes. I pointed out that counterfactuals did not receive due attention in their own right as a literary device. Counterfactuals are used in literary texts as *embedments* to introduce counterfactual thoughts of characters and/or narrators in the form of wishes, hopes, fears and dreams. They embellish the text with cognitive and emotional depth, making the characters round and well-

developed, as well as the literary text more thought-provoking. Counterfactual thoughts were extended from the intra-text level to the inter-text level, introducing the genre of counterfactual historical fiction. Counterfactual historical fiction has been defined as an alternate reality in which history unfolds differently. Whereas embedded counterfactuals contradict what happened in the text, counterfactual historical fiction contradicts what happened in reality. The consideration of both types of counterfactuals broadens the scope of the dissertation, giving a holistic understanding of counterfactuals in literature. The choice of these two kinds of counterfactuals was made based on the similarity of their cognitive processing which has been elaborated in depth in the subsequent section on possible worlds theory.

The potential of possible worlds to explain the cognitive processing and aesthetic function of counterfactuals has been found to be promising, and I discussed possible worlds theory beginning with philosophical roots to the use in the field of literature. I clarified between overlapping notions such as fictional worlds, possible worlds, and text worlds. Every text has its granular worlds, but fiction constructs a special kind of possible world that is autonomous and ontologically distinct. I defined three philosophical perspectives on the ontology of possible worlds and actuality (modal realism, moderate realism, and anti-realism). I argued that it is necessary to accommodate moderate realism, the subjective representations of the actual world, so as to better explain readers' engagement with fiction. Even if it has been noted by Raghunath (2017), the potential of RK-worlds to explain fictional recentring and the principle of minimal departure from cognitive perspective was not given due attention. The differences and similarities between philosophical possible worlds and fictional worlds have been discussed as well. Whereas the former obeys the logical principles of excluded middle and non-contradiction, the latter may not. Both possess accessibility relations. They are possible, provided they are accessible from the actual world.

After an overview of possible worlds account, I took Ryan's model as a blueprint. However, I questioned Ryan's ontological position because she admits that there is only one actual world and that the fictional world is a mental construct but claims that during fiction reading, the fictional world becomes actual. I raised the need to take a stance in ontological view. First, I revised Ryan's model of possible worlds, adding to the vocabulary AK-world (author's K-world) to explain the role of the referential textual universe that has been previously not given due consideration and RP-worlds (reader's possible worlds) proposed by Eco ([1976]1984). The textual referential universe is created by the author and influenced by his/her AK-world (to some extent). The events that take place in the textual reference world by the imagination of the author are projected into the textual actual world. Whereas the reader

cannot access AK-world, the author can project a model RK-world to the textual universe in the form of RP-worlds. Furthermore, I proposed to interpret fictional recentring using interrelation between AK-world and RK-world to fill the gap in the ambiguity of the ontological stance. According to the revised model of Ryan's recentrable possible worlds, fictional recentring is achieved by recentring the cognitive framework of the actual world, RK-world, from the actual world to the textual actual world. If actual in 'actual world' refers to the metaphysically existing world, actuality in 'textual actual world' is warranted by the evocation of schemas from RK-worlds and conscious make-believe, but TAW remains a mental construct. The interpretation of the fictional recentring in terms of the recentring RK-world that is explained in the confines of moderate realism helps us to avoid the reliance on modal realism that is found to be extravagant. Moreover, I explained Ryan's principle of minimal departure, applying Bartlett's schemas from cognitive science. According to this interpretation, a reader completes the textual universe by means of RK-world's schemas that are based on prior experiences as a result of interaction with the external world.

To apply the revised model of Ryan's possible worlds to the analysis of embedded counterfactuals, I also added Eco's textual states to identify the fabula, i.e., a skeleton of the story. I revised Eco's model of possible worlds by adding the alternative textual states created by the narrator(s), characters, and readers. The model shows how counterfactuals as alternatives to the textual states are nested around the textual actual world. Furthermore, readers cognitively engage with counterfactuals by imagining the textual actual world and its alternatives. While imagining embedded counterfactuals, readers recentre their cognitive framework from the textual actual world to the alternative textual world state. Afterwards, they compare them to each other, evaluating them and emotionally responding to the outcome. To show the feasibility of the model, I applied it to the interpretation of *The Snows of Kilimanjaro* by Ernest Hemingway (1936). First, I identified the linguistic elements that signal counterfactuality, which will be analysed under the linguistic microscope in the second part of the dissertation. It has been shown that imagination, comparison, evaluation, and emotion are essential for the comprehensive interpretation of the short story. The application of the model showed that literary counterfactuals add complexity, emotional depth, and moral value to the literary text.

In the following section, I extended the proposed model to the analysis of counterfactual historical fiction. Like the processing of embedded counterfactuals, a model reader engages in such cognitive processes as imagination, comparison, evaluation and emotion. At the genre level, although make-believe is important, suspending facts of the actual world once recentred

to the textual actual world. To illustrate the proposed model in practice, I analysed *Fatherland* by Robert Harris (1992). I identified the linguistic cues that sustain the counter-factuality and how a model reader contrasts the textual actual world with the actual world with the onset of the first cues in the form of images signalling counter-factuality. Besides the aforementioned cognitive processes, a reader might engage in a re-evaluation of the RK-world.

2 Counterfactuals from a cognitive paradigm

In this chapter, I am going to discuss the cognitive underpinnings of counterfactual reasoning to gain insights into the comprehension of counterfactuals. So far, the model based on possible worlds from the previous chapter suggests that readers comprehend embedded counterfactuals by comparing the textual state to its alternative and counterfactual historical fiction by initially contrasting the actual state to its alternative. But what can we learn from cognitive scientists? I need to consider cognition because, unlike Umberto Eco's focus on abstract readers, I am working with concrete, real readers. I will seek to confirm this hypothesis through experimental research.

In the realm of cognitive science, the textual/actual state can be regarded as the factual inference/meaning (factual possibility) and its alternative as suppositional/imaginary meaning (counterfactual possibility/conjecture). The combination of these two meanings is known as dual meaning. These notions will be used throughout the chapter. First, I will talk about cognitive theories of counterfactuals comprehension. I will provide arguments against considering conceptual blending as a valid theory for explaining cognitive engagement with counterfactuals. I will consider mental model theory as a more robust cognitive theory when it comes to mental representations associated with counterfactuals. However, I will provide an alternative theory, suppositional theory, that argues against mental model theory to give an unbiased picture of scientific discussion. Afterwards, I will overview the previous empirical findings about counterfactuals processing to show which cognitive theory is empirically supported. Furthermore, I will discuss cognitive constraints on comprehension, including limitations in making inferences and working memory capacity. These two are essential for understanding counterfactuals. Thus, this chapter is devoted to the discussion about a cognitive paradigm, which is crucial to know as I am gathering data from humans with cognitive facilities.

2.1 A critical analysis of the cognitive accounts of counterfactuals

2.1.1 The Conceptual Integration Theory

I have already mentioned that conceptual integration theory is not suitable for counterfactuals and in this section, I am going to explain *why*. Conceptual integration theory, aka blending, was proposed by Fauconnier and Turner (1998) to interpret the cognitive processing of counterfactuals. Before going into details on how they apply conceptual blending to

counterfactuals specifically, let me first introduce the general principles of the theory.

According to the account, “blending consists in partially matching the two inputs and projecting selectively from these two input spaces into a fourth mental space, the blended space” (Fauconnier and Turner, 2002: 58-59). Thus, to create a blend, four mental spaces should be created: input space 1, input space 2, generic space, and blended space. By a mental space, Fauconnier (1994: 16) describes “structured, incremental sets – that is, sets with elements (a,b,c,...) and relations holding between them (R_{1ab} , R_{2a} , R_{3cbf} ,...), such that new elements can be added to them and new relations established between their elements.” Input spaces 1 and 2 include information about elements and their relations. Generic space is the space where shared properties of two input spaces are projected. The blended space is where the elements are selectively projected from two input spaces. The conceptual blending has been extensively used to interpret the meaning of metaphors. It has also been applied to the counterfactuals (Fauconnier and Turner, 1998; Harding, 2004). In the analysis of counterfactual meaning, Fauconnier and Turner (1998) consider three spaces, i.e., two input spaces and a blend. They demonstrate the application of blending to the counterfactual: “If Churchill had been Prime Minister in 1938 instead of Neville Chamberlain, Hitler would have been deposed and World War II averted.” For understanding of the counterfactual, the following mental spaces are created:

Input space 1: 1938, Churchill, not Prime Minister, opposition to Germany, etc.

Input space 2: 1938, Chamberlain, Prime Minister, appeasement etc.

Blended space: Churchill, Prime Minister, opposes Hitler, WWII averted, no holocaust etc.

As we see from the information provided in the mental spaces, the blend contains the selection of Churchill and opposition to Germany from input space 1 and the Prime Minister from input space 2. Fauconnier and Turner (1998) note that the blended space contradicts both input spaces. Furthermore, they add that “the antecedent and the consequent exist in the blended space; neither exists in either of the input spaces” (Fauconnier and Turner, 1998: 1). This means that input spaces are not representations of dual meaning (supposition and factual inference) but rather the spaces representing two distinct concepts associated with two different people, i.e., Churchill and Chamberlain. In other words, input spaces include true propositions about Churchill and Chamberlain. In the blend, there is a supposition conveyed by the counterfactual that Churchill being Prime Minister in 1938 was a consequence of averting WWII and the holocaust by opposing Hitler. Both input spaces contain factual inferences about two

counterfactual individuals, Churchill and Chamberlain, but there is no information about the factual inference that WWII was not averted, and there was a holocaust because of Chamberlain's appeasement.

If we take another example when there is only one actant, such as "if Harris had written his stories, he would not have blamed himself for not writing them", the input space 2 will be empty because one cannot put there "Harris" and "writing" because according to Fauconnier and Turner (1998), the blended space contradicts both input spaces.

Input space 1: Harris, not writing, etc.

Input space 2: -

Blended space: Harris, writing, not blaming etc.

In this case, it is not clear from which space "writing" is projected to the blended space. The input space 2 can be filled in if only the phrase "instead of" is added to the sentence as in the following: "If Harris had written his stories instead of procrastinating, he would not have blamed himself for not writing them".

Input space 1: Harris, not writing, etc.

Input space 2: Harris, procrastinating, etc.

Blended space: Harris, writing, not blaming etc.

In the example above, the blended space contradicts both input spaces, but it is still not clear from which space "writing" is projected to the blended space. It follows there should be at least two individuals compared to each other to be able to properly apply the conceptual integration as in the following: "If Harris had written his stories instead of his brother Henry, he would not have blamed himself". To understand the example, let us imagine that Harris published the stories that had been written by his brother Henry indicating himself as an author. For this example, we construct the following mental spaces:

Input space 1: Harris, not writing, etc.

Input space 2: Henry, writing, etc.

Blended space: Harris, writing, not blaming etc.

The above example is satisfactory based on Fauconnier and Turner (1998) because all the

spaces are filled, the blended space contradicts both input spaces, and there are antecedent and consequent in neither of the two input spaces. As shown from examples, the application of conceptual blending to counterfactuals is valid only if there is a comparison between two distinct individuals that contradict each other. However, counterfactual sentences are not limited to the comparison between individuals, as shown in two previous examples. Thus, the application of conceptual blending to counterfactuals faces a problem with generalisability to counterfactuals that do not inherently compare two individuals.

Some scholars who tried to apply mental spaces in the classroom of English propose to use two input spaces for representing supposition (hypothetical space) and factual inference (reality space) and then blend two spaces to receive counterfactual statements (Alberding, 2004). Jacobsen (2018) used mental spaces to describe the meaning of conditional sentences, depicting one input space for a supposed future and the other for an alternative future. The descriptions contradict the original proposal of Fauconnier and Turner (1998), according to which the input spaces do not contain antecedent and consequent. In the application of conceptual integration to counterfactuals, Harding (2004: 85) used the example of her own experience that she “almost locked the keys in the car” when she was going to have lunch with her sister and kids and created four mental spaces: a generic space, two input spaces and counterfactual blend as the following:

Generic space: participants, plans, car, keys, evaluation

Input space 1 (reality input): participants (kids, sister, speaker), plans (lunch), car (locked), keys (*retrieved*), evaluation (*good*)

Input space 2 (counterfactual input): participants (kids, sister, speaker), plans (lunch), car (locked), keys (*on seat*), evaluation (*bad*)

Counterfactual blend: participants (kids, sister, speaker), plans (lunch), car (locked), keys (*on seat*), result (locked out), evaluation (*bad*), call Joe, Joe leaves work, everyone unhappy.

The context that Harding (2004) provides implies the counterfactual that if she “had not retrieved the keys from the seat”, she with her sister and kids “would have been locked out”, and “Joe would have had to come from work to bring the keys” (p.87-88). Notwithstanding a good point regarding evaluation that the contrast between two different evaluations enhances the evaluation of the actual situation as good, the application of the conceptual integration itself poses some problems. In line with the original proposal of Fauconnier and Turner (1998), Harding (2004) does not include both antecedent and consequent in the blend, although the

antecedent of the counterfactual blend is projected from the counterfactual input. According to Fauconnier and Turner (1998), blended space contradicts both input spaces; however, in the example provided by Harding (2004), it contradicts only input space 1 (reality space). Even if we put aside the original proposal, the application of the conceptual integration theory does not represent the counterfactual fully. It does not feature the consequent of reality, that is, *Joe not leaving work and everyone happy*. If one follows the logic of the theory based on the example, then it can be assumed that people compare two contrasting meanings of the antecedent (reality antecedent versus counterfactual antecedent) and think of the counterfactual possibility (counterfactual antecedent and counterfactual consequent) disregarding reality consequent. But it is essential to also consider reality consequent to reinforce the evaluation that what followed from the counterfactual antecedent was good/bad. For example, if we think of the fact that *Joe is not leaving work and everyone is happy*, we can enhance the evaluation of the counterfactual consequent *Joe leaving work and everyone being unhappy* as bad and, as a result, being relieved that it did not happen. Another issue is with its falsifiability (see Gibbs, 2000). According to Gibbs (2000), it is not just one theoretical account but a large framework that is challenging to test empirically.

2.1.2 The Mental Model Theory

Another cognitive theory that can be considered for the processing of counterfactuals is known as the mental model theory, developed by Johnson-Laird in 1980 to explain comprehension and reasoning. Unlike the conceptual integration account, the mental model theory is falsifiable and well-recognized among cognitive psychologists. Before going into details about how mental models are used to explain the cognitive processing of counterfactuals, let me first draw out the key points of the framework.

The notion of possible worlds is also used in the mental model framework of cognitive psychologists, each mental model representing a possibility. Johnson-Laird (1980) claims that discourse can be explained as the ability of the mind to create representations of possible worlds to the real world that exists. Successful communication is achieved because of mental models for subjects, situations, and relationships of discourse as well as mental states of interlocutors. During the conversation both interlocutors keep in mind the model of their ongoing discourse that creates its true context. Johnson-Laird (1980:653) interprets a possible world as a “possible state of affairs”. Thus, each mental model is created for each possible situation. He acknowledges the existence of the mental model of the world, which is how we mirror the

external world in our mind. In other words, it is an internal representation of the world. Hence, RK-world, as the representation of the actual world in mind, fits well with his account.

Despite being used to represent a possible world; mental models have a broader and more nuanced application. Johnson-Laird (1980) differentiates between mental models and related notions such as propositional representation and image concepts. According to him, a mental model takes a propositional representation as a base and adds general knowledge as well as other important representations to understand implicit information. Unlike the image concept, pictorial representation is not mandatory for a mental model as Johnson-Laird and Byrne (2002) propose that models representing possibilities are both usually imaginable and abstract. Propositional representation, based on Johnson-Laird (1980), is regarded as a function with definite syntactic and semantic properties in which representation is viewed as “an unordered set of expressions” (Johnson-Laird, 1980: 97). A propositional representation describes true or false information based on the mental model of the world. Propositions have a semantic network: similar propositions tied together to the same node. A propositional representation has an arbitrary or more abstract structure, whereas a mental model has a direct analogical structure to the state of affairs because its structure represents the major aspects of a similar state of affairs in the outside world (Johnson-Laird, 1980). But only the creation of mental models can be equated to deep processing because propositional representations lead to shallow comprehension, although they facilitate information encoding and retrieval due to semantic network. Whereas deep processing is longer but kept in mind better, shallow processing is faster and easily forgotten. In a similar vein, a number of models play a role in the speed and correctness of the interpretation. As a result, full explicit models require more time and are more difficult to draw inferences from them.

Based on the theory, mental models of quantified assertions are somewhat similar to an analogical role for structure, where one element means one individual, and links show identities between them. For example, quantified assertions, such as *all dogs are mammals*, or *some students are athletes*, are represented in our minds using mental models. These models work similarly to an analogical role for structure in that each element within the model corresponds to a specific individual or instance. The connections between these elements illustrate the relationships or identities among them. For example, in the assertion *all dogs are mammals*, each dog is an element, and the link showing that each dog is a mammal represents the identity relationship between these groups. Additionally, mental models represent an arbitrary number of elements to introduce the members of the set. For example, *two boys kissed one girl* has three elements: *two boys* and one *girl*. A link between these elements is a *kiss*. This example

can be called a (hybrid) model. Models can be more complex: two-/three- or more dimensional and dynamic. One of the advantages of propositional representation is that mental models can be scanned in any direction, unlike propositional representation, which can be scanned only in the direction encoded in the representation. However, there is a definite advantage of propositional representation over mental models when it comes to ambiguous statements: it is more economical to keep in mind the proposition because, otherwise, we need to create many possible mental models for accurate interpretation (Johnson-Laird, 1980). The law of truthfulness can be defined as a model of assertions representing a possibility, provided the assertions are true. A clause of assertions is represented by the model iff (if and only if) it is true in the given possibility (Johnson-Laird and Byrne, 2002). In the example of such inclusive disjunction, “The battery is dead, or the circuit is not connected, or both”, we can create three mental models of factual possibilities (Johnson-Laird and Byrne, 2002: 653): dead, $\neg$ connected, dead and $\neg$ connected. From this sentence, we can also deduce factual impossibility, namely: $\neg$ dead connected (Johnson-Laird and Byrne, 2002: 654).

According to Johnson-Laird (1980), oral as well as perceptual material can trigger the construction of the models, but subjective inference is necessary only in the former case. The elements of mental models that can be perceived from the real world can trigger corresponding images. In contrast, thinking might be based on models that do not represent any visuals. A mental model can provide prototypical information during the recognition of a real-world object (Roberts, 1965; Marr, 1976). It can be used to comprehend “the output of lower-level visual processes” (Johnson-Laird, 1980: 100), which is known as “primal sketch” (Marr, 1976). For example, when one sees a bird, (s), he activates a primal sketch of the bird in their mind, and to do that (s)he takes assistance from the mental model of the bird that constitutes such information as feathers, wings, beak, and the ability to fly. In addition, word semantics relates to the mental model that one creates for the external world; there is a connection between the usage of lexical procedures and procedures for building, altering, and assessing mental models (Johnson-Laird, 1980). Thus, according to Johnson-Laird and Byrne (2002), perception, imagination, and discourse understanding can construct models representing possibilities both visually imaginable and abstract.

To illustrate the application of the theoretical framework to the comprehension of counterfactuals, Johnson-Laird and Byrne (2002: 652) provide the following example: “if there had been a circle, there would have been a triangle”. To understand the counterfactual, one must create two explicit models: a model for fact ($\neg$ circle, $\neg$ triangle) and a model for

counterfactual possibility (circle, triangle). Johnson-Laird (1980) restates Scribner and Orasanu (1979) that the ability to make inferences cannot be done without building and altering these models. In contrast to counterfactual conditionals, for indicative conditionals such as “if there is a circle, there is a triangle”, people create a single model (circle, triangle) because of forgetting about the implicit model. Nevertheless, conditionals are very diverse because they can possess an unlimited number of meanings which contain approximately ten sets of possibilities and different kinds of relations between p and q . This can be reasoned by the fact that conditionals have complex interactions among their elements, namely, “their core meanings referring to possibilities, their representation in mental models, and their semantic and pragmatic modulation” (Johnson-Laird and Byrne, 2002: 674). Indicative conditionals are believed to be assertions, as Johnson-Laird and Byrne (2002:673) assume because people consider possibilities to be true in a certain context, and therefore, it is difficult to reveal modus tollens (if A, then B: not B, therefore, not A,). The semantics of counterfactuals postulate that they contain the same possibilities as the related indicative ones, with the only exception that the number of possibilities also includes counterfactual possibilities (Johnson-Laird and Byrne, 2002). Furthermore, compositionality is essential for mental models ensuring semantic and syntactic relations are intact (Johnson-Laird and Byrne, 1991). By compositionality, they mean that the meaning of a complex expression is determined by the meaning of its constituent parts and the way they are combined. In addition, context plays an essential role in conditionals interpretation, and therefore, we can apply the principle of pragmatic modulation, which postulates that: “the context of a conditional depends on general knowledge in long-term memory and knowledge of the specific circumstances of its utterance” (Johnson-Laird and Byrne, 2002: 658). According to the mental model theory, knowledge of discrete situations is illustrated in explicit models that are used for modulating the models of the basic interpretation.

In the chapter “Ten Sets of Possibilities for Conditionals”, Johnson-Laird and Byrne (2002) consider possible interpretations of conditional sentences. According to them, it is possible that the antecedent is denied and the consequent is affirmed. It can be illustrated by the following example: “If Bill Gates needs money, then I’ll be happy to lend it to him” (Johnson-Laird and Byrne, 2002: 660). It is obvious that the rich man does not need money, and therefore, the antecedent can be considered as false, whereas the consequent is true because the speaker is willing to lend money to Bill Gates. It can be demonstrated by the following fact: $\neg$ need; happy to lend. The same symbolic representation of fact can be used for the corresponding counterfactual “If Bill Gates had needed some money, then I’d have been happy to lend him some”. However, besides the factual possibility, it also conveys the counterfactual

possibility (Johnson-Laird and Byrne, 2002: 662): need; happy to lend. Based on the mental model theory, we can assume that people usually apply mental models of conditionals. These explicit models created by the individuals can differ because of the meaning and contextual information provided (Johnson-Laird and Byrne, 2002).

From the above we can deduce by now that the logic behind the conditional interpretation is based on the material implication that is defined by the truth and falsity of conditionals. Based on the truth-table of material conditionals used in formal logic, the counterfactual conditional is false only if the antecedent is true and the consequent is false. For example, *if he had invested in that stock, then he would be wealthy now* is false provided he did invest in that stock (p is true) and he is not wealthy now (q is false). However, according to Johnson-Laird and Byrne (2002), the same logic of truth and falsity is reasoned through the perspective of possibility and impossibility. According to Byrne & Tasso (1999), in comparison with the indicative conditionals, the perception of counterfactual conditionals results mostly in modus tollens. Modus tollens means “not q , therefore not p ”, whereas modus ponens means “ p , therefore q ”. Some people represent the counterfactual possibility from the counterfactual conditional, whilst some other people represent the factual possibility or pay attention to only one from available two models of interpretation (Thompson and Byrne, 2000). It follows that the counterfactual possibility tends to rise modus tollens and antecedent denial (Johnson-Laird and Byrne, 2002). It is also possible that people create the null model, no valid inference, when there is a conflict of beliefs (Johnson-Laird and Byrne, 2002). Hence, true assertions (both affirmative and negative) are represented by the models and not false ones.

If we apply a mental model framework to the example based on *The Snows of Kilimanjaro*, such as “if Harris and Helen stayed in Paris, they would have been comfortable”, we create two mental models, one for imaginary meaning that they are in Paris and comfortable and another one for factual inference that they are in Africa not Paris and not comfortable. In other words:

Imaginary meaning: Paris, comfortable.

Factual inference: $\neg$ Paris, $\neg$ comfortable (not Paris, not comfortable).

In relation to the proposed model based on possible worlds, a mental model for an imaginary meaning corresponds to the alternative textual state and a mental model for a factual inference to the actual world textual state. Thus, the proposed model well fits with the mental models account because both assume that people/readers imagine dual meaning.

Despite the application of mental models mostly at the level of propositions, it can also be considered at the text level. As has been mentioned before, the internal mirror of the world creates a world model similar to RK-world. The textual actual world of counterfactual historical fiction can be regarded as another model of how the world could have been. Based on the mental model theory, people keep in mind both factual and imaginary meanings to comprehend counterfactuals. This would imply that readers keep in mind both the actual world and the textual actual world. For example, while reading *Fatherland*, people think of the following:

Imaginary world: Hitler, winning

Actual world: $\neg$ Hitler, $\neg$ winning (no Hitler, not winning)

However, it would impede fictional pact including fictional recentring and make believe, and therefore it is not applicable to the genre. Although, it is in line with the contrast between the textual actual world and actual world that takes place before recentring to the fictional reality. Thus, mental model theory partially matches the proposed model based on possible worlds underscoring the importance of comparing between imaginary and factual.

Whereas most considerations in the framework of possible worlds theory remains theoretical, mental model theory has been extensively tested in empirical investigations. And therefore, I will discuss empirical investigations of counterfactuals that mostly dealt with their cognitive representation in the subsequent section. However, before going there, let me first to discuss the third account of counterfactuals comprehension that is known as suppositional theory.

2.1.3 The Suppositional Theory

Evans and Over (2004) put forward the suppositional theory. According to them, conditional probability hypothesis is favoured over truth functionality. The conditional probability hypothesis assumes that the mental representation of antecedent and consequent is subjectively connected which denotes the level of belief in the consequent given the antecedent. Evans and Over (2004) argue against the mental model theory because it is based on the material implication paradigm. They further argue that the notion of ‘mental models’ is not clear because it can denote any mental representation of real or hypothetical situation. Moreover, they add that limited working memory capacity does not allow us to construct more than one mental model. According to them, the current theory developed by Johnson-Laird and Byrne

(2002) does not look for counter-examples and, therefore, does not validate inferences that should be made according to the general theory of mental models. They claim that the mental model theory does not outline any connection between antecedent and consequent including the level of strength or probability. They criticize Johnson-Laird and Byrne's (2002) mental model theory for lack of directionality, propensity and implicature.

Suppositional theory suggests that models of conditionals should have directionality, level of confidence, belief, and probability expressed in conditionals and individuals' conclusions. Suppositional theory is based on the 'Ramsey test', 'pragmatic inference', and 'dual process theory'. The Ramsey test involves supposing the antecedent and evaluating the consequent (Williamson, 2020). In other words, the Ramsey test is used for reaching a level of belief. This is simply done by analysing the degree of our belief in consequence given the antecedent. This approach challenges the extensional semantics of mental model theory, which is criticized for being equivalent to the material conditional (Evans et al., 2005). The suppositional theory emphasizes the role of imagination in developing consequences of suppositions and considers various methods of assessing conditionals (Williamson, 2020). Recent research suggests that the Ramsey test may be incompatible with the Relevance Hypothesis, which posits that the antecedent must be probabilistically relevant to the consequent for a conditional to be acceptable (Sikorski, 2022). This has led to proposals for modifying the Ramsey test to incorporate relevance conditions. However, Evans and Over (2004) propose the mental representation of conditionals: people have a quick and automatic focus on the possibility expressed by the antecedent after the insert of 'if'. However, the next stage of processing is not clear. According to Evans and Over (2004), it heavily rests on individuals' background beliefs and access to additional relevant information.

Based on the suppositional theory, the following symbolic representation describes conditionals: $p \rightarrow q$ (0.95). Evans and Over (2004) interpret it as an arrow indicating the directionality of conditional belief and 95% standing for a propensity that we believe in the consequent q given the antecedent p . Its converse implicature is represented symbolically by $p \leftarrow q$ (0.80). This can be interpreted as there is an 80% propensity of belief in the antecedent p provided the consequent q . They rightly note that people cannot denote the exact percentage of propensity but rather use a level of high, middle, and low. Furthermore, Evans and Over (2004) propose people's pragmatic inference that the antecedent increases the probability of the consequent if p causes q . For example, *if John takes supplements, he will be healthy*. People tend to believe that taking supplements will increase the probability of being healthy. If people

believed that John would be healthy anyway, it would be consistent but pragmatically inappropriate. People assess “the probability of causal conditionals mainly in reference to the conditional probability” (Evans and Over, 2004: 14). In the framework of suppositional theory, it is of paramount importance to consider pragmatic influences and the dual process theory of reasoning, which relate to each other. According to the dual process theory, there is an interplay between heuristic/pragmatic influences and abstract rule-based reasoning: some people have a belief-based answer, whilst others have a logic-based response (Evans and Over, 2004). The content and context play an essential role in how individuals comprehend and draw inferences from conditionals, and therefore, the Ramsey test alone is not enough. Dual process theory is supported by belief bias research. Implicit inferences have the following features: quick and automatic inferences made without conscious reflection; corresponding contextual background knowledge and belief will be activated; uncertainty is noted; inferences are made based on high probability. Hence, we make logically valid conclusions based on the implicit inferences. There is also a double negation effect discussed in Evans and Over (2004): ‘if not p then q ; not q , therefore p ’. From this we see that the conclusion ‘not-not- p ’ can be drawn because of reduction reasoning. Research on conditional reasoning has explored the effects of negation and double negation on inference patterns. Evans (1972) found that negation impacts the difficulty of making valid inferences, with subjects struggling more to deny negative statements. Subsequent studies have investigated various aspects of negation in conditional reasoning. Evans et al. (1998) demonstrated that manipulating the order of premises and conclusions can reduce the negative conclusion bias. Evans and Handley (1999) discovered that implicit negations in premises suppress conditional inferences, operating independently of the double negation effect. Schaeken and Schroyens (2000) observed that explicit negatives influence inference patterns, particularly for Modus Tollens and Denial of the Antecedent problems. They also found that the size of the contrast class affects the difficulty of double negation and affirmative conclusion production in Denial of the Antecedent inferences. These findings contribute to our understanding of how negation impacts conditional reasoning processes.

According to the suppositional theory, the logic behind the conditional sentence is that we believe in the consequent supposing the antecedent. It can be best exemplified by the uncertainty of the conditional judgement: it is not uncertainty about the truthfulness of the proposition but uncertainty about the consequent supposing the antecedent (Edgington, 2007). Edgington (2007) tried to extend the notion of conditional uncertainty to the counterfactual conditionals. According to Edgington (2007), the counterfactuals do not express propositions, more specifically, truth conditions. He claims that the semantic value of *if* is closely related to

suppose, and it holds both for indicatives as well as counterfactuals. Using conditionals, as he states, we express the level of confidence in the consequent in the context of the antecedent. In the example of empirical reasoning, such as *the car is not at the garage because the garage door is closed, and if the car were at the garage, the garage door would be open*, Edgington (2007) says that this argument can be disproved provided the other reasonable alternatives such as *the car is in the garage but the owner closed the garage door for security reasons* or at least additional information should be given that *the owner always leaves the garage door open when the car is inside*. Edgington (2007) further argues about the incompatibility between the suppositional and propositional views: the probability of q on the supposition of p cannot be applied to measuring the probability of the propositional truth value. It follows that the interpretation of counterfactuals can be considered from the conditional probability perspective but not from the truth conditions view. Otherwise, we need a strong belief that the counterfactual is true. Edgington (2007) provides some arguments against the truth conditions for counterfactuals. One such argument is that *will* can be treated the same way as *would* from the conditional probability perspective. For example, it is 90% likely that *you will get heads if you flip a fair coin*; it was 90% likely that *you would have got heads if you had flipped a fair coin*. Edgington (2007) argues against a strict conditional account of Lewis (1973). According to Lewis (1973), $p \rightarrow q$ is true if and only if the consequent is true at all closest antecedent worlds. Edgington makes an example that the interpretation of counterfactual *if the lottery ticket had been purchased, she would have won the jackpot* is via strict conditional perspective (truth condition), suggesting that the counterfactual is false because it is difficult to say that she won the jackpot in all the closest antecedent worlds. The above example about the coin is also false, according to Edgington (2007). He argues that the radicalism of the truth condition is not applicable because both counterfactuals and indicatives have the same degree of probability. He also rejects a soft conditional perspective (Stalnaker), according to which the conditional is true if and only if the consequent is true at the closest antecedent world. According to Edgington (2007), it leads to indeterminism because we do not know what to assume about the likelihood of conditional.

Conditionals are regarded as suppositional statements also by Barnett (2010) that dismiss the categorical view. From a suppositional point of view, the consequent is stated, and the antecedent is supposed by a conditional. Barnett (2010) proposes the analysis of conditionals using the word “supposing” instead of “if”, but he goes further by suggesting the notion of “zif” as an alternative for “if” in counterfactuals. He argues that “zif” is lexically

compact, embeddable, and nominalizes the clause that it marks. To say “zif p ” is equal to the supposition that p : zif p, q means that consequent is relative to the supposition that p . What is expressed by suppositional statements cannot be evaluated categorically because the right assessment depends on the supposition (Barnett, 2010). It follows that the assigned values such as possible/ necessary/probable/true/false to the statement relative to the given supposition are correct not because of its value but due to the condition that the statement has a direct connection with what is assumed (Barnett, 2010). For instance, we can assign the value *probable* to the following utterance *supposing fish had legs, they would walk on the land* because *fish would walk on the land* became probable by the supposition that *they had legs*. We can distinguish two values of suppositional statements: necessity and possibility. If and only if (iff) the context of the statement is necessitated by its supposition, we assign necessity value. In other cases, if the context of the statement is consistent with its supposition, a possibility value is assigned. Both contain the suppositional element of what is stated (Barnett, 2010).

According to Barnett (2010), counterfactual conditional probability measures the “stability” of elements and relations. For instance, suppose that “a large number of children have been surveyed and that 95% of them like candy” (Barnett, 2010: 278). The question here is whether the link between being a child and liking candy is stable or just accidental. If we believe in the 95% probability that the next child surveyed will like candy, we can say that there is a stable relationship between the two elements in the following counterfactual conditional: “if there had been one additional child, (it is 95% probable that) it would have liked candy” (Barnett, 2010: 278). In addition, what is supposed cannot be accepted as neither true nor false. Barnett (2010) applies the same logic for zif conditionals outlining necessity, possibility, probability, factuality, truth, and falsity. Zif necessity can be characterised as the statement being necessary only if the content of the statement is entailed by its supposition. Zif possibility is when such a statement is possible, provided the context of the statement is consistent with its supposition. Zif probability can be regarded as such a statement is for some percent probable provided the context of the statement is made for some percent probable by its supposition. Zif factuality occurs when a zif question is factual only if the supposition of the question entails a corresponding response. Zif truth happens when a zif statement is true only provided the supposition entails the context of the statement. Zif falsity is applied when a zif statement is false only if the supposition is inconsistent with the context of the statement. Barnett (2010) states that zif-statements are not categorical statements, and not all of them are about the nearest possible world and possible hypothetical events. The meaning of ‘then’ in

zif-sentence can be interpreted as “in that situation” (Barnett, 2010). To analyse this point, Barnett (2010) gives a comparison of examples. The first example relates to the combination of when/ then: *when he stops, then (at that time) I will stop*. ‘When’ indicates time and ‘then’ resumes it. The second one is about where/there: *where he goes, there (at that place) I will go*. ‘Where’ indicates place and ‘there’ resumes it. Following this rationale, it seems that in zif counterfactual conditional, e.g., *zif he had left, then (in that situation) I would have left*, zif indicates a hypothetical situation and ‘then’ resumes it.

In this subsection, I have presented the scholars that advocate the suppositional account of counterfactuals, although each of them seems to approach the issue from slightly different perspectives. Whereas Evans and Over (2004) developed their approach from a psychological point of view, Edgington (2007) and Barnett (2010) were concerned with philosophy and pragmatics, respectively. Based on the suppositional theory that heavily rests on probability, the example from *The Snows of Kilimanjaro* such as *if Harry had put iodine, his scratch would not have worsened* is highly probable the same way as *if Harry puts iodine, his scratch will not be worsened*. In contrast, another counterfactual *if Harry had not married Helen, he would have written his stories* is less probable the same way as *if Harry does not marry Helen, he will write his stories*. If we interpret the examples using the truth table, we can say they are both true because p is false and q is false. But based on the context, we know that the second counterfactual is false because *if it had not been Helen, it would have been another one*. Thus, suppositional account seems to be more reliable than the truth table of formal logic. However, when it comes to the mental representation of counterfactuals, the suppositional account is not straightforward. For example, when one reads *if Harry had not married Helen, he would have written his stories*, (s)he first mentally represents the supposition Harry not marrying Helen but then based on the background information provided by the text, represents Harry marrying another rich woman and not writing his stories. According to suppositional theory, the antecedent is supposition, and the consequent is a statement and we express our belief in a statement given the supposition, and as the statement *Harry writing his stories* is not likely to happen given the supposition *Harry not marrying Helen* it follows that we cannot represent the statement and instead represent more likely consequent such as *Harry marrying another woman and not writing his stories*. It seems that in the case of low probability, people have complex mental representations, and thus suppositional account contradicts itself as its assumption is based on limited cognitive capacity. Despite this, when we read the highly probable counterfactual *if Harry had put iodine, his scratch would not have worsened*, based on suppositional account, we think of suppositional meaning only *Harry putting iodine and his*

scratch is not worsening the same way as we read highly probable indicative conditional *if Harry puts iodine, his scratch will not be worsened*. The equation of mental representations of counterfactuals with indicatives undermines the morphosemantic differences between two constructions. As counterfactuals have semantic deviation coupled with morphological deviation that will be discussed in the second part of the dissertation, and indicative conditionals do not have such deviations, I assume the difference should also be projected in the mental representation. However, in the case of extended counterfactuals such as *what if Hitler had won WWII*, it seems the suppositional framework is satisfactory as we believe in the probability of the reigning Nazi regime supposing the antecedent that Hitler won. At the level of the genre, as readers fictionally recentre to the alternative reality, they suppose the Nazi regime is happening because of Hitler's victory. I will further provide an overview of previous empirical investigations into counterfactuals in the following section to show which cognitive account of counterfactuals is empirically supported.

2.2 Insights from previous research on counterfactuals processing

Counterfactual conditional has been extensively studied from a cognitive perspective because it plays an important role in decision-making and rational thinking. Some scholars were concerned with at what age such constructions are acquired. Beck et al. (2006) showed that children around 5 or 6 years of age are capable of counterfactual thinking. However, Rafetseder et al. (2013) showed that not all children before 12 years old can fully apply counterfactual reasoning.

A group of studies were focused on how counterfactuals are processed in the context of surrounding sentences. De Vega et al. (2007) compared the reading time of counterfactual sentences and factual sentences and found out that counterfactual scenarios are held in mind for a short time but then suppressed, and the people's attention goes back to preceding scenarios. Ferguson and Sanford (2008) manipulated the sentence following counterfactuals to test how the information consistent with the counterfactual world is perceived. As a result of their investigation, it became clear that people quickly accommodated a new proposition into a counterfactual world. Stewart et al. (2009) studied the influence of prior context on the processing time of indicative and counterfactual conditionals. The results of their studies showed that the processing of counterfactual conditional sentences is constrained by the prior context, whereas the processing of indicative conditionals does not depend on the preceding sentence. Ferguson (2012) demonstrated that people can make a quick factual inference from

counterfactuals that were followed by consistent and inconsistent context. This happens although people keep in mind both conjecture and a presumed fact of counterfactuals. Kulakova and Nieuwland (2016) conducted an EEG study and found out that counterfactuality is rapidly integrated while discourse understanding and lessens online anticipations established by factual information.

Some scholars studied the mental representation while processing counterfactuals. Gomez-Veiga et al. (2010) investigated the possibilities accessible to people while reading indicative and counterfactual conditionals. For indicative conditionals, people only think of one possibility, whereas for counterfactual conditionals, people have multiple representations. De Vega and Urrutia (2011) illustrated that counterfactual conditionals invoke embodied simulations of counterfactual actions. Hence, we can deduce that people envisage counterfactual possibility while comprehending counterfactual conditionals. Their subsequent study (De Vega and Urrutia, 2012) showed that people can access the preceding and following event consistent with counterfactuals conjecture and presupposed fact faster in comparison with indicative conditionals. Hence, people keep in mind two meanings in working memory while comprehending counterfactuals. Kulakova et al. (2013) compared the processing of counterfactual and hypothetical conditionals. According to their fMRI study, the processing of hypothetical conditionals does not need actual world information, whilst the processing of counterfactuals requires both factual information and supposition. Their results showed that the processing of counterfactuals needs increased mental imagery and cognitive efforts to integrate information. In an ERP study, Kulakova et al. (2014) found out that the processing of counterfactuals' dual meaning is cognitively costly, although it is processed as soon as the subjunctive mood appears in German counterfactuals. Espino et al. (2015) contrasted negative exceptive conditionals (except if/unless) in subjunctive mood with indicative conditionals and confirmed the dual possibilities activated for the comprehension of counterfactuals using a truth table task. Espino and Sanchez-Curbelo's (2016) study also confirmed the activation of two possibilities for the comprehension of counterfactuals, whereas only one possibility is accessible for indicative conditionals.

Two major studies showed how counterfactuals are processed incrementally. Orenes et al. (2019) conducted eye-tracking studies to find out when and how people process the dual meaning of counterfactuals in Spanish as their native language. They conducted the same experiment with images and printed words. Then they also tested with explicit instructions. Orenes et al. (2019) study reveals that people deduce the inference about the real world within half a second. There were some individual differences in looking at the negative and affirmative

images, which might be explained by the image properties and working memory capacities of individuals. Orenes et al. (2022) conducted eye-tracking experiments to study the processing of affirmative and negative counterfactuals and compared them to the processing of affirmative and negative causal assertions. It was found that people process first the suppositional meaning and then the presupposed fact. But for negative counterfactuals, people pay attention to the latter more. However, if people are primed by the binary context, they tend to focus on the presupposed fact. This study supports that dual-meaning processing is required for the mental representation of counterfactuals. It also restates the previous research that two possibilities are envisaged very rapidly in the initial stage of the processing, and later, the presupposed fact takes a lead as the alternative possibility fades.

Some studies indicate the relation between mental representation and context. For example, Ferguson (2015) conducted an ERP study comparing the processing of counterfactuals followed by counterfactual world consistent and inconsistent sentences. People could correctly interpret situations regarding the counterfactual world when the counterfactual world reference was kept by the context. But for factual world reference, people compared information against both factual and counterfactual worlds at the same time. This study supports the dual meaning of counterfactuals and shows the importance of linguistic cues in choosing the world model. In addition, making counterfactual inferences depends on the working memory capacity. Those with high working memory capacity can successfully make counterfactual inferences, whilst those with low working memory capacity fail to do so. Macbeth and Razumiejczyk (2019) studied implicit facilitation effects on counterfactual and semifactual thinking, and as a result, they found that the antecedent and consequent are accelerated due to implicit counterfactuals. As for semifactuals, only the antecedent is accelerated. In another study, Espino and Byrne (2021) explored the suppositional meaning and presupposed fact of counterfactuals by priming participants. Their study revealed that people give more importance to the mental representation of presupposed fact provided they expect the relation with the past real event. However, when participants are primed with the suppositional world, they hold both possibilities active.

Some studies have also been identified that deal with inference and the possibility of counterfactuals. By using priming, paraphrasing, and inferences, Frosch and Byrne (2012) demonstrated the difference of mental representations regarding causal conditionals and causal counterfactuals. Causal indicatives were paraphrased using temporal and causal connectives, whereas causal counterfactuals were paraphrased using subjunctive constructions. It also showed that individuals make fewer inferences from counterfactual conditionals in the context

than in isolation. Causal indicative conditionals invoked two consistent possibilities, such as A and B and A and not-B, while understanding the cause. It did not support the probabilistic theory that people add the antecedent to their beliefs and evaluate whether the consequent holds. People assess factual conditionals such as “If Ricardo had a daughter then he was a father” to be real possibilities, whilst counterfactual conditionals such as “If Ricardo had had a daughter then he would have been a father” to be counterfactual possibilities (Quelhas et al., 2018: 2223). The meaning of the factual conditional is interpreted as “It was possible that Ricardo had a daughter, and it was possible that Ricardo was the father”. Counterfactual conditionals are interpreted as “It was once possible but didn’t happen that Ricardo had a daughter, and it was once possible but didn’t happen that Ricardo was a father” (Quelhas et al., 2018: 2223). Two types of conditionals possess the same truth values, provided their presuppositions are the same. Also, “the possibilities for a factual conditional map into a fact and counterfactual possibilities in counterfactual conditionals” (Quelhas et al., 2018: 2223). The results support mental models but raise issues with alternative theories of conditionals that are grounded in logic, suppositions, probabilities and Bayes nets (A causes B, and B causes C). Ferguson and Jayes (2018) investigated the impact of plausibility and perspective on the processing of counterfactuals. As the results of their study, it was suggested that people assess “incoming information within the counterfactual world” (Ferguson and Jayes, 2018:166). However, people also process information based on inferences about the real world. In addition, perspective plays a role in detecting anomalous words. Espino and Byrne (2020) investigated the inference that people make from factual and counterfactual conditionals, in particular modus ponens and modus tollens. Modus ponens refers to positive inference, whereas modus tollens refers to negative inference. They studied whether people suppress inferences given background conditions or presupposed facts. According to the results, counterfactuals trigger the occurrence of beliefs about additional conditions before beliefs about presupposed facts. If there is an additional condition, it suppresses modus tollens inference of counterfactuals. Brigard et al. (2021) found out that the plausibility of counterfactuals is affected by the similarity between the suppositional world and the real world. If people focus on the differences between the two worlds, then they are more likely to consider counterfactuals as less plausible. In contrast, when people pay attention to the similarities between the two worlds, they are more likely to assess counterfactuals as more plausible.

Thus, the empirical research focused on different aspects of counterfactuals processing, but the most relevant for the dissertation is the mental representations while processing counterfactuals. As the current research suggests, people imagine both imaginary meaning and

factual inference, thus supporting the mental model theory. However, it has been noted that people's working memory capacity might influence processing because people with low levels of working memory capacity struggle with the comprehension of counterfactuals. And therefore, in the subsequent section, I will write about cognitive constraints that might impede counterfactuals comprehension.

2.3 The cognitive constraints on comprehension

2.3.1 The cognitive limitations in making inferences

According to Walsh and Byrne (2007), people use the same kind of mental representations and cognitive processes for counterfactuals as for factual events. First, one must keep in mind the possibilities to represent different scenarios. In the spirit of Walsh and Byrne (2007), we can draw the following possibilities from the assertion: "If Peter is Polish then he likes pierogi".

Peter is Polish and he likes pierogi.

Peter is not Polish and he does not like pierogi.

Peter is not Polish and he likes pierogi.

Peter is Polish and he does not like pierogi.

However, while comprehending the assertion one does not keep in mind all possibilities due to the limits of the working memory (Johnson-Laird and Byrne, 1991). Therefore, people tend to choose possibilities that are true (Johnson-Laird and Byrne, 2002). People also remember only a few possibilities (Walsh and Byrne, 2007), e.g., Peter is Polish and he likes pierogi. The possibilities that one keeps in mind while comprehending counterfactual conditionals are not the same as with factual conditionals. This discrepancy can be noted in the number of possibilities kept in mind: two possibilities for counterfactuals (supposition and factual information). In addition, it is also necessary to monitor whether possibility corresponds to the supposition or factual information. Fillenbaum's (1974) study suggests that after reading counterfactuals, people tend to remember that they read negative assertions (presupposed fact), e.g., "Peter is not Polish" and "he does not like pierogi". The follow-up study by Thompson and Byrne (2002) also confirms that people conceive presupposed facts from counterfactuals. This supports the view that for the comprehension of counterfactuals, it is necessary to think of two possibilities, unlike indicative conditionals.

To reason about conditionals, one should be able to make inferences. In the spirit of Evans (1993), when people hear indicative conditional, e.g., "if Peter is Polish then he likes pierogi" and hear contradicting facts such as "Peter is not Polish", it is difficult for some people

to make inference whether he likes pierogi or not. It might be explained as they keep in mind only one possibility, and when it is not matched with the fact, they face difficulty with the integration of the new information. However, when people hear counterfactuals and keep in mind the possibility of “Peter is not Polish and does not like pierogi”, they can readily make inference from “Peter is not Polish” that “he does not like pierogi” (Walsh and Byrne, 2007). This is also the case when people are told the information corresponding to the supposition (Mandel, 2003), such as “Peter is Polish”, which makes them infer that “he likes pierogi”. People tend to keep in mind two possibilities for causal counterfactuals as “if the fridge had been working, it would have been cold inside” more than for counterfactuals with arbitrary content, such as “if Peter had eaten an ice cream, then Ann would have eaten chocolate”. This difference was detected by the consistency task (Thompson and Byrne, 2002), when people read causal counterfactuals, they think that the suppositional meaning, e.g., “the fridge was working and it was cold”, consistent with the counterfactual conditional, whereas for arbitrary counterfactuals they think that its suppositional meaning, e.g., “Peter ate ice cream and Ann ate chocolate” is inconsistent with the counterfactual.

Cognitive capacity might constrain the alternative scenarios that people imagine (Byrne, 1997). The ability to change facts might be influenced by the mental representation of the facts (Byrne, 1997; Legrenzi et al., 1993; Walsh and Byrne, 2007). One can only make minimal changes to the facts if they have limited working memory (Byrne, 1997; Walsh and Byrne, 2007). It is easier to represent a counterfactual alternative if you already have in mind two possibilities (Byrne, 2007; Walsh and Byrne, 2007), such as buying rice or buckwheat. While imagining alternative scenarios, people focus on actions more than inactions (Kahneman and Tversky, 1982) because they have already imagined two possibilities of doing something and not doing it (e.g., going on a trip or staying at home). People also tend to represent in their minds the most recent one (Miller and Gunasegaram, 1990; Mandel, 2003). It can be explained with a simple example like the ones proposed by Walsh and Byrne (2007). For example, *if Sarah and David both choose the same answer on a quiz, they each receive a bonus point*. Sarah first chose the answer C and David chose next the answer B and they did not receive a bonus point. It is likely that Sarah will blame David for not choosing answer C than David blaming Sarah for not choosing answer B because the latter is a more recent event. Due to the limitations of working memory capacity, people can only imagine the possibility in which Sarah chose C and David chose B, and they won. Hence, they do not consider the possibility in which both choose B. The representation of possibilities also depends on the way the story is told, as Walsh and Byrne (2007) suggest. For example, if two people had injuries because of

a collision during skiing and the doctor says, *if one of you but not both had turned right, there would have been no injuries*, it is readily accepted as the possibility in which the second person did not turn right. But if the doctor says, *if one or the other had continued skiing straight ahead, there would have been no injuries*, we imagine the possibility in which the first person continued to ski straight ahead. People mostly imagine alternatives to scenarios that are under their control, especially to the consequences resulting from their own decisions, and also, for socially unacceptable actions rather than acceptable ones (Walsh and Byrne, 2007). According to Walsh and Byrne (2007), one can also be reluctant to represent the counterfactual possibility of an obligatory action.

Thus, due to cognitive constraints in making inferences, people reduce the number of imagined possibilities to one possibility (suppositional meaning) for indicative conditionals and to two possibilities (suppositional meaning and factual meaning) for counterfactual conditionals. And the latter might be susceptible to people's working memory capacity. Therefore, it is essential to check the subjects' working memory capacity before gathering the data.

2.3.2 The working memory capacity

The working memory model developed by Baddeley (1986, 1996, 2000) encompasses two temporary storage systems: the phonological loop and the visuo-spatial sketchpad. The phonological loop is based on the speech pattern, whereas the visuospatial sketchpad is visual/spatial based. The model also includes rehearsal buffers, an episodic buffer, and a central executive component (supervisory attention system). The central executive component moderates the flow of thoughts and embodies task goals. Engle and Kane (2003) highlighted the relationship between attention and memory. According to them, working memory combines short-term 'stores', rehearsal, and executive attention. They also argue that individual differences in working memory capacity indicate specifically the capability of executive attention. Furthermore, they suggest that if we consider working memory capacity from a general cognition perspective, retrieval from long-term memory is crucial.

While measuring working memory capacity, it is important to differentiate between working memory capacity and short-term memory. To measure simple short-term memory span (e.g., word, letter, and digit span), we need to recall short sequences of stimuli right after their illustration (Engle and Kane, 2003). To measure complex working memory capacity span (e.g., operation, reading, and counting spans), in addition to speech- and visual-spatial-based

coding, we need executive attention. It is due to the maintenance of stimulus lists notwithstanding interference from prior lists during the performance of a complex secondary task (Engle and Kane, 2003). The results of the working memory capacity tasks strongly correlate with such higher-order cognitive functions as reading and listening comprehension (Daneman and Carpenter, 1983), language comprehension (King and Just, 1991), and reasoning (Barrouillet, 1996; Kylönnen and Christal, 1990), among others.

Dual-process theories of the mind suggest that the overlap of automatic and controlled processing determines cognitive behaviour (Barrett et al., 2004). Sensory features of elements draw our attention, and it is known as stimulus-driven, bottom-up or reflexive attention. We passively focus our attention on the knowledge structures in our minds, also named schemas, scripts, or concepts. This can result in thoughts, feelings, or actions. Such kind of processing is known as automatic (also nonconscious, implicit, heuristic) processing (Barrett et al., 2004). Controlled attention, which is crucial for controlled processing, is regarded as goal-directed and top-down attention (Egeth and Yantis, 1997). Controlled attention regulates the effect level of automating the processing of thoughts, feelings, and behaviours by manipulating representations. Such a function of controlled attention is usually regarded as controlled processing.

Barrett et al. (2004) demonstrated that individual differences in the ability to control attention are a primary contributor to differences in working memory capacity. They defined working memory capacity as “the number of items that can be recalled during a complex working memory task” (Barrett et al., 2004: 553). A complex working memory task requires parallel work of storing information for later recall and altering information for an ongoing computation (Daneman and Carpenter, 1980). This task is called a complex span task, in which a secondary processing task engages participants’ attention while maintaining target information in memory. According to this task, people first get some information in the form of words, digits, or spatial orientations, whilst, between the illustration of items, they do some computation such as reading sentences, doing simple arithmetic problems, etc. The purpose of the secondary activity is to interfere with the memory task. The result of the task is identified by the number of recalled items (Barrett et al., 2004).

Working memory capacity is related to such effects as activation, maintenance, and suppression (Barrett et al., 2004). People with high working memory capacity can activate and retrieve target information from long-term memory better than those with low capacity (e.g., Rosen and Engle, 1997). The same paradigm applies to interference effects; people with high capacity are less vulnerable to distractions, whereas the opposite can be stated for people with

low capacity (e.g., Tuholski et al., 2001). Regarding the suppression effect, people with high working memory capacity are better able to suppress the activation of irrelevant representation from automatic processing (e.g., Rosen and Engle, 1997).

The difference in working memory capacity results in different processing strategies; in particular, the use of automatic and controlled processing varies. People with lower working memory capacity rely more on automatic processing, whereas those with higher capacity use more controlled attention. That is why those with lower working memory capacity might have quicker responses to complex tasks. People with higher working memory capacity answer to “questions about syntactically ambiguous sentences slower due to the maintenance of two possible interpretations of the sentences and apply semantic information to disambiguate their meaning” (Barrett et al., 2004: 559). The working memory capacity also affects the ability to construct complicated mental models and new information encoding, suggesting that working memory capacity takes part in generating consistency of text elements during comprehension (Budd et al., 1995).

In cognitive science literature, there is a difference between working memory and working memory capacity. The former means a cognitive system that provides access to information necessary for current cognitive processes, whereas the latter refers to an individual difference construct connected with people’s working memory limitations (Wilhelm et al., 2013). Working memory capacity is defined as the attention used to keep or constrain information (Engle, 2002). The most popular method of measuring working memory capacity is the complex span paradigm (Daneman and Carpenter, 1980; Conway et al., 2005). Miyake et al. (2000) outlined such executive function factors as inhibition, shifting, and working memory updating. Complex span tasks do not test working memory updating, and therefore, another task called *n*-back is widespread because it involves working memory updating. The *n*-back task is very complex: a long sequence of stimuli is represented, and one must decide on matching the one *n* steps back in the sequence for each stimulus (Wilhelm et al., 2013).

According to dual-store models, both primary memory and secondary memory are necessary for working memory capacity (Unsworth and Engle, 2007; Wilhelm et al., 2013). Primary memory keeps information for a short period of time, and secondary memory maintains information over long periods. Hence, people actively keep information in primary memory and retrieve some information from secondary memory. As soon as the limit of primary memory consisting of four elements is reached, secondary memory steps in. In addition, the distractor task of the complex span task can also add constraints on the primary memory, which is why it is mostly oriented to the secondary memory. The rationale behind

simple and complex span tasks is that they measure such processes as rehearsal, maintenance, updating, and controlled search (Unsworth and Engle, 2007; Wilhelm et al., 2013). The difference between simple and complex memory span tasks is that the former measures primary memory, and the latter measures secondary memory. Individual differences are characterised by people's primary memory capacity and success in encoding information and searching for relevant information in secondary memory. Such people's ability mediates the correlation between complex span and fluid intelligence. Fluid intelligence is defined as "reasoning ability, and the ability to generate, transform, and manipulate different types of novel information in real time" (Zaval et al., 2015).

While a simple span task indicates short-term memory, working memory capacity encompasses such indicators as complex span and updating tasks. In accordance with Wilhelm et al. (2013), working memory builds, maintains, and quickly updates arbitrary bindings, which is why it is closely connected with secondary memory, cognitive control, and fluid intelligence. According to the binding hypothesis, the maintenance of temporary binding is correlated with other indicators of working memory capacity, such as complex span and updating. As a result, they all reflect the working memory capacity construct (Wilhelm et al., 2013).

Wilhelm et al. (2013) identified four working memory capacity task classes, in particular, complex span, updating, recall N-back and binding. Complex span task reflects simultaneous storage and processing when there is high interference. For example, one must memorise the letters, then evaluate the meaningfulness of the sentences (i.e., distractor task), and afterwards recall the letters in order. This example can be classified as a reading span task. There are also operation and rotation span tasks within complex span tasks. Updating tasks measure the accuracy of updating working memory across a series of steps (Wilhelm et al., 2013). It can be further divided into numerical updating and spatial-figural updating tasks. Binding tasks measure "the ability to establish and briefly maintain bindings in working memory" (Wilhelm et al., 2013: 5). Reasoning tasks and tasks measuring response inhibition can be classified as secondary memory tasks. As a result of testing mentioned related tasks to the working memory capacity, Wilhelm et al. (2013) supported the idea that the recall-n-back task is an accurate measure of working memory capacity. However, regarding their experimental study, all four categories of tasks were found to be good indicators. Among them, binding and updating tasks were the most successful in providing valid measures. Working memory capacity is the cause of well-working secondary memory (Wilhelm et al., 2013). Another cognitive construct as fluid intelligence shows the ability to keep and update temporary bindings in working memory (Oberauer et al., 2007; Wilhelm et al., 2013) and the

ability to acquire long associations in secondary memory (Tamez et al., 2008, 2012; Kaufman et al., 2009; Wilhelm et al., 2013).

Thus, to test the working memory capacity, it is not enough to test only short-term memory because working memory capacity also involves a cognitive operation. Therefore, to assess people's working memory capacity, one should incorporate recall with another cognitive process, such as a simple arithmetic task. The combination of arithmetic tasks with number recall might interfere with each other because both involve numbers. Another option is the use of words instead of numbers; however, the words contain semantic information, and their recall might interfere with such variables as frequency, length and imaginability. Based on this reasoning, letters are most suitable to use in combination with simple arithmetic tasks to check people's working memory capacity.

2.4 Summary

In this chapter, I discussed the cognitive dimensions of counterfactuals. To recap the chapter, I will provide some key points. First, I explained three cognitive theories that deal with counterfactuals comprehension. I showed that the conceptual blending is not suitable for counterfactuals because it faces the issues of generalisability and lack of full representation, disregarding factual consequent. In contrast to the conceptual blending framework, I evaluated the mental model theory as a reasonable approach to viewing mental representations evoked by counterfactuals. According to the mental model framework, people think of both suppositional meaning and factual inference to comprehend counterfactuals. It was mentioned that the mental model account is in line with the proposed model based on the possible world framework, according to which, to comprehend literary counterfactuals, readers compare the textual actual world event with its alternative, thus thinking of dual meaning.

Moreover, the suppositional theory was discussed which argues that people mentally represent only suppositional meaning while understanding counterfactual conditionals the same way as understanding indicative conditionals. In the context of literature, it means that readers mentally represent only an alternative to the textual actual world event. I argued against equating counterfactual conditionals with indicative conditionals because of linguistic concerns such as different morphosemantics. To solve the dispute between conflicting accounts, the empirical research on the issue was overviewed. As a result, it was shown that the findings of empirical studies support the mental model theory but noticed the potential influence of working memory capacity. Therefore, in the subsequent section, possible cognitive

constraints on comprehension were discussed. It was revealed that people keep in mind a limited number of inferences: for an indicative conditional one and for a counterfactual conditional two. However, the latter might be affected by the working memory capacity. That is, people with low working memory capacity might not be able to mentally represent dual meaning. That is why relevant tasks that can check subjects' working memory capacity were further explored. It was pointed out that an appropriate task would be recalling letters while doing simple arithmetic tasks.

3 Empirically testing the proposed models

In this chapter, I present two empirical studies on literary counterfactuals. The first study has been conducted on counterfactuals inside literary texts (embedded counterfactuals) and the second study on counterfactuals as a literary text (counterfactual historical fiction). Both studies are united with the agenda of testing cognitive engagement during reading counterfactuals. The first empirical study focuses on checking whether the proposed model of counterfactuals processing as embedment is empirically sound, and readers engage in imagining both the alternative textual state and the textual actual world state. This has been checked using an eye-tracking visual world paradigm experiment. The second study focuses on the cognitive engagement with counterfactual historical fiction and its potential role of influencing the RK-world as proposed in the model based on the possible world framework. Each section is composed of a detailed description of the study, including the rationale, scientific aim, questions and hypotheses; methods (experimental design, participants, apparatus, setting, materials, measures and procedure); results and discussion. First, I provide separate discussions for each study and, in the summary of the chapter, discuss both studies in terms of cognitive engagement with literary counterfactuals.

3.1 Study 1: A cognitive engagement with embedded counterfactuals. Visual World Paradigm.

3.1.1 Study 1: The rationale

The first study is based on the theoretical considerations discussed in chapter 1 on the aesthetic function of counterfactuals in literature and chapter 2 on the cognitive underpinnings of counterfactuals comprehension. I will recall the key points of these chapters that form the rationale of the first study. In the second chapter, I proposed a model of literary counterfactuals processing based on the possible world theory. It comprises cognitive processes such as imagination, comparison, evaluation, and emotional response. It is assumed that readers first imagine the textual actual world state and its alternative state, recentring their RK-worlds to the textual actual world and then to the textual alternative state; thus, the latter being more pronounced. Afterwards, they compare these two states and evaluate them. It is assumed that cognitive engagement with literary counterfactuals leads to emotional response. In the

following chapter, I discussed cognitive theories and found the similarities between the proposed model and the mental model framework in the representation of counterfactuals because both suggest that readers/people think of dual meaning/textual state and its alternative. An opposing theory known as suppositional theory was also discussed, according to which people imagine only the suppositional meaning for counterfactuals the same way as for non-counterfactual conditionals. As discussed, the empirical findings seem to support the mental model theory. However, it has not been empirically tested in the literary context, which underscores the imaginative dimension. Furthermore, there has been no empirical investigation into readers' emotional responses towards literary counterfactuals. I am taking into consideration imagination and emotional response because if readers imagine the textual actual state and its alternative state and respond emotionally, then it implies that readers also went through the cognitive processes, such as comparison and evaluation, that lead to the emotional response.

3.1.2 Study 1: Research aim, questions, and hypotheses

The first study aims to empirically test the feasibility of the proposed model on cognitive engagement with literary counterfactuals. Three main research questions are addressed in the present study:

- 1) Do readers envisage the textual actual world state and its alternative state while processing literary counterfactuals?
- 2) Is the textual alternative state more pronounced compared to the textual actual world state?
- 3) Are counterfactuals perceived to be emotional?

The first question helps to understand whether readers imagine both the textual actual world state and its textual alternative state (dual meaning in line with mental model theory) or imagine only the textual alternative state (suppositional meaning in line with suppositional theory). The second question addresses whether readers think more about the textual alternative state compared to the textual actual world state (recentring of RK-world to the textual alternative state). The third question identifies whether literary counterfactuals have an emotional effect on readers. Based on the proposed model of the cognitive engagement with embedded counterfactuals (illustrated in Figure 1.4.1.4), it is hypothesised that readers will imagine both the textual actual world state and its alternative state, being the alternative state more

pronounced in imagination as well as perceive embedded counterfactuals to be emotional. For convenience, the before illustrated Figure 1.4.1.4 from chapter 1 is provided below again.

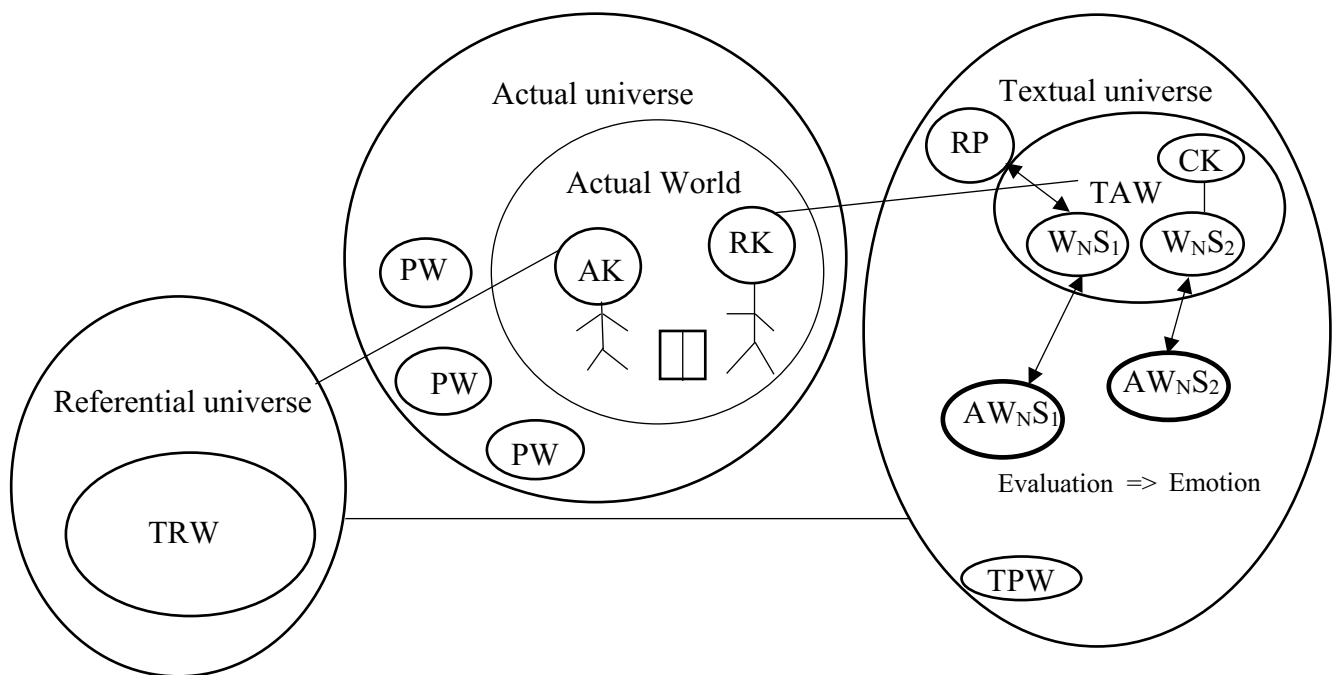


Figure 1.4.1.4 Readers' cognitive engagement with embedded counterfactuals based on a revised model of possible worlds (proposed by Ainur Kakimova)

As can be observed from the diagram, readers envisage the textual actual world with its textual actual states and then map to the alternative textual state that is outside of the textual actual world because of non-actualisation in the textual actual world. But still, in a remote possible world, that is in some alternative world of the textual universe, the alternative textual state is imagined to be true by recentring RK-world. To comprehend the textual actual world state, a reader imagines these two worlds and compares them, which entails evaluation. The combination of imagination, comparison and evaluation leads to an emotional response. Based on the proposed model, the following three hypotheses are put forward.

H₁: Readers imagine both the textual actual world state and the textual alternative state while processing literary counterfactuals.

H₂: Readers focus more on the textual alternative state compared to the textual actual world state while processing literary counterfactuals.

H₃: Reading of literary counterfactuals is perceived to be more emotional rather than reading of literary non-counterfactuals.

3.1.3 Study 1: Methods

Experimental design

The study was carried out following the ethical principles and received ethical approval from the University of Warsaw Rector's Committee for the Ethics of Research involving Human Participants (Approval number 138/2022) before conducting the experiment. The ethical clearance can be found in the appendix. In accordance with the ethical guidelines, participants were provided with the information sheet about the study and signed written informed consent before participation in any stage of the study. The study is composed of two stages. The first stage included qualification tests for the experiment, and the second stage encompassed an eye-tracking experiment (Visual World Paradigm) with self-report questionnaires. Participants had at least C1 level of English language competence that has been certified.

Before the eye-tracking experiment, potential participants were invited to take three kinds of tests. One test checked the grammatical knowledge of conditionals. It was necessary to check whether readers have sufficient knowledge of conditionals to participate in the experiment that targets the processing of this structure. If participants did not know the conditional structures, it could be a confounding variable in the online processing. And therefore, participants took the English grammar test consisting of 25 questions 10 of which checked the grammatical knowledge of conditionals. To pass the test on conditional knowledge, one had to receive at least 6 points out of 10 points (60%). The questions about conditionals have been covered by other grammatical filler questions so as not to draw specific attention to conditionals. In addition, the test was taken a week before the main experiment so that readers were not primed with conditionals. The second test that was also taken a week prior to the experiment was the working memory capacity test. As discussed in the previous chapters, a low working memory capacity might impact the comprehension of counterfactuals. Therefore, it was essential to check the working memory capacity of participants. The n-back recall test was used for this purpose, that is, the combination of letter recall with counting as was previously justified. To pass the working memory capacity test, one had to receive at least 4 points out of 9 points because it was calculated that up to three points indicate low working memory capacity, from four to six - average, and from seven to nine - high. A threshold of 4 points controlled for a low working memory capacity from being a confounding variable. The third test checked participants' English listening skills. Checking English listening skill

ensured that participants could comprehend while listening that is essential for the Visual World Paradigm experiment. Participants had to receive at least 7 points from 12 questions (60%) to pass the listening test. The listening test was taken from the IELTS practice listening test suggested by the British Council. Those who passed all three tests were invited to take part in the eye-tracking experiment. 40 participants were exposed to both literary counterfactuals and literary non-counterfactuals. The design of the eye-tracking experiment is within subjects: 40 subjects listened to 15 literary counterfactuals and 15 literary non-counterfactuals. They listened to a total of 30 critical items (15 counterfactuals and 15 non-counterfactuals) and the same 9 filler items. Counterbalancing was used which means that two lists were created. A full set of 30 different contents were written in two versions. One list was composed of one set of 15 contents in the counterfactual version and the other set of 15 contents in the non-counterfactual version (the reverse for the second list). 20 subjects listened to List 1, and the other 20 subjects listened to List 2. While listening, they saw four phrases on the four parts of the screen, one representing the textual actual world state, one representing the textual alternative state and two distractors in a randomised order. The screen was divided into four areas of interest, and a fixation count was recorded for each. The visual world paradigm is used because it is believed that the part where people's eyes are directed is cognitively engaged. The previous study by Orenes et al. (2019) suggests that there is no difference between print words and pictorial representations in the visual world paradigm. However, with the concern that colour and aesthetics of the pictorial representations might be a potentially confounding variable, the print words were favoured over pictorial representations. After the experiment, participants performed the perceived emotionality test and comprehension test. Also, an additional general questionnaire was filled in to give general information about participants' language competence as well as exposure to literature. The data was analysed, and appropriate statistical tests were run using SPSS software provided by the University of Warsaw license. After this holistic overview of the experimental design, detailed information about participants, materials, measures, experimental setting, apparatus, procedures, and data analysis will be given in the subsequent pages.

Participants

The participants were recruited through advertisement in social media (Facebook) as well as printed advertisements in the main library of the University of Warsaw and at the Faculty of Applied Linguistics after receiving authorisation from the administration. Each participant who

took part in both stages received an Empik gift card for PLN 100 immediately after participation in the second stage. The gifts for participants of the first study were funded by the ELIT (Empirical study of Literature Innovative Training Network) project that received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 860516.

The inclusion criteria for participation in the study were outlined as the following:

- English level C1 or higher (confirmed with a language certificate);
- Age range 18-35;
- No known history of reading, listening and memory difficulties;
- Normal eyesight (or near normal with soft lenses and spectacles, i.e., max. -3.00/+2.00);

A baseline for English language competence was C1 because in the visual world paradigm experiment, participants listened to each recording only once, and therefore it was needed to ensure a high level of English competence. In addition, participants' English listening skill was checked before admission to the experiment. The baseline for eyesight was normal or mild myopia (up to -3.00) or mild hyperopia (up to +2.00). In the present experiment, one screen is composed of four areas of interest, and therefore, it was crucial to ensure the high accuracy of eye-tracking data.

Around 50 subjects were interested to participate in the study. From them, 42 came to the first stage of the experiment and took the tests. A total of 40 subjects were qualified to take part in the eye-tracking experiment. It was possible for participants to see their results if they were interested. Each participant was randomly assigned to either List 1 or List 2. As a result, 20 subjects ($M_{\text{age}} = 24.90$ years; $SD = 4.800$; 14 females, 5 males and 1 non-binary) were exposed to List 1 and other 20 subjects ($M_{\text{age}} = 22.95$ years; $SD = 4.211$; 13 females and 7 males) were exposed to List 2.

All the participants had at least a C1 level of English or higher level confirmed with a language certificate or scores taken from the Oxford online placement test. In List 1, there were 13 people with C1 level, 2 people with C1/2 level, and 5 people with C2 level. In List 2, there were 15 people with C1, 1 person with C1/2, and 4 people with C2.

Participants of List 1 reported the following languages as their first language: Polish (10 people), Polish/Russian (1 person), Chinese (3 people), Azerbaijani (1 person), Finnish (1 person), Spanish (1 person), Russian (1 person), Turkish (2 people). Participants of List 2 reported the following languages as their first language: Polish (12 people), Azerbaijani (2

people), Georgian (1 person), German (1 person), Kazakh (1 person), Persian/Farsi (1 person), Spanish (1 person), Turkish (1 person).

In List 1, participants had the age of English onset from 4 up to 16 years old; length of studying English from 4 up to 21 years; the duration of stay in English speaking country from 0 to 2,5 years. In List 2, participants had the ages of English onset from 3 up to 15 years old; length of studying English from 9 up to 27 years; the duration of stay in English speaking country from 0 to 2,5 months.

Participants of List1 reported that they know other foreign languages such as Polish, Ukrainian, Russian, Portuguese, Hebrew, French, Spanish, German, Italian, Belarussian, Swedish, German, Arabic, Azerbaijani, Turkish, Chinese, Norwegian ranging from A1 to C2 with a median at A2. Participants of List2 reported that they know other foreign languages such as Polish, German, Korean, French, Swedish, Russian, Spanish, Hindi, Arabic, Belarussian, Ukrainian, Italian, Turkish, Japanese, and Finnish ranging from A1 to C2 with a median at A2.

Regarding exposure to literature, participants answered two questions, one addressed how many literature books in any language they have read this year ($M=13.30$, $SD=11.32$ for List1 and $M=14.20$, $SD=14.66$ for List2), and another question how many literature books in English they have read this year ($M=4$, $SD=3.68$ for List1 and $M=4.57$, $SD=5.99$ for List2). As the language and literature-specific information provided by participants do not differ considerably across groups, they have not been further investigated.

The admitted participants to the second stage received at least 4 points from 9 points on the working memory test, at least 6 points (60%) from 10 points on the test on English conditionals, and at least 7 points (60%) from 12 points at the listening task. Thus, the participants had from average to high working memory capacity, sufficient grammatical knowledge of conditionals as well as good English listening skills.

The participants voluntarily took part in both stages of the experiment with an available option to withdraw from participation at the experiment anytime. Before being invited to the first stage, participants received detailed information on the study, including all the relevant information such as procedure, duration, data analysis, and data storage that had been previously approved by the ethical committee. The study was introduced as sentence comprehension in English as a second language, not to prime participants in advance with counterfactual conditionals. However, after the experiment, the purpose of the study was explained, and participants' questions were answered by the experimenter. Before participation at the study, participants signed written informed consents.

Materials

The materials for the study consisted of 30 critical items and 9 filler items. Each critical item had two versions: literary counterfactual conditional and literary non-counterfactual conditional. The former was the original version chosen from 40 literary texts of the Gutenberg project using the Sketch engine searching tool. The list of literary texts from which the counterfactual conditionals were extracted is provided in the appendix (see Appendix 5). All the counterfactuals were taken from fictional literary texts. The main criteria for selecting counterfactuals were counterfactual conditionals with past-time reference. The present-time preference was not used because it has limitations on the type of the predicate to be regarded as counterfactual, namely, it should be a static verb or subjunctive. Future counterfactuals are rarely used. A baseline condition was the manipulated version of the original literary counterfactual conditional, that is, literary non-counterfactual (indicative conditional) with a past time reference. For example, compare the following:

Counterfactual: If he had come to Gardencourt, he would have seen Madame Merle.

Non-counterfactual (indicative): If he came to Gardencourt, he saw Madame Merle.

Participants were exposed to both literary counterfactuals and literary non-counterfactuals. For counterbalancing, two lists were created (in each 15x15). For instance, whereas List1 included a counterfactual version of the example, List2 included a non-counterfactual version of the example, and two versions were counterbalanced across the set of 30 contents (see Appendix 1). In addition, 9 fillers were used to maintain participants' engagement and prevent them from detecting the true purpose of the experiment, reducing demand characteristics. 9 filler items were extracted from the same literary texts and contained 9 different contents. Sentences beginning with *because* and *since* were selected as filler items due to common to all structures' cause-and-effect relationships. Participants listened to 30 critical items and 9 fillers while looking at the screen. On the four parts of the screen, they saw four phrases, two of which match the textual actual world state and the textual alternative state, and two others represent distractors. For example, while a participant listens to the literary counterfactual *If he had come to Gardencourt, he would have seen Madame Merle*, (s)he sees four phrases such as 'coming & seeing' (affirmative model), 'not coming & not seeing' (negative model), 'eating & leaving' (alternative affirmative) and 'not eating & not leaving' (alternative negative). The full set of experimental materials is given in the appendix (see Appendix 1). The affirmative model

corresponds to the textual alternative state; the negative model corresponds to the textual actual world state; the alternative affirmative – distractor; alternative negative – distractor.

Measures

Such measures as working memory capacity, test on the knowledge of English conditionals, English listening skill, fixation count, comprehension test, perceived emotionality test and general questionnaire were used. Detailed information is given about each of them in the order mentioned respectively.

For testing **working memory capacity**, an N-back test was used, namely, an auditory 2-back test. Participants listened to pre-recorded letters. They needed to decide whether they heard the same letter 2 letters ago. Thus, the task integrated both recall and simple arithmetic calculation. Each correct letter was equal to 1 point. The test results were interpreted in the following way: low (0-3 points), average (4-6 points), and high (7-9 points). To pass the working memory capacity test, participants needed to get at least 4 responses (40%) correct. Participants were instructed not to write letters on the paper while listening and instead to remember them and write the correct answers only. Before the real test, a practice test was performed to ensure that participants understood how to do the test. Participants could also ask questions before the real test. However, the test was constructed in a simple manner with clear and detailed instructions (see Appendix 6).

The test on the knowledge of English conditionals was similar to the English grammar test without directly revealing the target construction. It consisted of 25 questions: 10 questions regarding conditionals, and 15 questions were fillers. Each correct answer to a target question was equal to 1 point (in total, 10 points). Participants needed to get at least 6 points (60 %) to take part in the further experiment. Taking 60% as a threshold ensured that the answers were not correct by chance. The test was composed of multiple-choice questions with three options. Participants were instructed to fill in the gap in the sentence by choosing the correct option and it was also noted that there is only one correct option (see Appendix 7).

English listening skill test was taken from IELTS listening practice questions of the British Council (idp IELTS) and consisted of twelve questions (2 multiple choice questions, 4 sentence completion questions and 6 short answer questions). To pass the test, a participant had to answer at least to 7 questions correctly (60%).

The eye-tracking parameter of **fixation count** was taken as an eye-tracking measure. Fixation count is the number of fixations made in the area of interest. The study focused solely

on fixation count, as the goal was to determine which area of interest received greater attention. The fixation count was recorded in four areas of interest. Namely, one area of interest represents the textual actual world state/factual inference (negative model), the second area of interest represents the textual alternative state/suppositional meaning (affirmative model), and two other areas of interest represent distractors (alternative affirmative and alternative negative). The number of fixations indicates which area of interest the participant is focusing on. Based on Orenes et al. (2019), it is assumed that the fixated area of interest is being actively processed and represented in the mind.

The **comprehension test** checked whether participants could deduce the factual inference from counterfactuals and, therefore, fully understand them. The task was composed of 39 questions. The answer consisted of three options: Yes or No, or Hard to say. An example of the comprehension question to the literary counterfactual conditional is provided below:

Sentence: If he had come to Gardencourt, he would have seen Madame Merle.

Question: Did he see Madame Merle? Yes or No or Hard to say

The correct answer for the above example is No. If they replied to the question correctly, they received one score.

The **perceived emotionality test** consisted of a 9-point Likert scale measurement of perceived emotionality. After an eye-tracking experiment, participants were asked to rate the level of emotionality of each sentence they read using a 9-point Likert scale test from 1-not at all emotional to 9-very much emotional. The perceived emotionality test was used to determine whether literary counterfactuals are perceived to be more emotional than literary non-counterfactuals. Participants were instructed to evaluate the emotionality of sentences based on their perception. Each participant evaluated the emotionality of 39 items, that is 30 critical items (15 counterfactuals x 15 non-counterfactuals) and 9 filler items.

In addition, participants filled in **the general questionnaire** composed of such demographic questions as gender and age as well as language-related questions such as first language, English proficiency level, age of English onset, length of exposure to English, the duration of stay in an English-speaking country, knowledge and level of other foreign languages. Also, participants answered the questions regarding exposure to literature in general and English literature specifically.

Experimental settings

The study was composed of two stages. In the first stage, participants' working memory capacity, knowledge of conditionals and English listening skills were checked. In the second stage, participants took part in the eye-tracking experiment coupled with self-report questionnaires. The first stage of the study was organised in a conference room with a capacity of up to 15 people at the Faculty of Applied Linguistics, University of Warsaw. The second stage of the study took place at the Laboratory for Experimental Eye Tracking Linguistics in the Institute of Specialized and Intercultural Communication at the Faculty of Applied Linguistics of the University of Warsaw. The laboratory is a separate dedicated room for eye-tracking experiments. During each experimental session, the experimenter and a participant occupied the room and the entrance for other people was not allowed (a door sign was used). The distance between a participant's eyes and the monitor was around 60 cm, which is considered an optimal distance. Because of the high tolerance of the eye tracker to head movements, the head mounter was not used. This ensured that participants read in a natural and comfortable setting.

Apparatus

The SMI RED 500 remote eye tracker was used that is mounted under the monitor. The sampling frequency of 250 Hz was chosen because it has been proven to be accurate enough (e.g., Płużyczka, 2015, 2020). The display monitor is a 22-inch LCD screen.

Procedure

Each of the participants was given a participant number that was used for anonymisation purposes. These participant numbers were used throughout the study. Around a week prior before the main experiment, potential participants were invited to the Faculty of Applied Linguistics at the University of Warsaw to take an English grammar test, a test on working memory capacity and a test on English listening skills. Participants could choose a suitable date from the shared booking page of Calendly. They were given different options to choose from. Each testing session included from 2 up to 10 participants. As a venue for testing, a conference room was chosen with a capacity of 15 people. Before starting the test, they were asked to read and sign the consent on the personal data processing and the written informed consent if they agreed with what was written in the consent. The testing session started only after receiving

the participants' consent. A speaker with good sound quality was used, from which participants listened to letters in the working memory capacity test and audio recordings for the listening task. All tests, including the working memory capacity test, test on the knowledge of conditionals and listening skill test, were performed on paper. The whole testing session lasted around 30 minutes. Those who passed tests were invited to the eye tracking laboratory. The eye-tracking data was collected by meeting subjects individually in the eye-tracking laboratory. Participants were randomly assigned to one of the two lists: (i) List 1 (n = 20) and (ii) List 2 (n=20). Two lists were used to counterbalance the content, each containing 30 critical items (15 literary counterfactuals x 15 literary non-counterfactuals). Subjects sat comfortably on the chair while looking at the screen of the computer, and there were no constraints on head and movement. However, participants were asked to keep their position, not to move their heads and do not take off their eyes from the screen while listening. They were also instructed that they could blink in a usual manner. The instruction was carefully prepared so that participants understood what their task was. The instruction was composed of 3 separate pages.

The first page of instruction included the following information: "You are going to listen to 39 sentences via headphones. The aim of the experiment is to understand which words you look at when you comprehend sentences. Words will appear on the four parts of the screen. While listening to each sentence and shortly after, look at the words on the screen that correspond to the meaning of the sentence. Shortly after a sentence is finished, you will hear the next one and so on. Your eye movements will be recorded, please do not take your eyes off the screen during the experiment. *To move to the second page of the instruction, click the mouse.*"

The second page of instruction included the following: "Sometimes there will be sentences followed by listening to check whether you are listening. Choose "yes" if it is what you heard and "no" if it is not what you heard. You can use the mouse to choose the answer. There are three practice sentences at the beginning so that you can ask questions if something is not clear. *To move to the third page of instruction, click the mouse.*"

The third page of instruction: "Before beginning the experiment, we will do calibration and your task is to follow the dot on the screen with your eyes. Calibration and validation will be repeated several times during the experiment. It is needed to ensure the quality of eye tracking data being recorded. Please keep your set position during calibration and do not move your head throughout the experiment. If you have any questions, please ask the instructor now or after practice sentences and before beginning the experiment. *If you are ready, please click the mouse.*"

Before starting the main experiment, participants performed a practice block containing 3 sentences unrelated to either critical or filler items and corresponding questions to familiarise a subject with the task and to check whether participants understood the procedure. The 9-point calibration was conducted before starting the experiment. Calibration and validation were repeated 4 times, each before a set of 10 stimuli. To prevent the strain on the eyes, there was a short break after they finished listening to two sets of 10 stimuli. After a break, 9-point calibration was performed again before they started listening to the other two sets. Participants were instructed to listen to sentences that they heard via headphones and look at the words that corresponded to the meaning of the sentence. Sometimes, questions were asked to check whether they were listening. A total of 11 listening check questions were randomly distributed across stimuli. Participants chose either Yes or No using a computer mouse. Their responses were registered by the experimenter. The baseline for passing the listening check questionnaire was to receive at least 5 points. The words were presented in black over white background in Arial font, size 24 (UPPERCASE).

First, the dot appeared on the screen to drift the correct participants' gaze to the centre of the screen and lasted around 2 seconds. Afterwards, four phrases appeared on the four parts of the screen and lasted for 5 seconds so that readers could read them. In 5 seconds, participants listened to the item while they still saw words. After the audio stopped, participants still saw words for 4 seconds. The fixation counts were recorded while listening to the audio to tap into the online processing of literary counterfactuals. The position of critical words and distractors was randomised across all stimuli. An example of the procedure for literary counterfactual *If he had come to Gardencourt, he would have seen Madam Merle* is illustrated below (Figure 3.2.3).

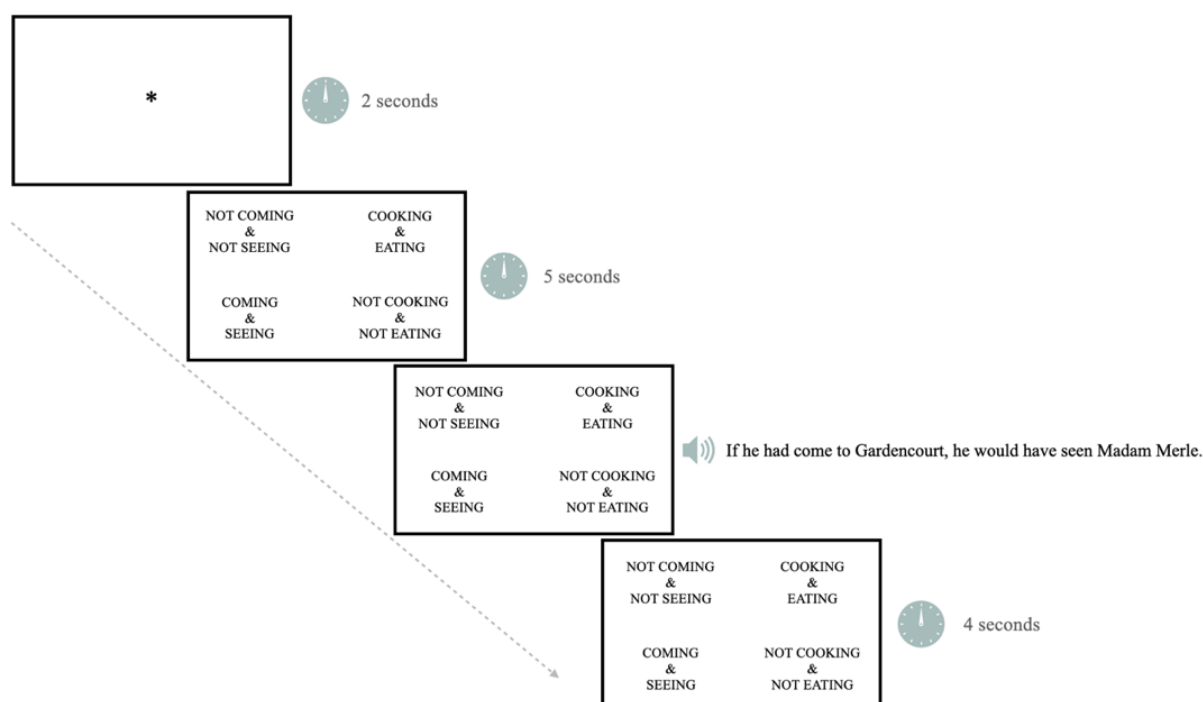


Figure 3.2.3 An example of the experimental procedure for literary counterfactual *If he had come to Gardencourt, he would have seen Madam Merle*

After completion of the eye tracking experiment, participants performed the perceived emotionality test, and comprehension test and filled in the general questionnaire. The whole experiment with questionnaires took around 30 minutes per participant. Upon completion, each participant received an Empik gift card for PLN 100.

Data analysis

Using BeGaze eye tracking data analysis software, four areas of interest were marked as affirmative model (textual alternative state), negative model (textual actual world state), alternative affirmative (distractor) and alternative negative (distractor). These four areas of interest were matched by counterfactual version (counterfactual affirmative model, counterfactual alternative affirmative, counterfactual alternative negative, counterfactual negative model) and non-counterfactual version (indicative affirmative model, indicative alternative affirmative, indicative alternative negative, indicative negative model). The data was checked for quality, as a result, 7 datapoints from List1 and 22 datapoints from List2 were trimmed because of poor quality. Two participants from List2 and one participant from List1 were moving, which affected the quality of data, but after they were reminded not to change their position constantly, the quality of data was improved. The loss of data points accounts for

0.6% of the dataset, which is considerably low and does not impact the results. However, it did impact the difference in the mean by subjects and by items shown in descriptive statistics. To optimize the processing of a considerably large amount of eye tracking data (4685 data points), Python programming language was used. The processed data was organised in the following way: a column for participants (each row representing a participant anonymised number), 8 subsequent columns for fixation count of four areas of interest (literary counterfactual x literary non-counterfactual) for the analysis by subjects. For the analysis by items, the processed data was organised in the following way: a column for items (each row representing a stimulus), 8 subsequent columns for fixation count of four areas of interest (literary counterfactual x literary non-counterfactual). The statistical tests were run using SPSS software version 29. A repeated measures ANOVA was conducted to explore the effects of the type of conditional (counterfactual vs indicative) and type of image (affirmative model x negative model x alternative affirmative x alternative negative) on fixation count.

Before conducting the test, the assumptions were checked. Data passed the assumption of normality. Greenhouse-Geisser corrections were applied to address the departure from sphericity. To mitigate the issue of multiple comparisons, a Bonferroni correction was implemented for subsequent paired samples t-tests, adjusting the significance threshold for individual comparisons while controlling the overall Type I error rate. The significance level was adjusted by dividing the original significance level (alpha) 0.05 to 4 as there were 4 times of comparison. And therefore, the adjusted significance level was 0.0125 ($0.05/4=0.0125$). The utilization of Greenhouse-Geisser corrections for sphericity violations and Bonferroni correction for multiple comparisons were vital in ensuring more accurate interpretations of the effects of type of conditional (counterfactual vs indicative) and type of image (affirmative model x negative model x alternative affirmative x alternative negative) on fixation count.

Data from the perceived emotionality test was analysed by items (30 literary counterfactuals x 30 literary non-counterfactuals) because this way, the content that could impact emotionality was counterbalanced across two conditions. After checking the assumptions, the data from the perceived emotionality test was analysed using parametric paired samples t-tests.

3.1.4 Study 1: Results

Visual world paradigm experiment. Analysis by subjects

The table below provides the descriptive statistics of fixation count on four areas of interest for two conditions (literary counterfactual vs literary non-counterfactual).

Condition	Area of interest	Mean	Standard deviation
Literary counterfactual	Affirmative model	6.86	2.65
	Alternative affirmative	2.59	.60
	Alternative negative	2.74	.82
	Negative model	5.51	2.68
Literary non-counterfactual	Affirmative model	6.27	2.00
	Alternative affirmative	2.32	.68
	Alternative negative	2.38	.81
	Negative model	3.78	1.79

Table 3.1.4.1 The descriptive statistics of the fixation count across conditions by subjects (n=40)

A repeated measures ANOVA was conducted to explore the effects of condition and areas of interest on fixation count. The results of the Multivariate tests show that there is an overall significant effect of condition on fixation count (Pillai's Trace=.781, $F(1.000, 39.000)=138.759$, $p < .001$, $\eta^2=.781$), areas of interest on fixation count (Pillai's Trace=.909, $F(3.000, 37.000)=122.926$, $p < .001$, $\eta^2=.909$) and revealed a significant interaction between condition and areas of interest (Pillai's Trace=.336, $F(3.000, 37.000)=6.242$, $p=.002$, $\eta^2=.336$). Mauchly's test revealed violations of sphericity for areas of interest (Mauchly's $W = 0.021$, $p < .001$) and the interaction effect (Mauchly's $W = 0.258$, $p < .001$) and, therefore, Greenhouse-Geisser corrections were applied to adjust the degrees of freedom. Tests of within-subjects effects confirmed the significance of the main effects of condition ($F(1.000, 39.000) = 138.759$, $p < .001$, $\eta^2= .781$) and areas of interest ($F(1.284, 50.070) = 53.795$, $p < .001$, $\eta^2 = .580$) on fixation count, also significance of interaction between condition and areas of interest ($F(2.097, 81.773) = 9.605$, $p < .001$, $\eta^2= .198$), suggesting a joint influence of these factors on fixation count. Furthermore, to compare conditions (literary counterfactual vs literary non-counterfactual) across areas of interest, a paired samples t-test was conducted.

A paired samples t-test was conducted with four pairs: a pair of counterfactual affirmative model versus non-counterfactual affirmative model; a pair of counterfactual negative model versus non-counterfactual negative model; a pair of counterfactual alternative affirmative versus non-counterfactual alternative affirmative; a pair of counterfactual

alternative negative verse non-counterfactual alternative negative. It showed that there is a statistically significant difference between literary counterfactuals and literary non-counterfactuals. For literary counterfactuals, participants looked more at the negative model ($M=5.51$, $SD=2.68$) rather than for literary non-counterfactuals ($M=3.78$, $SD=1.79$) as the result of a paired samples t-test suggests a significant difference $t(39)=6.283$, $p<.001$, 2-sided, 95%CI[1.17, 2.28] with a large effect size Cohen's $d=.993$ 95%CI[.609, 1.369]. For both literary counterfactual ($M=6.86$, $SD=2.65$) and literary non-counterfactual ($M=6.27$, $SD=2.00$), participants looked at the affirmative model $t(39)=2.554$, $p=.015$, 2-sided, 95%CI[.12,1.05] without significant difference between two conditions (Bonferroni corrected p-value is .0125). Thus, literary counterfactuals activate the negative model more than literary non-counterfactuals.

The pattern is also repeated for distractors: participants looked more at the alternative negative for literary counterfactuals ($M=2.74$, $SD=.82$) rather than for literary non-counterfactuals ($M=2.38$, $SD=.81$) $t(39)=2.944$, $p=.005$, two-sided, 95%CI[.11, .59], although the effect size is much less (Cohen's $d=.465$ 95%CI[.136, .789], a small-to-medium effect size). In a similar vein as for critical items, there is no significant difference for alternative affirmative between literary counterfactual ($M=2.59$, $SD=.50$) and literary non-counterfactual ($M=2.32$, $SD=.68$) $t(39)=2.160$, $p=.037$, two-sided, 95%CI[.02, .52] (Bonferroni corrected p-value is .0125). This might be explained as participants looking at the negative words while listening to literary counterfactuals in comparison to literary non-counterfactuals. However, based on the descriptive statistics, it is observed that participants looked more at critical areas of interest than distractor areas of interest, even without statistical tests. However, to make it statistically sound, separate paired samples t-tests were performed. While listening to the literary counterfactual, people looked at the negative model ($M=5.51$, $SD=2.68$), a critical area of interest, more than at the alternative negative ($M=2.74$, $SD=.82$), a distractor area of interest $t(39)=7.474$, $p<.001$, two-sided, 95%CI[2.02, 3.53] with a large effect size Cohen's $d=1.182$, 95% CI[.772, 1.583]; and more at the affirmative model ($M=6.86$, $SD=2.65$), a critical area of interest, rather than alternative affirmative ($M=2.59$, $SD=.60$), a distractor area of interest $t(39)=10.279$, $p<.001$, two-sided, 95%CI[3.43, 5.11] with a large effect size Cohen's $d=1.625$ 95%CI[1.146, 2.095]. While listening to literary non-counterfactuals, participants looked more at the affirmative model ($M=6.27$, $SD=2.00$), a critical area of interest, rather than alternative affirmative ($M=2.32$, $SD=.68$), a distractor area of interest $t(39)=11.716$, $p<.001$, two-sided, 95%CI[3.27, 4.63] with a large effect size Cohen's $d=1.852$, 95%CI[1.334, 2.362]; and more at the negative model ($M=3.78$, $SD=1.79$), a critical area of interest, more than at the alternative

negative ($M=2.38$, $SD=.81$), a distractor area of interest $t(39)=5.625$, $p < .001$, two-sided, $95\%CI[.90, 1.90]$ with a large effect size Cohen's $d=.889$, $95\%CI[.518, 1.252]$. This statistically confirms that people indeed looked more at the critical areas of interest rather than distractors. This is in line with their high scores on the listening check during the visual world paradigm experiment (List1 $M=9.85$ out of 11, $SD=0.87$; List2 $M=9.45$ out of 11, $SD=1.46$). This suggests that participants listened to the audio carefully and looked at the words that correspond to the meaning of sentences.

Furthermore, two separate paired samples t-tests were conducted within each condition to contrast the affirmative model with the negative model. For literary counterfactuals people think of both affirmative model ($M=6.86$, $SD=2.65$) and negative model ($M=5.51$, $SD=2.68$) as there is no statistical difference between two models $t(39)=1.831$, $p=.075$, 2-sided, $95\%CI[-.14, 2.84]$. In contrast, for literary non-counterfactuals people think of affirmative model ($M=6.27$, $SD=2.00$) rather than negative model ($M=3.78$, $SD=1.79$) that is shown in statistically significant difference $t(39)=4.794$, $p<.001$, 2-sided, $95\%CI[1.44, 3.54]$ with almost large effect size Cohen's $d=.758$ $95\%CI[.402, 1.107]$. Thus, when participants heard literary counterfactuals, they thought about both the negative model (textual actual world state) and the affirmative model (textual alternative state). In contrast, when participants heard literary non-counterfactuals, they thought about the affirmative model (suppositional textual state) only.

Visual world paradigm experiment. Analysis by items

The table below provides the descriptive statistics of fixation count on four areas of interest for two conditions (literary counterfactual vs literary non-counterfactual).

Condition	Area of interest	Mean	Standard deviation
Literary counterfactual	Affirmative model	6.87	2.24
	Alternative affirmative	2.60	.84
	Alternative negative	2.77	.93
	Negative model	5.59	2.09
Literary non-counterfactual	Affirmative model	6.34	2.56
	Alternative affirmative	2.33	.65
	Alternative negative	2.38	.65
	Negative model	3.82	1.55

Table 3.1.4.2 The descriptive statistics of the fixation count across conditions by items ($n=30$)

A repeated measures ANOVA was conducted to explore the effects of condition and areas of interest on fixation count. The results of the Multivariate tests show that there is an overall significant effect of condition on fixation count (Pillai's Trace=.669, $F(1.000, 29.000)=58.505$, $p < .001$, $\eta^2=.669$), areas of interest on fixation count (Pillai's Trace=.776, $F(3.000, 27.000)=31.247$, $p < .001$, $\eta^2=.776$) and revealed a significant interaction between condition and areas of interest (Pillai's Trace=.449, $F(3.000, 27.000)=7.342$, $p < .001$, $\eta^2=.449$). Mauchly's test revealed violations of sphericity for areas of interest (Mauchly's $W = .198$, $p < .001$) and the interaction effect (Mauchly's $W = .256$, $p < .001$) and therefore, Greenhouse-Geisser corrections were applied to adjust the degrees of freedom. Tests of within-subjects effects confirmed the significance of main effects of condition ($F(1.000, 29.000) = 58.505$, $p < .001$, $\eta^2 = .669$) and areas of interest ($F(1.707, 49.496) = 72.841$, $p < .001$, $\eta^2 = .715$) on fixation count, also significance of interaction between condition and areas of interest ($F(1.747, 50.662) = 8.196$, $p = .001$, $\eta^2 = .220$), suggesting a joint influence of these factors on fixation count. Furthermore, to compare conditions (literary counterfactual vs literary non-counterfactual) across areas of interest, a paired samples t-test was conducted.

A paired samples t-test was conducted with four pairs: a pair of counterfactual affirmative model versus non-counterfactual affirmative model; a pair of counterfactual negative model versus non-counterfactual negative model; a pair of counterfactual alternative affirmative versus non-counterfactual alternative affirmative; a pair of counterfactual alternative negative versus non-counterfactual alternative negative. It showed that there is a statistically significant difference between literary counterfactuals and literary non-counterfactuals. For literary counterfactuals, participants looked more at the negative model ($M=5.59$, $SD=2.09$) rather than for literary non-counterfactuals ($M=3.82$, $SD=1.55$) as the result of a paired samples t-test suggests a significant difference $t(29)=5.460$, $p<.001$, 2-sided, 95%CI[1.11, 2.44] with a large effect size Cohen's $d=.997$ 95%CI[.551, 1.431]. For both literary counterfactual ($M=6.87$, $SD=2.24$) and literary non-counterfactual ($M=6.34$, $SD=2.56$), participants looked at the affirmative model $t(29)=2.156$, $p=.040$, 2-sided, 95%CI[.03,1.02] without significant difference between two conditions (Bonferroni corrected p-value is .0125). Thus, literary counterfactuals activate the negative model more than literary non-counterfactuals.

As for distractors, there is no difference between literary counterfactuals ($M=2.77$, $SD=.93$) and literary non-counterfactuals ($M=2.38$, $SD=.65$) in looking at the alternative negative $t(29)=2.110$, $p=.044$, two-sided, 95%CI[.01, .76]. In a similar vein, there is no

significant difference between literary counterfactual ($M=2.60$, $SD=.84$) and literary non-counterfactual ($M=2.33$, $SD=.65$) for alternative affirmative $t(29)=2.089$, $p=.046$, two-sided, 95%CI[.00, .54] (Bonferroni corrected p-value is .0125). Based on the descriptive statistics, it is observed that participants looked more at critical areas of interest than distractor areas of interest, even without statistical tests. However, to make it statistically sound, separate paired samples t-tests were performed. While listening to literary counterfactual, people looked at the negative model ($M=5.59$, $SD=2.09$), a critical area of interest, more than at the alternative negative ($M=2.77$, $SD=.93$), a distractor area of interest $t(29)=7.732$, $p < .001$, two-sided, 95%CI[2.07, 3.57] with a large effect size Cohen's $d= 1.412$, 95% CI[.897, 1.914]; and more at the affirmative model ($M=6.87$, $SD=2.24$), a critical area of interest, rather than alternative affirmative ($M=2.60$, $SD=.84$), a distractor area of interest $t(29)=10.578$, $p < .001$, two-sided, 95%CI[3.44, 5.09] with a large effect size Cohen's $d=1.931$ 95%CI[1.315, 2.536]. While listening to literary non-counterfactuals, participants looked more at the affirmative model ($M=6.34$, $SD=2.56$), a critical area of interest, rather than alternative affirmative ($M=2.33$, $SD=.65$), a distractor area of interest $t(29)=8.163$, $p < .001$, two-sided, 95%CI[3.01, 5.02] with a large effect size Cohen's $d=1.490$, 95%CI[.961, 2.007]; and more at the negative model ($M=3.82$, $SD=1.55$), a critical area of interest, more than at the alternative negative ($M=2.38$, $SD=.65$), a distractor area of interest $t(29)=5.020$, $p < .001$, two-sided, 95%CI[.85, 2.02] with a large effect size Cohen's $d=.916$, 95%CI[.483, 1.339]. This statistically confirms that people indeed looked more at the critical areas of interest rather than distractors. This is in line with their high scores on the listening check during the visual world paradigm experiment (List1 $M=17.90$ out of 20 participants responded correctly, $SD=2.51$; List2 $M=17.18$ out of 20 participants responded correctly, $SD=1.83$). This suggests that participants listened to the audio carefully and looked at the words that correspond to the meaning of sentences.

Furthermore, two separate paired samples t-tests were conducted within each condition to contrast the affirmative model with the negative model. For literary counterfactuals people think more of the affirmative model ($M=6.87$, $SD=2.24$) rather than negative model ($M=5.59$, $SD=2.09$) as there is a statistical difference between two models $t(29)=3.234$, $p=.003$, 2-sided, 95%CI[.47, 2.08] with a moderate effect size Cohen's $d=.591$, 95%[.198,.975]. In the same vein, for literary non-counterfactuals people think of affirmative model ($M=6.34$, $SD=2.56$) rather than negative model ($M=3.82$, $SD=1.55$) that is shown in statistically significant difference $t(29)=5.908$, $p<.001$, 2-sided, 95%CI[1.65, 3.40] with a large effect size Cohen's $d=.1.079$ 95%CI[.621, 1.525]. However, based on the comparison between literary counterfactuals and literary non-counterfactuals, it was shown that people think more of a

negative model for the former than the latter. Thus, when participants heard literary counterfactuals, they thought about both the negative model (textual actual world state) and the affirmative model (textual alternative state) rather than for literary non-counterfactuals but focused more on the textual alternative state. In contrast, when participants heard literary non-counterfactuals, they thought about the affirmative model (suppositional textual state) only.

Both analyses by subjects and by items confirmed that readers think of the textual alternative state and textual actual world state while processing literary counterfactuals in comparison to literary non-counterfactuals, during which processing readers think of the suppositional textual state (suppositional meaning). Whereas analysis by subjects showed that there was no difference between textual alternative state and textual actual world state while listening to literary counterfactuals, analysis by items showed that there is a difference with a moderate effect size, and readers focus more on the textual alternative state rather than textual actual world state. It can be explained as literary counterfactuals reinforcing more textual alternative state rather than textual actual world state, but participants' imagination involves both. However, it should be noted that in the analysis by subjects, the content of two conditions was not the same for each individual participant even if counterbalanced across participants. This may affect their visualisation pattern. In the analysis by item, on the other hand, the content was the same for two conditions. Overall, it suggests that whereas participants think of both textual actual world state and textual alternative state, they tend to focus more on the textual alternative state.

Comprehension test

As no statistical test was planned for comprehension test, the results are only indicative of how well participants understood the literary counterfactuals by deducing the factual inference (textual actual world state). A point is given for a correct answer in the google form with predefined correct answers. The maximum number of points for each list was 15 as there were 15 literary counterfactuals.

Participants of List1 received an average of 13.8 points out of 15, that is 92% correct responses. The range was between minimum of 10 points and maximum of 15 points. Majority of participants scored very high with 14 points as median. To be more specific, 1 person scored 10 points, 2 people scored 12 points, 4 people scored 13 points, 5 people scored 14 points and 8 people scored 15 points. Thus, participants of List1 (n=20) could successfully deduce textual actual world state.

Participants of List2 received an average of 14.1 points out of 15, that is 94% correct responses. The range was between minimum of 10 points and maximum of 15 points. Majority of participants scored very high with 14 points as median. To be more specific, 1 person scored 10 points, 2 people scored 13 points, 9 people scored 14 points and 8 people scored 15 points. Thus, participants of List2 (n=20) could successfully deduce textual actual world state. Overall, all participants successfully comprehended literary counterfactuals.

Perceived emotionality test

The table below shows the descriptive statistics of the perceived emotionality test across two conditions (literary counterfactual vs literary non-counterfactual), including mean and standard deviation.

Condition	Mean	Standard deviation
Literary counterfactual	5.20	1.28
Literary non-counterfactual	4.75	1.37

Table 3.1.4.3 The descriptive statistics of the perceived emotionality test across conditions (n=30)

As can be observed from Table 3.2.4.3, the mean of the perceived emotional test is higher for literary counterfactuals (M=5.20, SD=1.28) rather than for literary non-counterfactuals (M=4.75, SD=1.37). The distribution of data passed the assumption of normality (Shapiro-Wilk test of normality) and therefore parametric paired t-test was performed. There is a statistically significant difference for the perceived emotionality between literary counterfactual (M=5.20, SD=1.28) and literary non-counterfactual (M=4.75, SD=1.37): $t(29)=3.677$, $p<.001$, one-sided (the same for two-sided), 95% CI [.20, .69] with a moderate effect size Cohen's $d = .671$ 95%CI[.270, 1.064]. Thus, literary counterfactuals are perceived to be more emotional rather than literary non-counterfactuals.

3.1.5 Study 1: Discussion

Based on the results, all three hypotheses of this study are confirmed. As stated earlier, according to the first hypothesis (H_1), readers imagine both the textual actual world state and the alternative textual state while processing literary counterfactuals. According to the second

hypothesis (H₂), readers focus more on the textual alternative state compared to the textual actual worlds state while processing literary counterfactuals. According to the third hypothesis (H₃), reading of literary counterfactuals is perceived to be more emotional rather than literary non-counterfactuals. This proves that the proposed model of cognitive engagement with literary counterfactuals based on a revised model of possible worlds theory is feasible. The proposed model suggested that the use of counterfactuals in the literary text maps the textual actual world state to its alternative textual state. As RK-world recentres to the textual alternative state from the textual actual world state, the former is more pronounced in imagination. Furthermore, it was assumed that the combination of such cognitive processes as imagination, comparison and evaluation makes literary counterfactual to be emotionally evocative. The results also support mental model theory, according to which, people envisage dual meaning while comprehending counterfactuals. However, the empirical testing of this theory had been done with simple discourse before such as *if there had been oranges, there would have been apples* (e.g., Orenes et al., 2019, 2022). This study extends the application of theory to literary discourse. The results of the study do not support suppositional theory according to which, people imagine only suppositional meaning for both types of conditionals.

It has been revealed that whilst readers imagine both the textual actual world state and its alternative state, they tend to focus more on the alternative textual state. It can be explained as the alternative textual state being more engaging because one can leave the confines of the textual actual world and extend it to the unexplored possible worlds where the alternatives are instantiated by recentring RK-world (previously proposed by Ryan (1991) as recentring from the textual actual world to the textual alternative possible world).

Furthermore, the results of the study can be interpreted in relation to foregrounding. The previous study (e.g., Hakemulder et al., 2016) showed that foregrounding relates to such aesthetic feeling as emotional engagement. The result of the present study supports the aesthetic appreciation linked to foregrounding in the form of an increased emotionality. In addition, the results show that readers are not restricted in the cognitive processes related to literary counterfactuals. They could successfully understand literary counterfactuals shown by the high scores of comprehension. Moreover, readers could engage in the imagination of both the textual actual world state and alternative textual state while comprehending literary counterfactuals. They could also emotionally engage with literary counterfactuals which shows the deep processing of counterfactuals. Thus, the first study revealed that readers imagine both the textual actual world state and its alternative textual state while comprehending literary counterfactuals, focusing more on the alternative textual state and perceive them to be

emotionally evocative.

3.2 Study 2: A cognitive engagement with counterfactual historical fiction¹

3.2.1 Study 2: The rationale

In chapter 1, I proposed a model of cognitive engagement with counterfactual historical fiction which is similar to the cognitive processing of embedded counterfactuals in the literary text as both models include imagination, comparison, evaluation and emotion. In the previous experiment, it has been shown that while processing embedded counterfactuals, readers contrast between the textual actual word state and its alternative state as well as aesthetically appreciate counterfactuals, rating them as more emotional than non-counterfactuals, thus supporting the proposed model. In the following experiment, it will be examined whether this is also true at the genre level. Whereas while processing embedded counterfactuals, readers contrast textual actual world with its alternative, while processing counterfactual historical fiction, readers contrast actual world with its alternative with the introduction of the first point of divergence. However, I argued that make believe is important once recentred to the textual actual world. And therefore, while reading the narrative, readers accept the textual actual world as temporarily true. Readers build up the textual actual world based on their RK-worlds that include schemas of historical figures, war and Nazi, suspending only the historical knowledge that contradicts with the history of the story. Hence, the text has supremacy in dictating the properties of the textual actual world. Furthermore, readers might perceive counterfactual historical fiction as more emotional rather than historical fiction, reflecting the results obtained for embedded counterfactuals from the previous experiment. In the case of genre, an increased emotionality might be due to contrast between a real past and a counterfactual past that leads to evaluation of the real past as much better/worse than it could have been.

While discussing in the first section of the first chapter about how the mind tracks what is fact and non-fact, it has been mentioned that there is a scope syntax that deals with it. It follows that readers even if temporarily pretend the story to be true, after the fictional play is done, can successfully distinguish their representation of the actual world (RK-world) from the textual actual world. However, the fictional play might affect the reconsideration of the RK-

¹ The results of Study 2 have been previously published in *Frontiers in Neurocognitive Science*, under the title “What if Hitler had won WWII and met Kennedy in 1964?” (cf. Kakimova and Salgaro, 2024). However, in this dissertation, I provide a novel interpretation based on the possible worlds framework.

world. This is realised due to the following steps: (i) readers take the representation of the actual world as a template; (ii) readers create textual actual world incorporating details as dictated by the text; (iii) readers save this textual actual world in mind; (iv) the actual world is compared to the textual actual world; (v) comparison leads to re-evaluation.

Furthermore, from evolutionary aesthetics perspective, it has been discussed that fiction has important adaptive functions such as structuring the world in norms, simulating events, understanding others and self, enhancing cognitive skills and improving psychological well-being. This is in line with my previous argument that fiction reading leads to re-evaluation of the RK-world. Textual actual world is structured in norms dictated by the text which consequently compared to the actual world that might prompt a reader to view the actual world in norms as well. Creating textual actual world involves re-evocation of similar schemas from RK-world and their alteration based on the text. The comparison of the actual world with the textual actual world can enlighten some aspects of the real-world including better understanding people and self. The whole process of going through these cognitive steps enhances cognitive skills such as critical thinking and creativity. In addition, the temporary deactivation of the actual world as the result of recentring to the textual actual world helps to escape the problems of the actual world boosting psychological well-being.

Thus, based on the theoretical considerations, it was outlined a model of cognitive engagement with counterfactual historical fiction that involves imagination, comparison, evaluation, emotional response and fictional recentring. The fictional recentring might in turn result in re-evaluation of the real world and improvement in cognitive skills.

3.2.2 Study 2: Research aim, questions, and hypotheses

The scientific aim of the second study is two-fold: (a) to examine the cognitive processing of counterfactual historical fiction; (b) to test whether reading fiction impacts the RK-world. Based on these objectives, the following questions have been explored:

- (1) How do readers cognitively process the counterfactual historical fiction?
- (2) Does reading fiction lead to the re-evaluation of the RK-world?
- (3) Does reading fiction improve the cognitive skills?
- (4) Is there difference between counterfactual historical fiction and historical fiction in their effect on the re-evaluation of the RK-world?

Based on the proposed model of counterfactuals processing, readers contrast the textual actual world with the actual world once counter-factuality is deduced and play make-believe pretending the textual actual world is true while reading. To answer the second question, readers' moral and political views are considered as it reflects the theme of alternative reality that involves Nazis, war and fascism. Fascism is operationalised as "authoritarianism, the use of excessive power to preserve the order and discrimination of minority" (Kakimova and Salgaro, 2024: 4). Fascism receptivity can be considered as a moral view because it is based on the rejection of such moral values as anti-discrimination and tolerance. Furthermore, satisfaction with present politics has been considered as it reflects readers' political views. To answer the third question, readers' superstition has been checked, as it can be interpreted as a lack of critical thinking (cf. Kakimova and Salgaro, 2024). Superstition is operationalised as "the incorrect assignment of cause and effect" (Foster and Kokko, 2009:1) and belief in astrology (horoscope) (Torgler, 2007). The fourth question is based on the idea that counterfactual historical fiction describes the Nazi regime not as reminiscent of the past (as the case for historical fiction) but as it is the present and the future. This might have a stronger impact on readers because they perceive it as something that concerns them and not just others. Furthermore, it was hypothesised that counterfactual historical fiction would be perceived as less real in factuality compared to historical fiction because, whereas the former contradicts the history of the real world, the latter does not. It follows that counterfactual historical fiction can be perceived as more surprising because it contradicts RK-world. Although both types of fiction are expected to be similar in plausibility – the relationship between father and son described in the story can be possible in real life. Thus, the following hypotheses have been formed:

H₁: Readers perceive counterfactual historical fiction as less real in factuality but the same in plausibility in comparison with historical fiction.

H₂: People perceive counterfactual historical fiction as more surprising compared to historical fiction.

H₃: The processing of counterfactual historical fiction is associated with more cognitive load compared to the processing of historical fiction.

H₄: Reading fiction about the Nazis reduces fascism receptivity.

H₅: Reading fiction lowers readers' superstition.

H₆: Reading fiction about the Nazis increases satisfaction with the present politics.

H₇: The effects of H₄, H₅ and H₆ may be more pronounced for counterfactual historical fiction rather than for historical fiction.

3.2.3 Study 2: Methods

Experimental design

The study was carried out in accordance with the ethical principles and received the ethical approval from the University of Verona Committee for the Ethics of Research involving Human Participants (Comitato di Approvazione della Ricerca sulla Persona - CARP) before conducting the experiment. The ethical clearance can be found in the appendix. In accordance with the ethical guidelines, participants were provided with the information sheet about the study and signed written informed consents before participation in the study. The study is composed of two stages. The first stage included pre-test to determine the baseline for moral and political views as well as the tendency to superstitious beliefs that was conducted online approximately a week before the second stage. The second stage encompassed an eye-tracking experiment followed by the post-test with self-report questionnaires. All participants were Italian native speakers. 74 participants were recruited to the study. The design of the eye tracking experiment is between-subjects: 37 subjects read counterfactual historical fiction and other 37 subjects read historical fiction. The original excerpt taken from *Fatherland* (1992) by Robert Harris was presented to the experimental group (counterfactual historical fiction) in the Italian language and the same excerpt but with manipulated points of divergence – points of divergence were changed to match history – was presented to the control group (historical fiction). After the experiment, participants performed the set of questionnaires: general questionnaire (age, gender, exposure to literature), fascism receptivity and superstition tests taken from F-scale test, political evaluation test, aesthetical appreciation test, perceived realism test, comprehension test, historical knowledge test, familiarity check (see Appendix 2). The data was analysed, and appropriate statistical tests were ran using SPSS software. After this holistic overview of the experimental design, a detailed information about participants, materials, measures, experimental setting, apparatus, procedures, and data analysis will be given in the subsequent pages.

Participants

The participants were Italian native speakers. The participants were recruited by the advertisement in the social media (Facebook, Instagram, Twitter) as well as printed advertisements at the Department of the Foreign Languages and Literatures of the University of Verona. Each participant who took part in both stages received 20 euros as remuneration for

their participation. The gifts for participants of the second study were funded by the ELIT (Empirical study of Literature Innovative Training network) project that received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 860516.

A total of 74 participants were recruited for the study. It was possible for participants to see their results if they were interested. Each participant was randomly assigned into either experimental group or control group. As a result, 37 subjects ($M_{\text{age}} = 22.19$ years; $SD = 3.73$; 27 females, 9 males and 1 non-binary) read counterfactual historical fiction and other 37 subjects ($M_{\text{age}} = 23.73$ years; $SD = 2.53$; 27 females, 9 males and 1 non-binary) read historical fiction.

Regarding exposure to literature, participants answered how many books they read last year with the possible options: none; 1; from 2 to 12; from 13 to 24; more than 25. Both groups had an average exposure without a disenable difference between groups.

The participants voluntarily took part in both stages of the experiment with an available option to withdraw from participation at the experiment anytime. The study was introduced as reading task not to prime participants in advance with counterfactuals. However, after the experiment, the purpose of the study was explained, and participants' questions were answered by the experimenter. Before participation at the study, participants signed written informed consents.

Materials

The materials for the study were some paragraphs taken from *Fatherland* (1992) by Robert Harris. All the materials, questionnaires, instructions and consents were presented in participants' native language, in Italian. The original book was translated into Italian by Roberta Rambelli (Arnoldo Mondadori Editore), ISBN 88-0436109-3. The paragraphs contained the points of divergence from the actual world history. The paragraphs had two versions: counterfactual historical fiction and historical fiction. The former was the original version. A baseline condition was the manipulated version of the original text that match the actual world history. Both versions were displayed in Times New Roman front, 20 font-size and 1.5 line-height consisting of 12 screen pages. The experimental material included 3248 words (17306 characters) and the control material encompassed 3253 words (17334 characters). For instance, whilst the counterfactual historical fiction included "On the inner walls are carved the names of the three million soldiers who fell in defence of the Fatherland

in the wars of 1914 to 1918 and 1939 to 1946” (Harris, 1992: 31), in the historical fiction it was rewritten as the following: “On the inner walls are carved ... in the wars of 1866 to 1871 and 1914 to 1918”. A total of 33 words were altered that makes only 1% of the text. All the elements in the text that are counterfactual have been taken as 26 interest areas.

Measures

As mentioned in the experimental design, such measures as eye tracking parameters, fascism receptivity test, test on superstition, test on the satisfaction with the present politics, perceived realism and aesthetical appreciation were considered. In addition, familiarity check, comprehension test and historical knowledge test insured that subjects did not read the text before, carefully read the text and had enough level of historical knowledge to deduce counterfactuality. A detailed information is given about each of them (the measures of the Study 2 can be found in Appendix 2).

Fixation count was taken as an eye-tracking measure. Fixation count is the number of fixations made in the interest area. The fixation count was recorded into twenty-six areas of interest. **Run count** also known as revisits and returns have been also taken into consideration. It reflects how many times a subject returned his/her gaze to the area of interest. The third eye tracking parameter considered was **dwelt time** or gaze duration: how long participant looked at the area of interest. These measures show the cognitive costs of processing the areas of interest.

The **fascism receptivity test** was composed of 9 items from the F-scale test. The items included subcategories of fascism such as conventionalism, authoritarian submission and aggression, power and toughness. The items had a high level of internal consistency (Cronbach's $\alpha = .813$). Participants were instructed to rate from 1 to 7 how much they agree with the statements: 1-strongly disagree and 7-strongly agree (7-point Likert scale).

Test on **superstition** was composed of 1 item from the F-scale test that was categorised as superstition by the author of the test. The same way with the previous measurement, participants were instructed to use 7-point Likert scale for indicating how much they agree with the statement.

Test on the **political evaluation** of readers was consisted of 4 questions. The questions reflected the satisfaction level with the present state of politics applying 7-point Likert scale. The items had a moderate level of internal consistency (Cronbach's $\alpha = .750$).

Test on **the perceived realism** was adapted from Elliott et al. (1983), Green (2004) and Cho et al. (2014). It included 5 items: 3 items reflected the reality of historical background

(factuality) and 2 items showed the reality of the depicted father and son relationship (plausibility). Both factuality items and plausibility items had a satisfactory level of internal consistency ($\alpha = .862$ and $\alpha = .606$ respectively). 7-point Likert scale was applied to assess the perceived reality.

The test on the **aesthetic appreciation** besides including the adjective “surprising” also encompassed the following: creative, suspenseful, tragic, dramatic and well-written. These adjectives are found to be the indicators of aesthetic evaluation by Knoop et al. (2016). 7-point Likert scale ranged from 1-not at all to 7-very much.

The **historical knowledge test** was designed to check whether participants had enough level of knowledge to deduce counterfactuality of the experimental material. It assessed the knowledge of historical events and figures described in the text. The test was composed of 12 questions. It was designed as a multiple-choice questionnaire consisting of three options. Both experimental and control groups took the test. The purpose of the test was to ensure that the manipulation worked and that readers could perceive the original text as counterfactual historical fiction and the manipulated text as historical fiction. A threshold for passing the test was 60% of correct answers.

The **comprehension test** consisted of 10 questions to check whether participants read the texts carefully and understood what happened in the story. A threshold was put on 60% of correct answers.

The last question checked the familiarity with the material that they read – **familiarity check**. The purpose of this was to ensure that they had not read the text before, which could potentially influence the results.

In addition, participants filled in **the general questionnaire, which was** composed of demographic questions such as gender and age, as well as questions regarding reading habits in the form of the number of books read.

Experimental settings

The study was composed of two stages. In the first stage, participants filled in the pre-test questionnaires on such measures as fascism receptivity, political evaluation and superstition. The demographic information together with the reading habits were also collected on the first stage. In the second stage, participants took part in the eye tracking experiment coupled with self-report questionnaires: the same questionnaires as for pre-test plus perceived realism, aesthetic appreciation, historical knowledge check, comprehension and familiarity check. The

first stage took place online: participants were asked to fill in the questionnaires in the google form about a week before the second stage. The second stage of the study took place at the Laboratory for Language Text and Cognition (Laboratorio LaTeC) of the University of Verona. The laboratory is a separate dedicated room for eye tracking experiments. During each experimental session, the experimenter and a participant occupied the room and the entrance for other people was not allowed (a door sign was used). The distance between a participant's eyes and the monitor was around 60 cm that is considered as an optimal distance. Head-mounter was used to make subjects' head stable during reading to enhance the accuracy of eye tracking.

Apparatus

The SR Research EyeLink 1000 Plus eye tracker was used that is mounted under the monitor. The sampling frequency of 1000 Hz was chosen to have an accurate tracking while reading each line of the text. The display was a 24-inch BenQ monitor.

Procedure

Each of the participant was given a participant number that was used for anonymisation purpose. These participants numbers were used throughout the study. Around a week prior before the main experiment, participants were asked to fill in the questionnaires of the pre-reading test. After sending their response, the subjects could choose a suitable date from the shared booking page of Calendly. They were given different options to choose from. The eye tracking data was collected by meeting subjects individually in the eye tracking laboratory. Participants were randomly assigned to one of the two groups: (i) counterfactual historical fiction ($n = 37$) and (ii) historical fiction ($n=37$). Subjects were asked to seat comfortably and chair as well as head mounter were adjusted for each subject. Participants were instructed to read the text that they see on the screen and after reading each page press the spacebar to move to the next page. The instruction was carefully prepared so that participants understood what their task was. They have been also instructed that there will be calibration and validation before reading to obtain accurate eye tracking data. A drift correct was used before the appearance of the first page to position participants' eyes on the top left corner where the first line of the text starts. They had an opportunity of asking questions before beginning the experiment.

After completion of the eye tracking experiment, participants performed the post-reading test. The whole experiment with questionnaires took around 45 minutes per participant.

As the appreciation of their participation, each participant received 20 euros which has been transferred to their bank accounts by the financial office of the Department of Foreign Languages and Literatures of the University of Verona.

Data analysis

Using Data Viewer eye-tracking data analysis software, twenty-six areas of interest were marked for each text. The data was checked for quality, as a result, the eye tracking data of 10 participants (5 per group) that accounted for 13% were trimmed because of poor quality which has been caused by thick eyeglasses, severe myopia and astigmatism. The statistical tests were run using SPSS software version 29.0.0.0 (241). For each subject, the data from such tests as perceived realism, fascism receptivity and political evaluation were averaged across items. The obtained data was explored for the assumption of normality and homogeneity of variance; if needed the Lg10 transformation was used, or the non-parametric test applied. Three separate two-way mixed design ANOVAs (2x2 Group: experimental/control; Time: pre-test/post-test) were conducted to analyse the data from fascism receptivity, superstition and political evaluation. The violation of sphericity was corrected by the Greenhouse-Geiser. The effect sizes are reported for both ANOVAs (partial eta-squared - η^2_p) and t-tests (Cohen's d). Four separate MANOVAs were performed for each eye tracking parameter and aesthetic appreciation test and subsequent independent samples t-tests were run. The non-parametric test was used for data derived from the ratings of the perceived realism. Alpha was defined at 0.05 - a statistically significant level for all statistical tests.

3.2.4 Study 2: Results

Eye tracking data

For all eye tracking parameters Pillai's Trace of the multivariate tests (MANOVA) showed a non-significant difference between groups across all 26 interest areas: fixation count – $F(26, 37) = 1.10, p = .39$; run count – $F(26, 37) = .77, p = .76$ and dwell time – $F(26, 37) = 1.10, p = .39$. The independent samples t-test was performed on the first interest area based on the rationale that it is the first time when readers face counterfactuality and compare the textual actual world with the actual world before recentring to the fictional world. The results showed a statistically significant difference between groups for the first interest area for all eye tracking parameters: fixation count (equal variances not assumed) – $t(53.63) = 2.37, p < .05$, one-sided, 95%CI [.67, 8.02]; run count – $t(62) = 2.16, p < .05$, one-sided, 95%CI [.201, 5.30]; dwell time

(Lg10transformed) – $t(62)=1.75, p <.05$, one-sided. The effect size is a moderate to large for fixation count – $d=.59$, 95%CI [0.90, 1.09] and run count – $d=.54$, 95%CI [0.38, 1.04]. The 95%CI of dwell time crossed 0 [-.09, .90] suggesting the indeterminacy of the true effect size.

Perceived realism

The results of independent samples Mann-Whitney U test suggest a statistically significant difference between groups (counterfactual historical fiction Mdn = 4.09 and historical fiction Mdn =5.66) with subjects receiving the counterfactual historical fiction less real in factuality: $U=955.00, p <.05$, two-tailed. Based on the results, there is no statistically significant difference between groups (counterfactual historical fiction $M = 5.32, SD=1.23$ and historical fiction $M =5.71, SD=1.16$) in perceiving the plausibility: $t(72) = -1.41, p =.08$.

Aesthetic appreciation

The results of Pillai's trace of MANOVA suggests a statistically significant difference between groups with counterfactual historical fiction perceived as more surprising: $F(1) = 6.15, p <.05$ with a moderate effect size $\eta^2_p = .08$. 1000 samples bootstrapping confirmed the significance. The difference is not significant for other adjectives.

Repeated measures

The results show a statistically significant difference within-subjects for all repeated measures: fascism receptivity – $F(1) = 35.91, p < .001$ with a large effect size $\eta^2_p = .33$; superstition – $F(1) =5.87, p <.02$ with a small effect size $\eta^2_p = .08$; political evaluation – $F(1) = 4.69, p <.05$ with a moderate effect size $\eta^2_p = .02$. The results of between-subjects effects were non-significant: fascism receptivity – $F(1) =.16, p=.69$; superstition – $F(1) =.40, p=.53$; political evaluation – $F(1) =1.09, p=.30$. The table below shows the descriptive statistics across all measures.

	Pre-reading				While-reading				Post-reading			
	CHF		HF		CHF		HF		CHF		HF	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Fascism	2.66	0.95	2.59	0.97	-	-	-	-	2.35	0.96	2.25	0.93
receptivity												
Superstition	2	1.29	2.27	1.64	-	-	-	-	1.76	1.34	2	1.60
Political	4.13	0.88	3.98	0.94	-	-	-	-	4.35	1.00	4.04	1.11
evaluation												
Fixation	-	-	-	-	14.50	8.65	10.16	5.70	-	-	-	-
count												
Revisits	-	-	-	-	11.34	5.76	8.59	4.34	-	-	-	-
Dwell time	-	-	-	-	4695.59	1484.90	3893.25	1261.14	-	-	-	-
[ms]												
Surprising	-	-	-	-	-	-	-	-	3.62	1.59	2.81	1.20
Factuality	-	-	-	-	-	-	-	-	*4.09	-	*5.66	-

*Median

Table 3.2.4 The descriptive statistics of measures across groups (7-point Likert scale: from 1-not at all agree/not much to 7-very much agree/very much)

3.2.5 Study 2: Discussion

The findings of the eye tracking experiment (an increased cognitive processing shown in dwell time, revisits and fixation count only for the first point of divergence but not for all the points of divergence) may suggest that readers do not move between the actual world and textual actual world constantly throughout the text, only making a comparison between these worlds at the beginning of reading. This implies that readers recentre themselves to the fictional world adopting its historical facts as temporally true during reading. It supports the proposed model that involves an initial contrast between two worlds and fictional recentring. Counterfactuality is deduced with the introduction of the first point of divergence. The contrast effect makes the counterfactual historical fiction more surprising that can be also interpreted as the perception of the aesthetic feeling that is achieved using counterfactual as a literary device causing defamiliarization. As the history of this genre diverges from the actual world, they perceive

them as less real in factuality. Despite the counterfactual historical element, the fiction narrates the same story in two versions of the text, and therefore they are evaluated as similar in plausibility. Thus, the findings of the eye tracking experiment triangulated with self-report questionnaires support the proposed model of the cognitive engagement with counterfactual historical fiction.

Perceived realism results indicate that both texts are perceived more real than unreal. Even if the described relationship between father and son was fictional, readers evaluated it based on their RK-world where such schema as a child with divorced parents can be available and the relationship described is perceived to be possible. In addition, readers perceived both versions as more real than unreal in factuality that might highlight the role of make believe. Once recentred to the fictional world, a reader pretends the fiction to be real suspending the contradicting knowledge and beliefs. This pretence may affect the perception of the fiction as temporarily real. It might be also connected with activation of schemas such as Nazi, fascism and war that indeed happened as written in the black pages of world history. Thus, perceiving fiction as temporarily true and conceiving it with schemas from RK-world might collaboratively contribute to the perceived realism of the fictional narrative.

Moreover, the findings suggest that exposure to reading about negative history increases a positive evaluation of the current political situation. According to the functional theory of counterfactuals, it has been assumed that downward counterfactuals that describe what could have been worse have an affective function helping people feel relieved and enhance the mood. This in turn can lead to more satisfaction with the present conditions. The results suggest that not only counterfactual historical fiction but also historical fiction about Nazi can have such an effect. This can be explained in terms of comparison between the RK-world of the reader and the textual actual world – despite that historical fiction matches the RK-world, the comparison is made not between two pasts – actual world history and textual actual world history – but between the textual actual world and RK-world in the present condition. As the present state of RK-world is relatively better than its negative past, readers might evaluate it as more satisfactory than previously thought.

In addition, the findings showed that the exposure to a negative part of history about Nazi reduces the fascism receptivity. It suggests that the fictional recentring to the textual actual world can influence the RK-world having a short-term effect on how readers perceive and evaluate the actual world. As has been discussed before, the comparison between a reader's RK-world and textual actual world can facilitate re-evaluation of the RK-world. As the results indicate, readers in post-test showed more disagreement with fascistic views. This might be

due to the reminder of how the fascistic approach can lead to horrible consequences - a reminder conceived as the result of comparing the world where Nazi reigns with the world where people can freely express themselves without a fear of punishment. However, the same effect is yielded from both counterfactual historical fiction and historical fiction. This might be due to the activation of negative past for both types of text regardless of whether this past can be imaginatively projected to the present.

In the post-test, readers' superstitious beliefs decreased in comparison with the pre-test. This may tentatively be explained as an improvement in critical thinking, as critical thinking involves correctly identifying cause-and-effect relationships, and accurate causal inference is central to this skill. Hence, the less superstitious a person is, the more (s)he thinks critically. In accordance with the evolutionary aesthetics, it has been argued that fiction serves adaptive functions contributing to the improvement of the genetic fit, and the development of cognitive abilities such as critical thinking was one of its functions. It might be that even a short exposure to literature can potentially stimulate cognitive faculties and rationality.

The findings of Study 2 support the model that I am proposing based on the possible world framework (see chapter 1, section 1.4.3). Namely, it shows that readers compare the textual actual world with the actual world yielding a contrast effect at the onset of the first linguistic cue that signals counterfactuality (the first point of divergence). The fictional world is built using RK-world as a template. Relevant schemas are activated from RK-world to understand the context of the textual actual world such as Nazi and war. Readers fictionally recentre to the textual actual world playing make believe and suspending contradictory knowledge. The textual actual world is saved in memory that leaves room for comparison with the actual world leading to the re-evaluation of the RK-world. Fiction might also serve an adaptive purpose in improving cognitive abilities as the tendency to reducing superstition shows.

3.3 Summary

In the third chapter, I presented two studies on the cognitive engagement with counterfactuals in two levels. The first level is micro-level because counterfactuals are embedded as alternative textual states on the textual actual world. The second level is macro-level as a textual actual world is itself counterfactual. Whereas the former contradicts the textual actual world, the latter contradicts the actual world. While comprehending both types of counterfactuals, readers imagine two possible worlds (actual and counterfactual) which leads to comparison. The

comparison between two states and worlds leads to the evaluation of actual state/world and an emotional reaction towards it.

Based on findings of the first study, readers imagine both the textual actual world state and the textual alternative state; focus more on the textual alternative state; perceive literary counterfactuals as more emotional. According to the results of the visual world paradigm experiment, participants looked at both textual actual world state and the textual alternative state while comprehending literary counterfactuals. The results were discussed in relation to cognitive accounts of counterfactuals comprehension. The study supported mental model theory that suggests the dual meaning of counterfactuals. In contrast, the study did not support the suppositional theory that interprets counterfactuals with the suppositional meaning only.

In the case of counterfactual historical fiction, the contrast between two worlds creates a surprise effect, also being emotionally more engaging than its non-counterfactual version. While reading counterfactual historical fiction during the second eye-tracking experiment, readers imagined both worlds initially but later were engaged with the alternative world. After fictional recentring, readers' agreement with fascism decreased, positive evaluation of the present politics increased, and readers tended to be less superstitious.

The results of both experiments suggest that the proposed models of literary counterfactuals processing based on possible worlds framework including such cognitive processes as imagination, comparison, evaluation and emotional response is feasible. Readers of both embedded counterfactuals and counterfactual historical fiction imagined two worlds and performed fictional recentring. It aligns with the fictional recentring of Ryan according to which readers recentre from the actual world to the textual actual world and from textual actual world to the textual alternative state. Furthermore, it seems that readers re-evaluate the actual world after fictionally recentring to the textual actual world. It shows that exposure to fiction can influence how readers perceive and evaluate the actual world. The influence can be positive such as the increase in satisfaction and decrease in agreement with fascism demonstrated in the second study. Moreover, exposure to the literary text might improve cognitive skills such as critical thinking by lowering superstitious beliefs.

Part II: The perception and evaluation of the literary counterfactuals by L2 readers

4 When literary studies meet linguistics: Counterfactuals as foregrounding

In this part, I will discuss (i) foregrounding; (ii) literary counterfactuals as deviations; (iii) second language processing. First, the study of foregrounding will be defined as the link between two disciplines, namely literary theory and linguistics. By drawing attention to linguistic features, I will highlight the importance of form and meaning as deviations. In (ii), I delve into embedded counterfactuals and counterfactual historical fiction as deviations. Regarding embedded counterfactuals, I will show the morphosyntactic make-up and linguistic debates regarding how the counterfactual meaning is derived. I will critically analyse the current discussions in the field of linguistics to provide the most feasible account for interpretation of counterfactual meaning. Based on this, I identify embedded counterfactuals as formal and semantic deviations. The linguistic perspective on counterfactual conditionals will help to clarify the difference between hypotheticals and counterfactuals which have been treated as the same in the field of literature and identify the deviation in the morphosyntax of counterfactuals as well as explain how this deviation contributes to its semantic deviation, i.e., counterfactual meaning. Furthermore, the points of divergence used in counterfactual historical fiction will be described as semantic deviation. The illustration will be made with the example of *Fatherland* (1992) by Robert Harris. Identifying linguistic elements of both embedded counterfactual and counterfactual historical fiction as deviations allows us to see counterfactuals as foregrounding that fosters defamiliarization and enhances the aesthetic value of the literary work. Afterwards, the second language processing hypotheses and accounts will be discussed to reveal processing peculiarities in L2. It is important to address a possible L2 influence while reading counterfactuals as the participants of the first study were second-language speakers of English.

4.1 Foregrounding as deviations

The cross-section between linguistics and literary studies is stylistics, the study of language in literature. Its main assumption is that the text is composed of foregrounding and backgrounding. Whereas the former is regarded as stylistic devices, the latter is the context. The idea of foregrounding put forward by formalists (Shklovsky) at the beginning of the twentieth century and by structuralists (Mukarovsky) at the middle of the twentieth century drew attention to the language used in a literary text. As Shklovsky (1917) writes, “the technique of art is to make objects ‘unfamiliar’, to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself

and must be prolonged” (Shklovsky, 1917: 12). Structuralists in turn see foregrounding (which is translation of Czech *aktualisace*) as violations of norms to receive an aesthetic effect (Mukarovsky, 1964). For a detailed investigation into the development of foregrounding as a concept in literary theory, one can read van Peer (1986) and Douthwaite (2000), two book-length studies of foregrounding. For the dissertation, I consider foregrounding in its present shape, the definition of which has been extended since its first introduction. Balint et al. (2016) defines three ways of seeing foregrounding: (i) textual features or deviations; (ii) perception of textual element as a deviation; (iii) experience of the perceived deviation. In the scope of the dissertation, I adopt the first interpretation of foregrounding, that is deviations. More precisely, I regard foregrounding as an effect of deviation on readers in the spirit of Leech (2014).

Deviation is defined as the violation of norms such as communicative, social or artistic by Balint et al. (2016) and as linguistic by Leech (2014). Both Balint et al. (2016) and Leech (2014) consider stylistic devices or figures of speech as deviations. Leech further classifies them into “formal (grammatical or lexical), phonological, orthographic, or semantic (referential or contextual), or perhaps assigned to a combination of these categories” (Leech, 2014: 20). If to take into account this linguistic classification, embedded counterfactuals can be considered as the combination of grammatical and referential deviations (which will be described in the following chapter on the form and semantics of counterfactuals) and counterfactual historical fiction as containing referential deviation (that will be described afterwards). Moreover, counterfactuals can be considered as a ‘paradigmatic figure’ that is defined as “a gap in the established code – a violation of the predictable pattern” (Leech, 2014: 19) in other words “disruption, at one particular level, of the normal pattern of linguistic organization” (Leech, 2014: 24) rather than syntagmatic that is “a pattern superimposed on the background of ordinary linguistic patterning” (Leech, 2014: 19). According to Leech (2014), the deviation is meaningful once it has some connection that makes to infer meaning from a composite linguistic occurrence. In the case of embedded counterfactuals, the combination of grammatical and semantic deviation warrants counterfactual meaning, thus making a linguistic event meaningful. In the case of points of divergence implemented in counterfactual historical fiction, the referential deviation elicits a counterfactual meaning that is essential to build a counterfactual world and therefore makes the use of this linguistic tool significant.

Levin (1963) proposed two types of deviations: statistical and determinate. The former refers to the number of occurrences, and the latter to the norms. Norms can be either absolute, that is language norms, or relative, that is textual norms. However, such classification faced criticism, as it is impossible to render either statistical norm or rely on pure grammatical norm

(e.g., Lipski 1977).

Futhermore, foregrounding causes defamiliarization, the estrangement effect. In other words, what is seemingly familiar may seem strange to us (Shklovsky, 1965). Balint et al. 2016 see defamiliarization in terms of the third convention – experience of the perceived deviation. However, textual features or deviations (i) can also cause defamiliarization. For example, counterfactuals encoding grammatical and semantical deviation shifts the perspective from *what it is* to *what might have been*, that is strange or novel as the former is usually referred. Although, counterfactual thoughts are familiar to us, probably most people wonder “what if” scenarios, from most trivial “what if I had woken up earlier” to of more importance “what if I had chosen another career”. It seems that (i) and (iii) are not necessarily mutually exclusive but rather complementary.

Based on Leech and Short (1981), defamiliarization might result in novel understanding. And further this novel understanding may be added to the reader’s worldview, thus refamiliarization (Miall and Kuiken, 1995). In our case, considering *what might have been* may help readers to understand the importance of an event that caused a particular outcome. As a result, reader perceives *what it is* differently.

According to the empirical research, the effect of deviations can be associated with a slow reading (e.g., Miall and Kuiken, 1994) and aesthetic feeling (e.g., Miall, 1995) such as emotional engagement (Hakemulder et al., 2016). This corresponds with the neurocognitive model of literary reading proposed by Jacobs (2011). However still, the theoretical investigations not mentioning the empirical studies on the micro-level structures of literary text that encompass foregrounding are scarce (as noted by van Peer 2007 and Salgado 2015). Thus, both theoretical and empirical investigation into counterfactuals as a literary device that foregrounds a literary text contributes to the issue.

4.2 Formal and semantic deviations in counterfactuals

The grammatical markers of counterfactuality in English conditionals have been changing since its first use dated back to c800 (Molencik, 1999). These changes have been mostly observed in the verb forms of the conditional sentences. It was mainly due to the two contradicting approaches: eagerness to have morphosyntactic parallelism in both clauses and bias for consequent clause to encompass a more remote verb form because it is believed to convey more counterfactuality than in the antecedent clause. More counterfactuality in the

consequent clause might be explained given that its truthfulness is established only in the world created by the antecedent clause. Molencki (1999) supports the view that such competition reflects the principles of linguistic economy that on the one hand, erases unnecessary discrepancies and on the other hand, maintains important distinctions to enable effective communication. A more remote verb form view is promoted by cognitivists within the mental space framework (Fauconnier 1996; Sweetser, 1996). With respect to the cognitivist approach, *q*-clause is only possible in the mental space created by the *p*-clause, and therefore more distant from reality which should be illustrated by the corresponding verb form. Molencki (1999) also mentioned Dahl (1997)'s life-cycle of counterfactual markers which concerns the preterite tense, the subjunctive mood, the perfective aspect and the use of modal verbs, in accordance with the four-stage scenario (Old, Middle, early New, Modern English). It was also noted by Molencki (1999) that one of the crucial developments was the use of the past tense for expressing present time.

From a diachronic perspective, in Old and early Middle English, the pluperfect appeared first in past time reference cases, but later it was used to indicate the remoteness of present time counterfactual situations. Molencki (1999) illustrated the verb forms used in the past counterfactual protases (*p*-clause) in Old (c800-c1000), Middle (c1100-c1400), early New (c1500-c1600) and Modern English (c1700-c2000). From c800 to c1300, preterite subjunctive was used in *p*-clause. The use of pluperfect began in c1200 and has been successfully lasting to the present day. Such structure as *would have* + past participle (PP) sometimes occurred in the 1900s as well as *had have* + PP, which was prior found in the texts of c1400. The verb forms in past counterfactual apodoses used preterite subjunctive from 800 to 1200, whereas pluperfect form prevailed from the end of 1200 to 1700. *Would have* + PP became common from the middle of 1300 and to the present day. Interestingly, *would have* + PP was used for some time instead of *had have* + PP that we use today. This direction shows that the strive for showing more counterfactuality in the consequent is prevailed than the want of morphosyntactic parallelism. However, morphosyntactic parallelism is accepted in nonstandard usage (Molencki, 1999). The diachronic perspective is useful in seeing the dynamics of counterfactuals structure development to clarify the purpose of using past tense in counterfactuals. It was necessary to use past tense to show the remoteness. Furthermore, the consequent is even more remote than the antecedent.

If we grammaticalise the structure of counterfactuals described in the first part of the dissertation, the following glossing will be obtained. The first sentence is borrowed from Henry James:

- Past counterfactual
 If he had come to Gardencourt, he would have seen Madame Merle.
 if he AUX-PST come-PST to Gardencourt, he AUX-FTR-PST AUX see-PST Madame Merle
- Present stative verb counterfactual
 If she knew the answer, she would tell you
 if she know-PST the answer.ACC, she AUX-FTR-PST tell-INF you
- Present subjunctive counterfactual
 If he were the president, he would rule the government.
 if he be-SBJ the president, he AUX-FTR-PST rule-INF the government.ACC
- Mixed counterfactual
 If he had bought Bitcoin early, he would be wealthy now.
 if he AUX-PST buy-PST Bitcoin early, he AUX-FTR-PST be-INF wealthy now

From this glossing, it can be observed that for past counterfactuals two layers of past tense (PST) are used in both protasis and apodosis whereas for present counterfactuals one layer of past tense morphology is used in both antecedent and consequent. It follows that one layer of past tense of past counterfactuals is used for locating the event in the past time and the second layer for making the imagined event remote. If we stick to our previous claim of Molencki (1999) that the apodosis (consequent) is more remote than the protasis (antecedent), it means that the combination of future and past tenses denotes a stronger form of remoteness. It seems logical because the consequent happens only if the antecedent holds, i.e., after the condition in the antecedent has been fulfilled, and therefore future in respect to the antecedent. The future tense also refers that the consequent world is further compared to the antecedent world. Or it can also be because *will* functions here as a modal verb as Ippolito (2006; 2013) suggests. She regards *will* as *woll* (first proposed by Abusch, 1988), that is a ‘tenseless modal operator’. The opinion in treating *will* as a modal or auxiliary verb varies among linguists but in both cases, it seems that *would* marks double remoteness.

An extra layer of past tense morphology is also regarded as a fake past (e.g., Iatridou, 2000; Karawani, 2014; Kakimova, 2021). The use of past tense morphology for denoting remoteness instead of past time is a peculiar phenomenon that I would treat as a deviation from the grammatical norm. The phenomenon inspired von Fintel and Iatridou (2023) to propose an X-marking theory. According to their proposal, counterfactuals are regarded as X-marked conditionals, with X meaning an extra layer of morphology. They argue that such a structure

does not always convey counterfactuality. For example, the most cited arsenic case (Anderson, 1951):

- (4) If Jones had [have.PST] taken [take.PST] arsenic, he would [woll.PST] have shown [show.PST] just exactly those symptoms which he does in fact show.

This example shows that the derived meaning from an extra layer of morphology is not counterfactual because Jones does show the symptoms and he did take arsenic. Another example of a non-counterfactual meaning is a future-less-vivid conditional (5) taken from von Fintel and Iatridou (2023:1481).

- (5) If he took [take.PST] the syrup, he would [woll.PST] get better.

The above example does not convey a counterfactual meaning that he will not take the syrup and that he will not get better. An extra layer morphology is used to express the unlikelihood of the event to occur. It is not likely that he will take the syrup for whatever reason (maybe he does not like the taste of it) and therefore he will probably not get better.

They also voted against the term subjunctive because such structures rarely use the subjunctive mood as can be already noticed from before provided examples. Furthermore, the subjunctive does not always convey a counter-factuality. For example, free factive subjunctives in German (6) taken from Csipak (2020:14).

- (6) Es wäre Pizza im Kühlschrank.
it is.SUBJ pizza in-the fridge
'There is pizza in the fridge.'

The subjunctive used in this example is interpreted non-counterfactually: it conveys the truth of preajacent that there is indeed pizza in the fridge.

Because these terms do not capture adequately the content of conditionals, von Fintel and Iatridou (2023) propose to distinguish two types of conditionals based on the morphological properties: O-marked and X-marked. O-marking means the absence of X-marking and X-marking is an addition of an extra layer of morphology. Based on the cross-linguistic analysis, they suggest that X-marking is not necessarily only past tense morphology, it can also be imperfective, future, subjunctive among others. Although, the past tense morpheme in combination with another morphology is predominantly used for X-marking in many languages including Polish, Russian and Kazakh (cf. forthcoming Kakimova, 2024).

The main discussion in linguistics that concerns the semantics of counterfactuals is how the counterfactuality is derived. As it relates to the past tense morphology that does not refer to the past time, linguists have proposed different perspectives in viewing the issue. Some suggested that it is just accidental homophony (Portner, 1992) but soon rejected as it occurs across different languages (e.g., Iatridou 2000). Others assumed that the combination of conditional semantics and temporal past tense yields counterfactual meaning (Hornstein 1991) but also dismissed as conditional operators such as *if* and *then* are semantically vacuous. According to Schulz (2014), the most recognized approaches to treating past tense morphology are *past as past* and *past as modal*.

According to the *past as past* approach (Ippolito 2003, 2013; Arregui 2005, 2007; Ferreira 2011; Romero 2014; Khoo 2015, 2022), past tense morphology in counterfactuals is used for back shifting purposes. Ippolito called it a branching time, which is the morphology that basically helps us shift the evaluation time back to when different options were accessible. For example, by using extra past in “if he had come to Gardencourt, he would have seen Madame Merle” we go back to the time when the question of him coming to Gardencourt is still open and there are two possibilities accessible, that is him coming and him not coming. And I think “if he comes to Gardencourt, he will see Madame Merle”. The interpretation faces two problems. First, the accessibility time cannot always precede the event time, as von Fintel and Iatridou suggest. I quote their example below (von Fintel and Iatridou, 2023:1429):

(7) “If there had been no big bang, we wouldn’t be here.”

According to the example, there was no accessibility time before the Big Bang, and therefore, branching time cannot be used in this case. Second, *past as past* approach faces difficulty when future counterfactuals are concerned (also mentioned by von Fintel and Iatridou). Let us take the following counterfactual as an example:

(8) If George had taken the test tomorrow, he would have had Prof. Smith in the commission.

The above example suggests that the speaker knows that George will not take the test tomorrow (Wednesday) because he already did yesterday (Monday), and the test can be taken only once. The speaker also knows that Prof. Smith will be in the commission only tomorrow (Wednesday). In future counterfactuals, the action described in the antecedent can be accomplished only once and it already happened, and therefore it is impossible to repeat. One

layer of past tense is used to convey that the event already took place in the past (George took the test yesterday) and the second layer of the past, according to *past as past* approach, is used to branch over times (performing its usual temporal shift). However, if we use the branching time and shift ourselves to the moment before him hypothetically taking the test (which would be today, Tuesday), we cannot say “if George takes the test tomorrow, he will have Prof. Smith in the commission” because at this point, we already know that he cannot take the test again tomorrow. And even if we back shift to the moment before him factually taking the test on Monday (that is Sunday), we cannot still say “if George takes the test tomorrow, he will have Prof. Smith in the commission” because we know that Prof. Smith will not be in the commission on Monday.

The second approach known as *past as modal* claims that an extra layer of past tense morphology is used to allow branching over worlds as opposed to over times. The proponents of this account (e.g., Iatridou 2000; Schulz 2014; Mackay 2019) believe that the past tense morphology can branch over times to yield a usual past time reference, and can branch over worlds to yield a counterfactual meaning. Hence, past tense morphology does not have fixed temporal meaning but rather flexible. According to Iatridou (2000), an extra layer of past tense morphology has *exclusion feature*, that is when topic world excludes the speaker’s world. For example, when I say “if he had come to Gardencourt, he would have seen Madam Merle”, using an additional layer of past tense morphology I exclude the speaker’s world where he did not come to Gardencourt, and imagine the topic world where he came to Gardencourt and saw Madam Merle. A usual layer of past tense also has exclusion feature, but in this case it is used for locating the event in the past temporally: he did not come to Gardencourt and did not see Madame Merle.

However, the exclusion feature was deemed inappropriate later by Iatridou herself and von Fintel (2023) because it does not include the evaluation world (as the speaker’s world is excluded) that was mentioned previously in Mackay (2015) and Leahy (2018) and we can end up with incorrect examples like the following:

- (9) #The gardener committed the crime with a wrench, but if the gardener had committed the crime, he would have used a shovel.

Even if the exclusion feature, which was developed under the approach of the *past as modal*, is incorrect, it does not mean that the approach itself is wrong because the representations of this approach by other scholars that do not include exclusion feature such as von Fintel (1998) and Mackay (2019) seem to align with Stalnaker’s (1975) domain widening view that is found to be the most appropriate explanation how the counterfactual meaning is derived as von Fintel

and Iatridou (2023) acknowledged in their recent prolegomena to the X-marking theory. However, their attempt is beyond the scope of the dissertation as they want to account for all the instances when the extra layer of morphology is used (also outside of conditionals) and provide a composite meaning of this phenomenon (that is, the matter of joined multifaceted investigation by linguists and philosophers for some years).

The domain widening view seems to be feasible, and I will briefly elaborate on this. According to the view, X-marking (extra layer of morphology) extends to the worlds outside of the epistemic set (what we know) or context set, in comparison to O-marking (lack of X-marking) which domain is in the framework of the epistemic set or context set. According to Stalnaker (1975), the context set includes the possible worlds, the possible worlds that are not dismissed by the common ground (background information). Here, a possible world means “an alternative way that things may be or might have been” (Stalnaker, 1975: 273). A proposition (a declarative sentence that is either true or false) can be compatible with the context, if it is true in some possible world. If a proposition is true in all the possible worlds, then it is entailed by the context. The first instance leaves open the question of truthfulness, whereas the latter is presupposed in the context. Thus, whenever a proposition is uttered, it can be considered within the context set, either being compatible with (either true or false) or entailed by (true). However, when it comes to counterfactuals, the selection function can be used to select the possible worlds that are outside of the context set. Von Fintel and Iatridou (2023) opt for Kratzerian approach in defining *would* as a modal operator that helps to select the world out of the epistemic/context set. The accomplishment of this procedure means that one suspends temporarily some background information (presupposition) in the context set. For example, if we utter “if he had come to Gardencourt, he would have seen Madam Merle”, we reach the world where he came to Gardencourt and saw Madam Merle that is outside of the context set and we suspend background information that he did not come to Gardencourt. Selection function and domain are flexible. If a speaker intends to reach outside the context set, (s)he can select a particular world beyond the possible worlds of the context set and therefore widening the domain of possible worlds. Stalnaker (1975) made use of possible worlds, the philosophical framework developed by Leibnizian philosophers and later mostly by Lewis in the 1960s and 1970s, that influenced not only linguistics, but also reached to literature (which has been already discussed in detail in the previous part).

Thus, an extra layer of morphology is a grammatical deviation and the counterfactual meaning that emerges is a semantic deviation, namely referential deviation, because it refers to the possible world outside of the context set. The combination of formal and semantic deviation

makes embedded counterfactuals foregrounding elements in the literary text causing defamiliarization. Furthermore, counterfactuals occur in literary texts as semantic deviations creating the textual actual world that contradicts the actual world. These are regarded as points of divergence that will be further elaborated on the following section in the example of *Fatherland* (1992) by Robert Harris.

4.3 Points of divergence as a semantic deviation in the example of *Fatherland*

Whereas embedded counterfactuals in the form of counterfactual conditionals use the combination of grammatical and referential deviations, counterfactual historical fiction applies referential deviation only. By using the points of divergence, the author refers to an imaginary world that contradicts the actual world. The points of divergence used in counterfactual historical fiction are referential deviations, as they intentionally deviate from actual historical events to explore alternate realities and highlight the speculative nature of the narrative. As has been discussed in the first part of the dissertation, the point of divergence is a paramount feature of the counterfactual historical fiction that sets the counterfactual world. The use of this literary device makes the text deviate from conventional narrative that deals with the actual world. This, in turn, can lead to defamiliarisation, making readers surprised. After defamiliarisation, readers might engage in refamiliarisation that has been shown in the re-evaluation of the actual world. Thus, a point of divergence as a literary device creates the counterfactual world which history is not familiar for readers. And therefore, it can be regarded as a referential deviation.

For example, in *Fatherland* (1992) by Robert Harris, the following points of divergence were used that deviate from the history that we know:

- Hitler's project of reconstructing Berlin realised in 1964.
- Greater German Reich still existing in 1964.
- "...endless struggle against the American-backed Soviet guerillas, which had been grinding on east of the Urals for twenty years." (p.23)
- "Construction of the Arch of Triumph was commenced in 1946 and work was completed in time for the Day of National Reawakening in 1950. The inspiration for the design came from the Führer and is based upon original drawings made by him during the Years of Struggle." (p.30)
- "On the inner walls are carved the names of the three million soldiers who fell in defense of the Fatherland in the wars of 1914 to 1918 and 1939 to 1946." (p.31)

- “The Avenue was designed by Reich Minister Albert Speer and was completed in 1957.” (p.32)
- “Berlin-Moscow Autobahn” (p.33)
- “...since 1959, children had been given a week off for the Führer’s birthday, rather than for Easter.” (p.34)
- “From here, trains as high as houses, with a gauge of four metres, left for the outposts of the German Empire – for Gotenland (formerly Crimea) and Theoderichshafen (formerly Sevastopol); for the Generalkommissariat of Taurida and its capital, Melitopol; for Volhynia-Podolia, Zhitomir, Kiev, Nikolaev, Dnepropetrovsk, Karkov, Rostov, Saratov...” (p.39)
- “Führer’s hundredth birthday” (p.47)
- “The subject served as State Secretary in the General Government, 1939-51.” (p.70)
- “Victory over Russia in the spring of ’43 – a triumph for the Führer’s strategic genius! The Wehrmach summer offensive of the year before had cut Moscow off from the Caucasus, separating the Red armies from the Baku oilfield. Stalin’s war machine had simply ground to a halt for want of fuel” (p.112).
- “Peace with the British in ’44 – a triumph for the Führer’s counter-intelligence genius! March remembered how all U-boats had been recalled to their bases on the Atlantic coast to be equipped with a new cipher system: the treacherous British, they were told, had been reading the Fatherland’s codes. Picking off merchant shipping had been easy after that. England was starved into submission. Churchill and his gang of war-mongers had fled to Canada.” (p.112)
- “Peace with the Americans in ’46 – a triumph for the Führer’s scientific genius! When America defeated Japan by detonating an atomic bomb, the Führer had sent a V-3 rocket to explode in the skies over New York to prove he could retaliate in kind if struck. After that, the war had dwindled to a series of bloody guerilla conflicts at the fringes of the new German Empire. A nuclear stalement which the diplomats called the Cold War.” (p112)
- “...Goering had died in ’51,...” (p.113)
- “Himmler...when he was killed in an aircraft explosion in ’62.” (p.113)
- “...invitation to the President of the United States of America to visit the Greater German Reich for personal discussions aimed at promoting greater understanding between our two peoples. This invitation has been accepted. (p.114)...Herr Kennedy intends to meet the Führer in Berlin in September.”

- "...1948 Reich Civil Defense Law..." (p.147)
- "Now he (Heydrich) was said to be in line to succeed the Führer" (p.177)
- "...gilt-framed photographs of the Führer – the official portrait from the mid-1950s..." (p.179)
- "In 1954, ...(Nebe was alive)" (p.181)
- "In the West, twelve nations – Portugal, Spain, France, Ireland, Great Britain, Belgium, Holland, Italy, Denmark, Norway, Sweden and Finland – had been corralled by Germany, under the Treaty of Rome, into a European trading bloc. German was the official second language in all schools" (p.265)
- "In the 1950s,...Omsk, the capital of what was left of Russia" (p.272).
- "Winston Churchill...is an old man now. In Canada. He lives there. So does the Queen." (p.276)
- "July 1942. On the Eastern Front, the Wehrmacht has launched Operation 'Blue': the offensive which will eventually win Germany the war" (p.305).
- "The Americans supply money, weapons, training. They've kept the Reds going for twenty years" (p.318)

Based on the actual world and our historical knowledge, the examples above can be regarded as deviations. To understand these deviations, I will further provide historical details. According to historiography, Hitler's project of reconstructing Berlin, sketched by Albert Speer, exists only as a drawing and is not implemented in real life. It is well known that German Reich did not exist in 1964, and there was no such struggle between American-backed Soviet and Nazi Germany that lasted for twenty years. As Germany was defeated, the Arch of Triumph was not constructed in 1946. The Day of National Reawakening was an actual event in Nazi Germany celebrated on January 30, 1933, marking Hitler's appointment as Chancellor, but it was not celebrated in 1950. There is also no historical proof that Hitler made some drawings of the construction during the Years of Struggle. WWII ended in 1945 with the defeat of Axis powers, including Germany, and therefore it is not historically plausible that the wall of victory for soldiers of Nazi Germany who fought in 1939-1946 were commenced. The Avenue designed by the Reich's Minister Albert Speer was not completed. Furthermore, there is no direct Berlin-Moscow highway. It is not plausible that "since 1959, children had been given a week off for the Führer's birthday" (p.34) because of the loss of Germany in 1945 and Hitler being remembered as an evil leader who killed millions of Jews. Four-meter-long trains are an exaggeration. Even if the mentioned territories were briefly under Germany during WWII,

Crimea was not called Gotenland and Sevastopol was not called Theoderichshafen. These territories were not part of Germany after WWII. Führer committed suicide at the age of 56, and it is impossible for him to have a hundredth birthday. The General Government was dissolved in 1945, and therefore, it is impossible for “the subject to serve as State Secretary in the General Government in 1939-51” (p.70).

There was no victory over Russia in the spring of 1943. Case Blue (Fall Blau) was launched by Germans in 1942, aiming to capture oil-rich regions of the Caucasus and secure the southern Soviet territories, particularly around Stalingrad. However, the Germans were defeated in the Battle of Stalingrad in 1943, and it was a pivotal moment that ultimately contributed to the overall decline of Nazi Germany. There was no peace between Germany and Britain in 1944. Throughout the war, the German U-boats (submarines) were engaged in naval warfare, but the war continued with intense fighting and resistance. The British, along with other Allied countries, made significant advancements in breaking German codes (i.e., Enigma cypher), which greatly aided the Allied war effort. Churchill fought till the end against Germany. There was no peace treaty signed between Germany and America in 1946. Even if America indeed defeated Japan by detonating atomic bombs, there is no historical record of the Führer sending a V-3 rocket to explode over New York City. The Cold War was a historical period from WWII until the 1990s that was characterised by political, economic, and ideological tensions and proxy conflicts between the United States and the Soviet Union.

Goering could not die in 1951 because he committed suicide in 1946 before the verdict of the Nuremberg Trials. Himmler could not be killed in an aircraft explosion in 1962 because he committed suicide in 1945 while in British custody. Also, it was impossible for Kennedy as president to meet Hitler as the former was the president of America from 1961 to 1963, and Hitler lived until 1945. Reich Civil Defence Law was not created in 1948 as the German Reich was dissolved after the end of World War II in 1945. Before that, Adolf Hitler held absolute power as the Führer, and Heydrich was not in line to succeed him. As Hitler died in 1945, no portrait of him was taken in the 1950s. Nebe was arrested by the Gestapo in 1944 and was executed by hanging in 1945.

The Treaty of Rome is a historic agreement signed in 1957 by six founding members: Belgium, France, Italy, Luxembourg, the Netherlands, and West Germany. During the war, Germany implemented Germanization policies, but it was not to the extent of making German the official second language in all schools. During the 1950s, the capital of the Soviet Union was Moscow, not Omsk. Both Churchill and the Queen lived in London, UK, and they did not run away to Canada. The operation “Blue” was a decisive defeat for German forces.

Based on the differences between the actual world and the textual actual world, the main point of divergence in the history of *Fatherland* is the outcome of Operation ‘Blue’. In the textual actual world, the offensive brought Germany’s victory in the war. In the actual world, Operation ‘Blue’, launched in 1942, failed. One of the key components of Operation Blue (which aimed to capture the Caucasus with its rich oil fields) was the diversionary attack on Stalingrad. However, the Soviet Union organised a massive counteroffensive known as the “Battle of Stalingrad”. The Soviet victory in the Battle of Stalingrad was a pivotal turning point in the war (Lyons, 2016). After the battle, the Red Army went on the offensive and began to drive the German forces westward, eventually pushing them back across the entire Eastern Front. In the textual actual world, WWII ended in 1946 as the result of peace with America. However, in the actual world history, WWII officially ended in 1945. Up to 1942, the historical background of the textual actual world is the same as that of the actual world. After 1942, the history of the textual actual world develops in the opposite direction: Nazi Germany succeeds in the operation ‘Blue’ and eventually wins WWII gaining power across the world.

The nexus point between two counterfactual histories can be illustrated with the following bifurcation line:

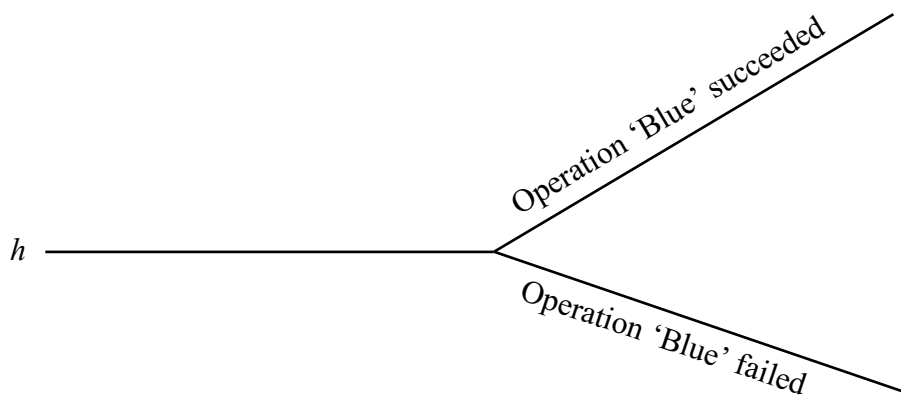


Figure 4.4 Historical bifurcation in *Fatherland*

As illustrated in the diagram, the main event that changed the history of the textual actual world is a counterfactual winning of the operation ‘Blue’. The victory in this battle led to subsequent victories, ultimately winning WWII. Thus, the main event is a meaningful historical event that played a decisive role during the war. The deviation from historiography makes the text salient and unfamiliar, causing defamiliarisation.

Thus, the use of points of divergence from the past helps to emerge the counterfactual meaning, creating an alternative reality that could have happened but could not. The creation of the alternative world makes the application of points of divergence as referential deviation meaningful. This literary device refers to the alternative reality that is contradictory to our reality. In the same way as embedded counterfactuals, counterfactual historical fiction refers to the possible world out of the context set. Whereas the former creates a textual alternative possible world that is counterfactual to the textual actual world, the latter builds up the textual actual world that is counterfactual to the actual world.

4.4 Summary

First, I discussed foregrounding and saw foregrounding as an effect of deviation on readers. Counterfactuals have been considered a combination of formal and semantic deviations in embedded counterfactuals and semantic deviations in counterfactual historical fiction. It has been pointed out that the use of counterfactuals as foregrounding can lead to defamiliarisation because of a shift from *what it is* to *what might have been*. Defamiliarisation causes novel understanding; in the case of counterfactuals, readers understand the importance of an event that caused a particular outcome. This novel understanding is added to the reader's worldview (refamiliarisation): readers perceive *what it is* differently. The processing of foregrounding is associated with a slow reading and aesthetic feeling, such as emotional engagement. Whereas the former is still to be discovered in the empirical part of the dissertation, the latter has been illustrated in the first part of the dissertation in the example of *The Snows of Kilimanjaro*, i.e., counterfactuals evoke emotions.

I argued that hypotheticals are not necessarily counterfactuals, and the term subjunctive is not enough to capture the linguistic structure of counterfactuals because counterfactuals rarely use subjunctive in their morphosyntax. I proposed to treat bona fide counterfactuals, that is, counterfactual conditionals, as X-marked conditionals or, in other words, counterfactuals with X-marking (an extra layer of morphology) based on the due consideration of their linguistic form. In this section, I investigated counterfactuals under a linguistic microscope. After giving consideration to the grammatical properties of counterfactuals, the issue of counterfactual meaning derivation was discussed. Two approaches, *past as past* and *past as modal*, were critically analysed, and the latter was found to be more accurate except for the exclusion feature that could not hold criticism. As the *past as modal* approach is based on a domain-widening view, it was explained taking into consideration Stalnaker's (1975) work.

According to the accepted view, *would* as a modal operator widens the domain of possible worlds reaching outside of the context set to yield counterfactual meaning. Thus, counterfactuals, which depict what might have been scenarios, have an extra morphology in their linguistic form that contributes to counterfactuality. I regarded the extra morphology as a deviation from the grammatical norm, as well as the derived counterfactual meaning as a deviation from a semantical norm.

Furthermore, I presented the points of divergence in counterfactual historical fiction as semantic deviation giving an ample example from *Fatherland* (1992) by Robert Harris. It was categorised as referential deviation because it does not refer to the actual world, which is usually the case. I outlined the main nexus point in two histories from which the textual actual world of *Fatherland* follows a counterfactual direction. Thus, both embedded counterfactuals and counterfactual historical fiction can be regarded as deviations leading to defamiliarisation and as a consequence to refamiliarisation.

5 The second language processing

Most empirical research on literature focuses on reading in one's first language (L1). However, people often engage in reading not only in their native language but also in non-native languages (L2). Literary texts, for instance, are frequently used as resources in foreign language learning. Reading in a non-native language, though, may impose additional cognitive processing costs. This is particularly relevant when dealing with complex linguistic structures like counterfactuals, which require comparing two contradicting scenarios - a task shown to demand cognitive resources in the previous two studies. In the first of these studies, participants were non-native speakers, making an understanding of second language processing especially pertinent. This chapter will explore how reading in a second language can affect readers' processing behaviour, shedding light on the cognitive demands involved. First, the previous empirical findings on L2 processing will be overviewed. This leads us to the discussion of second language processing hypotheses that have emerged as a result of empirical investigations. I will draw attention to three hypotheses prominent in psycholinguistic literature: the shallow structure hypothesis, the reduced ability to generate expectations hypothesis and the interface hypothesis. The shallow structure hypothesis assumes that non-native speakers do not have full syntactic processing as native speakers do and, therefore, rely on lexical-semantic processing and pragmatic cues. The second hypothesis does not need clarification as its name implies what the hypothesis suggests – a reduced ability of non-native speakers to generate expectations. The interface hypothesis assumes that for non-native speakers, it is difficult to integrate information in the complex interface of morphosyntax and semantics as well as morphosyntax and pragmatics and a combination of the two. I will discuss the findings of previous empirical studies to identify whether these hypotheses are supported and whether there is a considerable difference between L1 and L2 processing. Afterwards, language transfer theory will be discussed that suggests the L1 influence on L2 processing. The discussion of the above-mentioned hypotheses and the language transfer theory is important because counterfactuals have both complex morphosyntax and semantics.

5.1 Insights from previous research on L2 processing

L2 processing research is mostly based on the investigation of subject-verb agreement, case marking and relative clause attachment ambiguities (also known as garden path sentences). Felser et al. (2003)'s studies on L2 sentence processing claimed that people do not rely on syntactic information in L2. This has generated significant attention in the literature, motivating

researchers to test this claim. However, some researchers debated this hypothesis both theoretically and with empirical evidence. The structure under investigation was the relative clause, e.g., “The journalist criticised the pilot of the traveller who was drinking too much” (Felser et al., 2003:8). The relative clause “who was drinking too much” might be applied to the initial noun phrase according to the Recency principle – pilot, or to the second noun phrase according to the Predicate Proximity principle – traveller (Gibson et al., 1996). The application of the noun phrase attachment principle differs among different languages: we favour the former in English (Carreiras and Clifton, 1999) and German (Hemforth et al., 2000), and the latter in such languages as Russian (Sekerina, 1997). In Felser’s (2003) study, L2 learners of English did not have a clear attachment pattern, whereas native English speakers preferred attachment to the second noun phrase (pilot). Dussias (2003) failed to replicate Felser’s (2003) study with English learners with Spanish background, thus, stating that the processing in L2 does not differ from L1 in terms of syntactic information processing. Furthermore, Omaki and Arijji’s (2005) offline experiment (i.e., sentence complexity rating task) demonstrated that L2 learners are sensitive to both syntactic and lexical information in the same way as native speakers. However, according to some studies (i.e., Jiang, 2004; 2007), people in L2 are less sensitive to certain types of morphosyntactic information: it is more difficult for L2 speakers to immediately integrate subject-verb agreement and singular/plural violations. However, some other studies showed that L2 speakers can be sensitive to verb-subcategorization information at the same level as native speakers (e.g., Frenck-Mestre and Pynte, 1997). It was also attested that highly proficient second language speakers’ morphosyntactic processing is not different from native speakers, which was exemplified by French preverbal pronominalizations in causatives/non-causatives (Hoover and Dwivedi, 1998). Hopp (2006)’s study supported this view also for case-marking in German. Jackson (2008) extended Hopp’s study to single-clause wh-questions. In accordance with Jackson (2008), highly proficient second language learners process morphosyntactic information peculiar to L2 despite the discrepancies in L1 and L2 morphosyntactic structures.

Another body of research was interested in the role of lexical-semantic and pragmatic information during L2 processing. Based on the L1 processing research, we know that there are two leading views: one states that we process syntactic information first; the other supports the idea that lexical information is accessed in the initial stage of processing (i.e., constraint-based theories). The L2 processing hypothesis put forward by Clahsen and Felser (2006) is based on the constraint-based theories that highlight the role of lexical-semantic and pragmatic information. Furthermore, researchers were interested in L1 influence on L2 parsing strategy.

Most of the studies regarding this question were done on the resolution of relative clause attachment ambiguities illustrated above (e.g., Dussias, 2001, 2003). Numerous cross-linguistic studies could not conclude the effect of L1 in processing L2 because the results contradict each other. However, the main factors that might influence the processing strategy in L2 have been similarities between L1 and L2, proficiency level and exposure duration (Jackson and Dussias, 2009). Jackson and Dussias's (2009) study supported the view that highly proficient L2 speakers apply the same processing strategy as L1 does. However, native speakers and L2 speakers might differ in processing strategies because they acquire language in different ways. Whereas native speakers acquired language in a more natural way implicitly, L2 speakers acquired the target language explicitly in a classroom context (Guo et al., 2009). To test such differences, Guo et al. (2009) conducted electrophysiological research using event-related potentials. As the results suggest, there is a difference between L2 speakers and natives in processing verb subcategorization violations. It is explained by the L2 speakers' reduced syntactic ability.

Based on the L1 research, we can conclude that language processing is incremental. It was shown that anticipation plays an important role in incrementality (e.g., Pickering and Garrod, 2013). Hence, we immediately integrate both grammatical and non-linguistic information to anticipate upcoming elements in L1 (e.g., Huettig et al., 2011). However, some research on L2 processing shows that people have difficulties in integrating grammatical/morphosyntactic information in L2 during online comprehension (e.g., Kaan, 2014). The cause of the difficulties might relate to explicit learning of L2 (e.g., Clahsen and Felser, 2006), the difference in neurocognitive elements responsible for comprehension in L1 and L2 (e.g., Ullman, 2005), and lack of cognitive resources due to the online comprehension (e.g., Hopp, 2010). As a result, L2 learners are not as rapid as L1 speakers in anticipating upcoming information (e.g., Gruter et al., 2012; Hopp, 2013). Such a view motivated the emergence of the approach called "reduced ability to generate expectations" (RAGE). Hopp (2015) studied L2 learners' ability to generate expectations while processing case marking and verb semantics: natives use both morphosyntactic and lexical-semantic information, whereas people use only lexical-semantic information in L2 for anticipation. Additionally, the L2 proficiency level does not affect the integration of morphosyntax in anticipatory processing. It is explained by Hopp (2015) in terms of the restricted scope of syntactic prediction previously stated by Kaan et al. (2010).

It is supposed that semantic information processing precedes pragmatic information according to the dissociation theory (Foster, 1979). But there is another view that states that world knowledge plays an essential role in identifying the right interpretation of semantic

words, the so-called “simultaneous theory”. From the research on semantic processing in L2, it is known that people react to semantic violation in L2 slower than in their L1 (e.g., Newman et al., 2012). The processing becomes more rapid with the increase in proficiency and similarity of the target language to L1 (e.g., Oliver et al., 2012; FitzPatrick and Indefrey, 2014). Romero-Rivas et al. (2017) compared world knowledge and new information processing in L1 and L2 by presenting factually correct/incorrect/unknown sentences. According to the results, L2 learners have less automatic processing in L2 compared to L1 (Romero-Rivas et al., 2017). The interaction of linguistic (semantic) and non-linguistic (world knowledge) information during L2 processing was studied by Ahn (2021), who investigated the definiteness. Ahn’s (2021) study showed that the ability to anticipate upcoming elements based on pure semantic information might be activated only at a higher proficiency level. Furthermore, L1 speakers could integrate semantic and world knowledge information, whereas L2 speakers could not. This might be explained by the assumption that L2 learners can use semantic information if the world knowledge is unnecessary (Ahn, 2021).

As can be observed, there is no universal agreement on second language processing. However, it is assumed that L2 processing is somewhat limited compared to L1 processing which motivated the emergence of such hypotheses as the Shallow Structure Hypothesis, RAGE (reduced ability to generate expectations) and Interface hypothesis. These approaches assume that information processing is qualitatively different between L1 and L2. Such differences have been motivating researchers to study more about second language processing which is relatively new in comparison with the first language processing research. So far, it is believed that L2 learners have some difficulties in incorporating various types of inputs, including lexical, structural, and contextual information (Felser et al., 2003). Furthermore, some ERP studies showed that second-language processing is somewhat slower than first-language processing (Hahne, 2001). It might relate to the assumption that people try to use the processing strategy applicable to L1 in L2. The other tentative hypothesis might be that multilinguals have all languages active during processing, and suppressing the competitive dominant language (mostly L1) is cognitively costly. In the following two sections, I will discuss in detail three hypotheses that have been in the spotlight in second language literature.

5.2 The accounts of the second language processing

5.2.1 The Shallow Structure Hypothesis

It is assumed that the processing of difficult grammar (i.e., complex syntax) in L2 is different

from L1 processing (Clahsen and Felser, 2006a). Such factors as insufficient grammatical knowledge, L1 influence, lack of cognitive resources, and physiological underpinnings (i.e., the age of onset) can cause the differences in L1 and L2 processing behaviour (Hawkins, 2001). Some studies suggest that L2 grammar is different from L1 grammar because adult late learners' rule systems do not have the same principles as in L1 grammar (Bley-Vroman, 1990; Clahsen and Muysken, 1996; Meisel, 1997). Clahsen and Felser (2006a) assume that this might be one of the reasons for non-native-like processing. Despite the high proficiency level of the target language, there are some differences in processing between native and non-native speakers (Felser and Roberts, 2007). It seems that lexical-semantic processing is the same between L1 and L2, but structural processing differs (Felser et al., 2003; Papadopoulou and Clahsen, 2003). These findings are explained as the Shallow Structure Hypothesis (SSH) (Clahsen and Felser, 2006b; Clahsen and Felser, 2006c). Based on previous research, we interpret sentences in L1 based on two processing strategies, in particular, full parsing involving syntactic information and shallow parsing involving lexical-semantic information and contextual cues (Ferreira et al., 2002; Sanford and Sturt, 2002; Townsend and Bever, 2001). SSH proposes that we apply only shallow parsing in L2 (Clahsen and Felser, 2006a). This can be tested by research on hierarchically complex structures and L1 transfer effect. Some offline studies have found L1 influence in L2 processing (Fernandez, 2003; Hartsuiker et al., 2004; MacWhinney, 2005). The results of online studies imply that there are limitations in L1 influence (Clahsen and Felser, 2006a). It has been proven that L1 influences L2 in such domains as phonology, orthography, morpholexis and lexico-semantics (Frenck-Mestre and Pynte, 1997; Hernandez et al., 2005; Marian and Spivey, 2003; Scheutz and Eberhard, 2004; Tan et al., 2003; Weber and Cutler, 2004). In the domain of morpho-syntax, the findings are controversial: some show that there is L1 influence (Sabourin and Haverkort, 2003; Tokowicz and MacWhinney, 2005), others suggest there is no L1 influence (McDonald, 2000; Montrul, 2004).

Clahsen and Felser (2006b) proposed SSH to account for the differences in L1 and L2 processing. Before this hypothesis, L2 difficulties in the integration of various kinds of information during parsing have been explained through different possibilities: shortage of working memory capacity, lack of automaticity, L1 influence and L2 dependency on the lexical memory system. Clahsen and Felser (2006b) took a step further in explaining L2 processing differences. They compared the processing pattern between child L1 learners and adult L2 learners. In the morphological domain, both have similar complex word representation and processing. In the syntactic domain, in contrast to child L1 learners, adult L2 learners do not

experience difficulties in using lexical-semantic and pragmatic information during ambiguous resolution. In addition, it might be affected by the L1 syntactic features. Filler-gap dependencies have been a primary interest in studying language learners' sentence processing. For example, while parsing the sentence *Who did Jack tell Simon finished the project?* adult native speakers apply syntactically defined gaps between *who* and *finished*. The same pattern can be observed in the processing of child native speakers. However, L2 learners integrate filler as soon as they see a potential subcategorizer (i.e., lexically driven processing) (Clahsen and Felser, 2006b). Clahsen and Felser (2006b) suggested that the syntactic representation in L2 is shallower and less detailed compared to L1. For example, consider the following sentence: "The waiter who the chef argued that the customer had reproached is leaving the restaurant". Native speakers recognize subordinate clauses beginning with "who" and "that" and attach the noun phrase "the waiter" to the verb "is leaving" during parsing. Adult L2 learners tend to attach the noun phrase "the waiter" to the verb "reproached" relying on lexical, pragmatic, and world knowledge. Clahsen and Felser (2006b) also noted no effect of learners' language background on L2 processing and argued against the influence of L1 transfer considering the studies on the relative clause attachment. The SSH interprets differences between L1 and L2 processing based on the studies of ambiguity resolution and filler-gap dependencies. Hence, the hypothesis is limited to certain grammatical phenomena and further investigations are needed to clarify its applicability to other syntactic structures. Furthermore, the subjects under consideration were child L1 learners who might have limited working memory capacity, and they may not be as successful as mature learners in lexical retrieval. These limitations have been acknowledged by Clahsen and Felser (2006b).

Dowens and Carreiras (2006) criticised SSH saying that it does not consider early bilinguals. Moreover, they also noted that it is essential to study other grammatical structures to claim about L2 processing in general. It is also possible that L2 knowledge is constantly developing which can later affect parsing strategies. Dowens and Carreiras (2006) also argued against dismissing such confounding variables as working memory limitations, incomplete acquisition, and L1 transfer among others. The question that still needs to be answered is whether all the language elements are processed shallowly (Dowens and Carreiras, 2006). Dekydtspotter et al. (2006) critiqued SSH for being contradictory to some experimental findings. One of the arguments is that there is observed L1 influence in L2 French (e.g., Frenck-Mestre, 2002). Thus, SSH has drawn a lot of attention from other linguists who extensively commented on the hypothesis, and therefore Clahsen and Felser (2006c) addressed some questions by replying to commentators. They account for continuity of the parsing hypothesis

that considers child and adult speakers the same in parsing. Despite criticism received on SSH, Clahsen and Felser (2006c) maintain the idea that there is a fundamental difference between L1 and L2 processing that can be seen from the underuse of full parsing in L2. Clahsen et al. (2010) overviewed the L2 processing of morphology and morphosyntax. In the domain of morphology, the studies were focused on inflection and derived word form. In the domain of morphosyntax, the research was on simple sentences with grammatical violations. As the results suggest, L2 speakers were found to account more for lexical storage rather than for morphological structure in comparison with L1 speakers.

About a decade after the emergence of SSH, Clahsen and Felser (2018) reconsidered this hypothesis based on the findings and theoretical underpinnings of language processing. They argued against oversimplification of SSH stating that underusing syntactic information does not mean not having syntactic representation in L2. It might be also the case that highly proficient L2 learners can process complex sentences the same way as native speakers (Felser and Drummer, 2017). However, the difference between L1 and L2 in processing might be demonstrated when there is a need for abstract elements of grammatical representation (Boxell et al., 2017). It might also happen that L2 learners with solid knowledge of the target grammar (i.e., nativelike grammar) illustrate different processing compared to native speakers (Felser and Cunnings, 2012). Hence, even if L2 speakers are proficient in the target language, they still have a problem of using L2 grammar while online processing (Clahsen and Felser, 2018). Clahsen and Felser (2006) outlined two potential causes for L1 and L2 grammatical processing differences, in particular non-nativelike grammatical knowledge, and non-native like processing apparatus. According to SSH, people apply multiple pathways to comprehend sentences. The dominance of shallow processing routes might be dependent on the type of the task and language proficiency (Lim and Christianson, 2013). Regarding L1 influence, Clahsen and Felser (2018) claim to be neutral, acknowledging an indirect influence on L2 by L1 because of having two grammars available during processing. However, this influence is somehow limited because the underuse of grammatical information does not depend on L1. In the refined version of SSH, Clahsen and Felser (2018) propose that there is a ‘gradient’ quantifiable difference between L1 and L2 grammatical processing. Hopp (2014) suggested that this difference might be because L2 speakers have a lack of resources for syntactic processing as they spend lots of resources on lexical processing during comprehension. Cunnings (2017) maintains the idea highlighted in the SSH that there is a different level of sensitivity to grammatical/non-grammatical knowledge between L1 and L2 speakers. Furthermore, L2 speakers might have somewhat delayed processing compared to L1 speakers (Clahsen and

Felser, 2018).

5.2.2 The Reduced Ability to Generate Expectations hypothesis

Grüter and Rohde (2014) proposed the Reduced Ability to Generate Expectations (RAGE) hypothesis to account for the differences in the prediction of upcoming information between L1 and L2 speakers. People use different types of information to anticipate the upcoming linguistic element (Grüter and Rohde (2014). The studies on this domain have been carried out on referential expectations (e.g., Pyykkönen and Järvikivi, 2010). As the result suggests, the prediction is made based on the lexical meaning of a verb. Other studies show that the morphosyntactic features of determiners also play a role in anticipation of upcoming nouns (e.g., Lew-Williams and Fernald, 2007). However, anticipatory processing might not be so pronounced in older adults due to the limitations of working memory capacity (Federmeier et al., 2002). The effect of working memory capacity limitations may extend to L2 speakers resulting in limits of anticipatory processing. Indeed, it was demonstrated that such deficits can be observed in the domain of lexical and morphosyntactic processing (e.g., Martin et al., 2013). These findings suggest that L2 speakers are prone to reduced ability in terms of generating prediction for upcoming information.

According to Grüter and Rohde (2014), L2 speakers are less sensitive to upcoming linguistic elements. This can be best illustrated by the visual-world paradigm eye-tracking experiment when people can look to the following word after e.g., *the girl was eating...* It is expected that the word from the category “food” will be more looked at than the word from another category (e.g., Altmann and Kamide, 1999). In line with some eye tracking studies, L2 speakers fail or have a diminished ability to anticipate the determiner of the noun based on gender in Spanish (Grüter et al., 2012). The same pattern can be observed regarding phonological prediction (Martin et al., 2013). Grüter and Rohde (2014) proposed to investigate the coreference in the discourse domain to validate the hypothesis because it does not bear the direct implication of grammatical knowledge as in the case of determiners. For example, there are two possibilities for who the pronoun “she” refers to in the following discourse *Mother (source) gave/was giving a candy to her daughter (goal). She....* The pronoun “she” might refer either to the source - mother or the goal - daughter. It is more likely that people think of mother in the subsequent sentence if there is an imperfective aspect (e.g., *was giving*) because it describes an ongoing event (or transfer event). However, people tend to think of daughter when there is a perfective aspect (e.g., *gave*) because it indicates a completed event. Another reason

for preferring one instead of another might relate to a pronominal form (pronoun prompt), according to which, topic of the discourse or the subject referent (i.e., mother) is favoured. Grüter and Rohde (2014) hypothesise that L2 speakers are less sensitive to prediction based on the aspect and more sensitive to the referential form in the pronoun prompt. It is because people need to be able to predict in the case of the aspect cue, whereas the referential form is immediately computed at the moment of coreference interpretation. Grüter and Rohde (2014) tested their hypothesis on English L2 speakers whose first language is either Japanese or Korean. The results of the story continuation task and knowledge of aspect task support RAGE. Furthermore, it was found that L2 speakers are more likely to use a recency account in choosing the right continuation in comparison with native speakers. The rationale behind the observed results is explained by RAGE, according to which, L2 speaker's processor can be reduced because of incremental processing including lexical access and structural integration. As a result of such strain to the already limited capacity of the L2 processor, there are no more resources reserved for anticipation of upcoming information.

Contemori and Dussias (2018) conducted an eye-tracking study using the visual world paradigm to investigate the difference between L1 and L2 speakers' anticipatory processing abilities. The results suggest that L2 speakers might have delayed prediction or do not engage in predictive processing. However, the results from the offline task showed that they can generate predictions. Contemori and Dussias (2018) could not explain the findings in the scope of RAGE. The delays were assumed to be related to less exposure to the experimental verbs. Grüter et al. (2018) studied (i.e., an eye-tracking study) the kind of linguistic information that helps to predict an upcoming input. They were interested in how L2 (Mandarin) speakers predict the following noun after classifiers. The results indicated that whereas L1 speakers rely on form-class as the main cue and semantics as secondary, L2 speakers have a reverse pattern. In other words, L2 speakers rely more on semantic information to anticipate the upcoming linguistic element. This also supports the previous studies in which L2 speakers showed more reliance on lexico-semantic information rather than on grammatical (i.e., Felser et al., 2003, Van Patten, 2004). Grüter et al. (2018) support the updated version of SSH proposed by Clahsen and Felser (2018) in which the difference between L1 and L2 is seen to be gradual and not categorical.

5.2.3 The Interface hypothesis

Sorace and Filiaci (2006) studied the processing of anaphora resolution by near-native English

(L1) speakers of Italian (L2) and found indeterminacy at the syntax-discourse interface that might suggest the difficulty of L2 acquisition at the interface level. The interface hypothesis was initially based on the idea that linguistic constructions encompassing an intersection of syntax and other domains (e.g., pragmatics, semantics) might not be fully acquired as opposed to those that do not have such an interface. The initial proposal is too general since there are hardly any structures without interfaces (so-called ‘narrow syntax’). The interface is defined as the necessity of syntactic structure to be grammatical, fulfilled by implementing various conditions (Sorace, 2011). Interfaces may be observed between the elements which connect linguistics submodules and between linguistic and cognitive systems (Ramchand and Reiss, 2007). Tsimpli and Sorace (2006) treat syntax-discourse interface differently than syntax-semantics interface. According to their definition, the former is external that combines linguistic features and pragmatics, and the latter is internal that includes only formal linguistic features.

According to Sorace (2011), bilinguals’ processing (in comparison with monolinguals’) is believed to be less detailed, less automatic and with less cognitive resources during online comprehension. Less automaticity might relate to a lack of fully developed knowledge representations or with less skilled access to them. The interface hypothesis (Sorace, 2006) contradicts with the shallow structure hypothesis (Clahsen and Felser, 2006) assuming that shallow processing does not apply to near-native speakers that have native-like representations. However, this contradiction might not apply to the syntax-pragmatics interface, in which even near-native speakers face difficulties in integrating syntactic knowledge. The difference between bilinguals and monolinguals is likely to be of a rather quantitative nature than qualitative which is also influenced by the task peculiarities. Furthermore, the reduced ability of bilinguals to fully acquire interface structures might be affected by such non-linguistic factors as language input and executive control (e.g., resource allocation, inhibition of the language not in use). Regarding inhibition, it is believed that two languages are parallelly active in bilinguals’ minds (Green, 1998), and therefore it is necessary to practice executive control to stop the other language interference. According to Teixeira (2016), constructions at the external interface level are more difficult for second language learners if the structures are dissimilar in two languages. Montrul (2011) questions whether it is useful to distinguish internal and external interfaces when morphology-syntax-semantics can in fact involve discourse. It seems impossible to entangle one kind of interface from the other (e.g., tense, aspect, mood). Such examples as aspect and subjunctive morphology encompass various interfaces including morphology, syntax, semantics, pragmatics, and discourse. According to

Montrul (2011), the Interface hypothesis at this stage can be applied only for such constructions as null/overt subject, topic, focus and genericity that fall under a certain syntax-discourse interface category. He argues that it makes the theory problematic to falsify when the structures under investigation involve a mix of different interfaces.

Some studies on case markers support the Interface hypothesis (e.g., Antonova-Ünlü, E., 2015). But the results of some other studies are not consistent with the hypothesis. For instance, Ivanov (2012) examined the acquisition of clitic doubling as a topicality marker by advanced and intermediate English (L1) speakers of Bulgarian (L2). His findings showed that advanced second language speakers are capable of full acquisition of interface properties, thus contradicting the Interface hypothesis. Park (2013) suggests that it is not entirely correct to say that syntax-discourse interface is more challenging than syntax-semantics interface: L2 speakers' non-nativelike processing cannot be solely associated with the division of interfaces into internal and external. Instead, some semantic properties might be associated with second language processing difficulties. Özçelik (2018) compared the processing of external and internal interfaces by English-Turkish bilingual speakers and found that the internal interface (semantics-syntax) was more difficult for bilinguals than the external interface (semantics-syntax-pragmatics), thus showing contradicting results against the Interface hypothesis. Herbay et al. (2018) conducted a self-paced reading study on verb phrases in sentences among French-English bilingual speakers. They revealed that target-like online processing of non-common constructions embedded in the syntax-semantics interface is feasible. Hence, it suggests that first and second language processing is almost the same. However, the processing might be handicapped since learners can have problems with lexical acquisition and cognitive limitations.

5.3 The Language Transfer Theory

Initial proposals that the first language affects the second language date back to the end of the twentieth century (e.g., Lado, 1957). Bardovi-Harlig and Sprouse (2018:1) define language transfer (also known as a crosslinguistic influence) as “the influence of the learner’s native language”. In line with Bardovi-Harlig and Sprouse (2018), two types of transfer are differentiated: negative and positive. On the one hand, negative transfer (interference) happens when the first language (L1) causes mistakes in the second language. On the other hand, positive transfer (facilitation) might occur if the speaker’s first language facilitates the attainment of the second language. Whereas negative transfer is assumed to be the cause of

mostly morphosyntactic mistakes, the positive transfer is more common with the vocabulary (except false friends) in the target language (Bardovi-Harlig and Sprouse, 2018). According to Bardovi-Harlig and Sprouse (2018), the current view favours mentalist perspective and language transfer is treated as the impact of the L1 grammar representation on the interlanguage grammar representation.

Yip and Matthews (2000) examined syntactic transfer from Cantonese to English in bilinguals. They focused specifically on such constructions as *wh-in-situ* interrogatives, null objects, and prenominal relatives due to the typological differences in two languages. As their results suggest, the transfer occurs from the dominant language. Håkansson et al. (2002) studied language transfer effects in the target language. They investigated learners of German as a second language who had Swedish as their native language. Their results showed that instead of transferring the verb-second structure from the first language, participants created an intermediate structure that was ungrammatical in both languages. It was interpreted as the developmentally moderated transfer that is in opposition to the full transfer hypothesis proposed by Schwartz and Sprouse (1994, 1996). Tokowicz and MacWhinney (2005) conducted an ERPs study with English speakers whose second language is Spanish. They revealed that when the grammatical violations occurred in the structures similar to first and second languages, then participants showed sensitivity. However, when the structures were typologically different in two languages, then the participants ignored grammatical violations. It was found that second language speakers had implicit sensitivity to the grammatical structures that were particular to the second language.

It is assumed that the transfer can be observed from the more dominant language towards less dominant language, and therefore the age of acquisition matters (Montrul, 2010). In addition, the linguistic structures that are at the interface between syntax and pragmatics are found to be especially vulnerable to crosslinguistic influence (Montrul, 2010; Sanchez et al., 2010) as well as the structures at the interface between syntax and semantics (e.g., Oh, 2010). According to the review done by Tolentino and Tokowicz (2011), the results of the fMRI and ERP investigations support the idea that the processing discrepancies between the first language and the second language speakers are connected with the structures that are particular to the second language. Otherwise, if the linguistic constructions are the same in L1 and L2, then L2 morphosyntactic processing is the same as in L1 (e.g., Foucart and Frenck-Mestre, 2011). Furthermore, besides the syntactic structure present in both languages, L2 processing is similar to native-like processing provided a second language was acquired at an early age and the level of proficiency is high (Díaz et al., 2016). However, the other study (Bañón et al.,

2014) contradicts with these findings suggesting that the similarity between structures in L1 and L2 does not determine native-like processing and advanced L2 speakers can be equally good at processing new structures in the second language.

It is revealed that the level of language proficiency affects syntactic representation. More specifically, more advanced learners have a shared syntactic representation: learners' syntactic representation in the target language rapidly collapsed with the corresponding structures of native language (Bernolet et al., 2013). Another study on wh-dependencies (Kim et al., 2015) also supports the idea that the linguistic features of the first language make an impact on the online sentence processing in the second language. Negative language transfer from the first language to the second language can be observed among different-script bilinguals across such domains as lexis and syntax undermining proficiency (Prior, 2017). But as for the offline task, proficiency can reduce negative language transfer in the domain of syntax. The study conducted by Prior (2017) examined the processing of false-cognates and similar and non-similar syntactic structures in Hebrew and Arabic. On the other hand, the results of the ERP studies suggest that the first language's grammatical features influence the second language processing despite proficiency and age of acquisition (e.g., Erdocia and Laka, 2018). This has been attested among Spanish (L1) speakers of Basque (L2) who were examined during processing of word order that are different or similar in two languages. According to Lemmerth and Hopp (2019), the first and second language of early bilinguals interacts during grammatical gender processing; they propose that the gender of the second language is initially processed via the first language lexicon. An eye-tracking study carried out by Soares et al. (2019) focused on the processing of temporally ambiguous relative clauses among European Portuguese (L1) speakers of English (L2). Their results favoured both a shared account and a developmental approach to syntax in bilinguals: lower proficient learners have separate syntactic representations and highly proficient learners develop a single syntactic representation which is shared across two languages.

In literature of second language processing, we can find ample evidence of the syntactic transfer among learners of English as a second language. For example, Chan (2004) illustrated that Chinese learners of English produce five common errors that relate to the lack of similar grammatical features and/or negatively transferred from their first language. It was also reported during the writing task that second language learners mostly thought initially in their first language. Chinese learners of English also used similar structures to their first language in the second language. This pattern was mostly observed among lower proficient learners. However, highly proficient learners could also show this tendency if they found some

difficulties in the second language (Chan, 2004). Grüter and Hopp (2021) examined the language transfer from L1 to L2 and vice versa among German (L1) speakers of English (L2) and English (L1) speakers of German (L2). They found that speakers' first language had influence during the second language sentence processing notwithstanding the proficiency (including near-native speakers) and immersion. However, this persistent influence was not observed in the reverse case: from L2 to L1. The other study done by the same authors (Hopp and Grüter, 2021) showed contradicting results: first language grammar competition (enhanced by grammatical priming) during offline but not online processing. Although, their results also suggest that similar interpretations are prone to structural priming.

Lago et al. (2021) propose to treat language transfer in the domain of lexicon and syntax differently. Crosslinguistic influence at the lexicon level denotes the coactivation of words in two languages. Crosslinguistic influence at the syntax level refers to that speakers of the second language apply processing mechanisms from their first language as well as associated problems with L2 processing due to the absence or difference of grammatical features in speakers' first language. From second language processing literature, we see that research on language transfer in the domain of lexicon overweighs research in the domain of syntax in respect to the number of studies. And therefore, more research on the second language syntactic processing is needed to account for the differences between crosslinguistic influence in two different domains (Lago et al., 2021). One of the steps in this direction is made by Dijk et al. (2022). They studied the bilingual (English-Dutch, German-Dutch) and Dutch monolingual children's processing of sentence structures that have partially/fully/no overlap between first and second languages. They examined long passives, verb second and verb third sentences. Their results show that in case of partially/no overlap, syntactic coactivation takes place and inhibits second language processing. Thus, negative language transfer is modulated by syntactic (probably also lexical) overlap between languages. Dijk et al. (2022) also highlighted language dominance as one of the modulating variables for language transfer. Perkins and Zhang (2022) summarise the history of language transfer from diachronic perspective and suggest some didactic implications. According to them, the more two languages are similar the less difficult for second language learners to make correspondences between grammatical features.

Based on the language transfer theory, second language readers might have first language influence in the morphosyntactic representation of the second language while reading. As the target group of the study is Polish (L1) speakers of English (L2), some language transfer effects can be shown from Polish as L1 to English as L2 in the morphosyntactic representation of counterfactual conditionals. A possible L1 interference can be outlined

through X-marking both antecedent and consequent in L2 due to the morphosyntactic representation of counterfactuals in L1. The following example illustrates the negative language transfer in the morphosyntactic representation of counterfactuals from L1 (Polish) to L2 (English): *If Harry would have written his stories, he would not have regretted.* The structure is permissible in the American English but in British English it is ungrammatical. As in English as second language classrooms of Poland the grammatical rules are taught based on British English, Polish speakers of English might perceive the structure ungrammatical. Negative language transfer from the first language results in the use of counterfactual marker *would* in the antecedent that resemble the morphosyntactic structure in the first language. These transfer effects might not be obvious in offline tasks when second language learners are given time to think of the correct form because they have explicit knowledge of grammatical rules in the target language. However, such L1 interference effects might be observed during online processing. While online processing, the similarity between L1 and L2 morphosyntax might facilitate the processing of the second language causing a positive influence because readers might hold in mind L1 morphosyntax.

5.3.1 The contrastive analysis of counterfactuals in English as L2 and Polish as L1

It is essential to differentiate between languages when examining potential discrepancies that could influence processing. For instance, in the second experiment, participants read in their native language, Italian. However, participants in the first experiment had a Polish linguistic background. Since the upcoming experiments will be conducted in Poland with native Polish speakers, this chapter will focus specifically on the distinction between English and Polish. In this section, I will compare the grammatical properties of counterfactuals in English and Polish to identify differences in their morphosyntax that may affect sentence processing when Polish native speakers read English as a second language. As has been discussed in a previous chapter, in the English language, one uses an additional layer of morphology known as X-marking to derive a counterfactual meaning. Like English, in Polish language, counter-factuality is conveyed by the extra morphology in the form of the past tense. However, the difference lies in the use of the particle *by* in Polish. For example, compare the morphosyntax of a past counterfactual conditional in English and Polish. I will borrow an example from Dickens:

(10) a. English past counterfactual

If I had been easy with Joe, Joe would have been easy with me.

if I AUX-PST be-PST easy with Joe, Joe AUX-FTR-PST AUX be-PST easy with me

b. Polish past counterfactual

Gdybym był łagodny dla Joe, Joe byłby łagodny dla mnie
 if-by-1SG be-PST-3MSG gentle for Joe, Joe be-PST-3MSG-by gentle for me
 ‘If I had been easy with Joe, Joe would have been easy with me’.

From the glossing, it can be observed that in Polish there is one layer of past tense (PST), whereas in English two in both protasis and apodosis. However, in Polish both present and past counterfactuals are made with an extra layer of past tense and the lack of an additional past tense morphology in the past counterfactuals relates to the absence of pluperfect form. If we want to say “If I was easier with Joe, Joe would be easier with me”, I will use the same morphosyntax illustrated in (10b). According to Polańska (2006), In Old Polish, it was common to add two layers of past tense for past counterfactuals by using auxiliary “był/była” that contains past tense, past participle and the suffix -by. However, it has been reduced to one layer of past. It suggests that the combination of one layer of past tense and particle by is enough to convey counterfactuality. But if we take off the particle by then we receive past indicative conditional such as in the following example 11.

(11) Polish past indicative

Jeśli byłem łagodny dla Joe, Joe był łagodny dla mnie
 if be-PST-1MSG gentle for Joe, Joe be-PST-3MSG gentle for me
 ‘If I was easy with Joe, Joe was easy with me.’

It shows us that it is necessary to use the particle by to receive counterfactuality. If in English, the modal/auxiliary *would* suggests the extra remoteness, i.e., counterfactuality, it is by that performs this function in Polish. Hence, *would* = by. If we want to make the structure in English similar to Polish, the following morphosyntax can be obtained:

(12) English past counterfactual imitating Polish morphosyntax:

If I *would* have been easy with Joe, Joe *would* have been easy with me.
 if I by AUX be-PST easy with Joe, Joe by AUX be-PST easy with me

The above example shows morphosyntactic parallelism. It is used in nonstandard English and can be also observed in American literature. According to the language transfer theory, readers’

first language might affect the processing of the second language leading to negative transfer from the first language to the second language. Mostly, it is assumed that speakers transfer words from L1 to L2, especially false friends. However, little is known about the language transfer effect at the morphosyntactic level. Do people represent the L1 morphosyntax while processing in L2 or fully switch to the L2 morphosyntax? If L1 morphosyntax is still active during L2 processing, it would influence the processing: similar to L1 structure would probably facilitate the processing of L2 and dissimilar to L1 structure would be harder to process because it does not match what is represented in mind. Based on the contrastive analysis of the morphosyntactic structure of counterfactuals in two languages, it is observed that Polish as L1 speakers would mentally represent the counterfactual markers both in the antecedent and consequent that is not typical in the English language. Thus, putting a counterfactual marker also in the antecedent of English counterfactual, the native structure can be simulated, which in turn should facilitate the processing as it matches the structural representation.

5.4 Summary

In this chapter, the potential role of the second language on processing has been discussed. The findings from empirical research suggested that information processing between L1 and L2 is qualitatively different. This in turn motivated the emergence of second language processing hypotheses such as shallow structure hypothesis, reduced ability to generate expectations (RAGE) hypothesis and interface hypothesis each denoting limitations of second language processing. According to shallow structure hypothesis (SSH), second language speakers rely on lexical-semantic information rather than morpho-syntactic information while online processing. According to the RAGE hypothesis, second language speakers do not predict an upcoming linguistic information or if predict (with a limited ability) then they rely on the lexical-semantic information rather than grammatical. Thus, SSH and RAGE are complementary hypotheses suggesting the lexical-semantic dominance in the comprehension of sentences. Interface hypothesis (IH) suggests that structures at the interface of different domains such as syntax-semantics and/or syntax-pragmatics might be challenging to acquire for L2 speakers. This challenge might relate to the inhibition process while online processing. That is, two languages are active in bilinguals' mind, and therefore one should inhibit the interference of the other language. Based on the language transfer theory (LT), that is much older than the other hypotheses, points out that linguistic features of the first language might

influence the online processing in the second language because both languages are active in mind.

An extra layer of past tense morphology was found to be responsible for counterfactual meaning in English (L2) as well as in Polish (L1). However, whereas in English the past tense morphology alone is sufficient in the antecedent, in Polish we should also use the particle *by* that was defined as an equivalent of English *would*. Based on the contrastive analysis, I defined an English (L2) morphosyntax that best resembles Polish (L1) morphosyntax, creating an interlanguage grammar. The identified structure shows morphosyntactic parallelism that is natural for Polish counterfactuals. In addition, the diachronic perspective of English counterfactuals suggests that the structure once was used in English but later reduced. Hence, interface hypothesis seems to be in line with the language transfer theory. SSH suggests that the influence of L1 is limited because of underuse of grammatical information. RAGE seems to be neutral to L1 influence. Later empirical findings suggest that the difference between L1 and L2 processing is more quantitative rather than qualitative, non-native speakers being slower due to potential cognitive costs of L1 inhibition. Even if applied linguists agree on the gradual difference between L1 and L2, the nature of L2 processing seems to be far from conclusive. Moreover, the morpho-syntactic structure under investigation is mostly limited to garden path sentences or simple sentences. The second language processing literature highlights the importance of the additional research on L2 processing with broadening the scope of morpho-syntactic constructions under investigation. Thus, the experiment on counterfactual conditionals will contribute to the field.

6 Empirical investigations into L2 reading

So far, I have discussed how counterfactuals can be treated as foregrounded elements due to their morphological and/or semantic deviations. To briefly recall previous experiments, the first experiment demonstrated that literary counterfactuals map onto both the textual actual world and an alternative, a pattern also observed in the second experiment, which focused on counterfactual historical fiction in relation to the actual world and its alternative. In the second experiment, participants read in their first language (Italian), while in the first experiment, participants read in their second language (English). It has been justified that reading in a non-native language represents a real-world situation. This raised the question of whether reading in a second language impacts the processing of counterfactuals. Following this, the role of a second language (L2) was explored as a potential variable, considering the debates surrounding L2 processing.

As a result of these theoretical considerations, two main objectives have emerged: first, to empirically test whether literary counterfactuals are indeed cognitively demanding to process in L2 due to deviations; second, to determine whether L2 processing theories hold true for the processing of literary counterfactuals. Therefore, this chapter is dedicated to the empirical study of how literary counterfactuals are processed in L2.

The sentence level of processing is preferred over textual level for two main reasons. First, it helps to target a specific effect of counterfactuals without textual interference. Based on the previous research discussed in the first part, the preceding sentence might affect how counterfactuals are processed. Second, it allows to test a large number of items that is impossible to do with texts. Hence, sentence level processing will enhance statistical reliability. As the main research method for empirical investigation, I am using an eye-tracking method that will enable to check the processing of counterfactuals in a natural setting. The use of eye-tracking method allows more natural reading compared to self-paced reading. The method is triangulated with self-report questionnaires to obtain comprehensive results. I will further report my third and fourth studies that target two outlined objectives.

6.1 Study 3: Processing of literary counterfactuals in L2

6.1.1 Study 3: The rationale

To outline the rationale, let me first to recap the key points discussed in relevant chapters. As discussed in a previous theoretical chapter on the linguistic form of counterfactuals, embedded

counterfactuals possess morphological and semantic deviations. Morphological deviation can be explained with the use of an extra layer of past tense morphology that is not interpreted temporally. This is known as X-marking (an extra layer of morphology), and therefore *bona fide* counterfactuals (counterfactual conditionals) can be regarded as X-marked conditionals. Semantic deviation can be interpreted by the domain widening because the modal operator widens its domain from the worlds that are possible to the worlds that are far reached from the possible worlds of the reference world. In the context of literature, the domain widening can be explained as the widening of the textual universe from the textual actual world and its near possible worlds to far reached possible worlds. In other words, counterfactuals as alternatives of textual actual world states are remote from the textual actual world that is usually referred. As a result of this widening, a reader shifts his/her attention from the state in the textual actual world to its alternative state by recentring RK-world. The semantic deviation is marked by the morphological deviation, thus, making linguistic deviation complete and meaningful. Because of this deviation, the use of counterfactuals in a literary text can be regarded as foregrounding. In a similar vein, the points of divergence used in counterfactual historical fiction can be regarded as semantic deviation because it refers to the textual actual world widening the domain from the actual universe to the textual universe. As it has been decided to take sentence-level processing rather than text-level, I will specifically focus on the embedded counterfactuals. Based on the neurocognitive model of literary reading (Jacobs, 2011), foregrounding is cognitively costly to process, and therefore it is often associated with a slow reading. It follows that embedded counterfactuals will be processed slower than their counterparts that do not convey deviations. In addition, L2 processing hypotheses were discussed that assume limitations of L2 processing, especially in the domain of morpho-syntax and the interface of morpho-syntax and semantics and/or morpho-syntax-pragmatics or the combination of complex domains, and therefore these structures are assumed to be difficult to acquire for L2 speakers leading to the failure of deducing morpho-syntactic information and the failure of integration the morpho-syntactic information with semantic information. However, the results of the previous research are contradictory, some suggesting that L2 readers can successfully deduce morpho-syntactic information as well as successfully integrate morpho-syntax with semantics. In addition, as discussed in the second chapter of the first part of the dissertation, according to the first language processing, people generate more *modus tollens* from counterfactuals rather than *modus ponens*.

6.1.2 Study 3: Research aim, questions, and hypotheses

As can be inferred from the rationale of the study, the aim of the third study is to reveal the second language processing of literary counterfactuals. To reach this scientific aim of the study, the corresponding questions entailed by the aim should be answered. It needs to be clarified what the L2 online processing costs of literary counterfactuals. This will show whether counterfactuals that possess deviations indeed require additional cognitive processing compared to non-counterfactuals that are void of deviations, as well as whether L2 readers can successfully deduce morphosyntactic information that contributes to counterfactual meaning and understand counterfactuals by successfully integrating morpho-syntax with semantics. If literary counterfactuals are processed with additional cognitive costs compared to literary non-counterfactuals and comprehended, it will mean that L2 readers do not rely solely on lexical-semantic information but can also process morphosyntactic information. In a similar vein, if literary counterfactuals require additional costs and comprehended which entails successful integration of morphosyntax with semantics, then it will show that the cognitive processing costs are associated with the deviations and not with the failure of integration of the morphosyntax with semantics. Furthermore, the perceived difficulty ratings will show whether literary counterfactuals that require complex processing that integrates morphosyntax with semantics are evaluated as (un)difficult, therefore showing whether successful processing is demanding. In addition, it will be checked whether L2 readers can successfully deduce modus Tollens (not p and not q) from literary counterfactuals. Thus, the following research questions will be addressed in this study:

- 1) Are literary counterfactuals cognitively costly to process by L2 readers?
- 2) Do L2 readers fully comprehend literary counterfactuals?
- 3) Do L2 readers evaluate counterfactuals as (un)difficult?

As a control item, non-counterfactual (indicative) conditionals will be taken that do not convey linguistic deviation. Based on theoretical considerations discussed in previous chapters, the following directional hypothesis has been formed for this study.

H₁: L2 reading of literary counterfactual conditionals is associated with additional cognitive costs compared to L2 reading of literary non-counterfactual conditionals.

H₂: L2 readers can fully comprehend literary counterfactuals.

H₃: L2 readers might evaluate counterfactuals as difficult due to complex morphosyntactic integration.

6.1.3 Study 3: Methods

Experimental design

Before delving into details, let me first outline the overall experimental design to give a holistic overview. The study was carried out in accordance with the ethical principles and received ethical approval from the University of Warsaw Rector's Committee for the Ethics of Research involving Human Participants before conducting the experiment. The ethical clearance can be found in the appendix. In accordance with the ethical guidelines, participants were provided with the information sheet about the study and signed written informed consents before participation in any stage of the study. The study is composed of two stages. The first stage included qualification tests for the experiment and the second stage encompassed an eye-tracking experiment with self-report questionnaires. Participants had at least B2 level of English language competence that has been certified. Before the eye tracking experiment, potential participants were invited to take two kinds of tests. One test checked the grammatical knowledge of conditionals. It was necessary to check whether L2 readers have sufficient knowledge of conditionals to participate in the experiment that targets the processing of this structure. If participants did not know the conditional structures, it could be a confounding variable in the online processing. And therefore, participants took the English grammar test consisting of 25 questions 10 of which checked the grammatical knowledge of conditionals. To pass the test on conditional knowledge, one had to receive at least 6 points out of 10 points (60%). The questions about conditionals have been covered by other grammatical filler questions to not draw a specific attention to conditionals. In addition, the test was taken a week prior to the main experiment so that readers were not primed with conditionals. The second test that was also taken a week prior to the experiment was working memory capacity test. As discussed in the previous chapters, a low working memory capacity might impact both the comprehension of counterfactuals and L2 reading. And therefore, it was essential to check the working memory capacity of participants. N-back recall test was used for this purpose, that is the combination of letter recall with counting as was previously justified. To pass the working memory capacity test, one had to receive at least 4 points out of 9 points because it was calculated that up to three points indicate low working memory capacity, from four to six - average, and from seven to nine - high. A threshold of 4 points controlled for a low working memory capacity from being a confounding variable. Those who passed both tests, were invited

to take part in the eye tracking experiment. 60 participants were divided randomly in either a group who read literary counterfactual conditionals or a group who read literary non-counterfactual conditionals. The design of the eye tracking experiment was between-subjects: 30 subjects read literary counterfactual conditionals and the other 30 subjects read literary non-counterfactual conditionals (indicative conditionals). They read a total of 40 critical items (either counterfactual or non-counterfactual) and the same 20 filler items. Such eye tracking parameters as fixation time, fixation count and dwell time were recorded. After the experiment, participants performed comprehension test and difficulty assessment task. Also, additional general questionnaire was filled in to give general information about participants' language competence. The data was analysed, and appropriate statistical tests were run using SPSS software provided by the University of Warsaw license. After this holistic overview of the experimental design, a detailed information about participants, materials, measures, experimental settings, apparatus, procedures, and analysis will be given in the subsequent pages.

Participants

The participants were English as a second language speakers, with Polish language as the first language. They were all undergraduate students of the University of Warsaw. The participants were recruited through the advertisement at the Studenci UW group on social media (Facebook). The platform was used to recruit participants because the calls for participation in the experiments are usually published there. Each participant who took part in both stages received an Empik electronic gift card for PLN 100 immediately after participation in the second stage. The e-card was sent to a participant via the doctoral candidate's university email address. The preference for e-cards over plastic cards was justified by the university office's optimisation of the purchase. The gifts for participants were funded by the Excellence Initiative – Research University (IDUB) Programme grant as the result of winning the 1st Research Competition in Action IV.4.1 – “A complex programme of support for UW PhD students” by the doctoral candidate. The inclusion criteria of participants were outlined as the following:

- English language level minimum B2;
- Age range 18-34;
- No known history of reading difficulties;
- Normal eyesight (or near normal with soft lenses and spectacles).

Around 80 subjects were interested to participate in the study. From them, 62 came to the first stage of the experiment and took the tests. A total of 60 subjects were qualified to take part in the eye tracking experiment. It was possible for participants to see their results if they were interested. Each participant was randomly assigned into either experimental group or control group. As a result, experimental group consisted of 30 subjects ($M_{\text{age}} = 21.33$ years; $SD = 2.564$; 24 females, 5 males and 1 non-binary) and control group consisted of 30 subjects ($M_{\text{age}} = 20.83$ years; $SD = 1.895$; 23 females, 6 males and 1 non-binary). As a teacher of statistics with SPSS taught, a rule of thumb in applied linguistics is to include at least 30 participants per group to receive any statistically sound results. The distribution of age and gender across two groups was almost identical.

All the participants had at least B2 level of English or higher level confirmed with a language certificate or scores taken from Oxford online placement test. In the experimental group, there were 12 people with B2 level, 7 people with B2/C1 level, 8 people with C1 level and 3 people with C2 level. In the control group, there were 9 people with B2, 4 people with B2/C1, 12 people with C1 and 5 people with C2 level.

Participants of the experimental group reported in the self-report questionnaires that they know such foreign languages as Spanish, German, French, Russian, Serbian, Chinese, Turkish, Bengali, Swedish, Portuguese, ranging from basic to B2/C1 level and with one participant with German C2 level, however, those who have high level of competence in other foreign languages, also have high or even higher level of language competence in English. Thus, participants' English level competence was comparatively higher than other foreign languages. Participants of the control group also reported in the self-report questionnaire that they know other foreign languages such as German, Spanish, French, Russian, Italian, Japanese, Chinese, Arabic, Latin, Greek, Portuguese, although, despite the variety of different languages, the level of language competence ranges from very beginning up to B2, hence, not higher than English level competence. In both groups, the medium range of other foreign languages (excluding English) competence fall in approximately A2 level.

Participants had age of English onset from 3 up to 16 years old; length of studying English from 7 up to 21 years; the duration of stay in English speaking country from 0 to 4 months. As the previous research does not show the considerable effect of such language specific information on the L2 processing, they have not been further investigated. Anyway, the difference in these parameters were gradual rather than categorical, and therefore there was no need to categorise groups into subgroups.

The admitted participants to the second stage received at least 4 points from 9 points at the working memory test and at least 6 points out of 10 points at the test on English conditionals. Thus, the participants had from average to high working memory capacity and a sufficient grammatical knowledge of conditionals.

The participants voluntarily took part in both stages of the experiment with an available option to withdraw from participation at the experiment anytime. Before being invited to the first stage, participants received a detailed information on the study including all the relevant information such as procedure, duration, data analysis, data storage that has been previously approved by the ethical committee. The study was introduced as sentence comprehension in English as second language not to prime participants in advance with counterfactual conditionals. However, after the experiment, the purpose of the study was explained, and participants' questions were answered by the experimenter. Before participation at the study, participants signed informed written consents.

Materials

The materials for the study consisted of 40 critical items and 20 filler items. Each critical item had two versions: literary counterfactual conditional and literary non-counterfactual conditional. The former was the original version chosen from 35 literary texts of the Gutenberg project using a sketch engine searching tool. The list of literary texts from which the counterfactual conditionals were extracted is provided in Appendix 5. There was no specific parameter for choosing literary texts, although all the counterfactuals were taken from fictional literary texts. The main criteria for selecting counterfactuals were X-marked conditionals with past-time reference. Past-time references were preferred because they are true counterfactuals and are largely used compared to other types of counterfactuals. The present-time preference was not used because it has limitations on the type of the predicate to be regarded as counterfactual, namely, it should be a static verb or subjunctive. A baseline condition was the manipulated version of original literary counterfactual conditionals, that is, literary non-counterfactuals or indicative conditionals with past-time references. In linguistics, it is a common practice to contrast counterfactual conditionals with indicative conditionals. However, some previous studies contrasted past counterfactual conditionals with present indicative conditionals. I, on the other hand, changed the original past counterfactual conditionals to past indicative conditionals rather than present indicative conditionals to make the time consistent between groups. I think in my study (and probably in all studies on

counterfactuals in future), the time should be consistent between two types of items to see a specific effect of grammatical deviation (X-marking) and its entailed semantic deviation. This will save us from the “past tense versus present tense” confounding variable. As discussed in theoretical considerations, whereas counterfactual conditionals are marked with an X-marking, the non-counterfactual/indicative conditionals are marked with an O-marking, that is, the absence of the X-marking. For example, compare the X-marked past conditional with the O-marked past conditional below:

X-marking: If he had come to Gardencourt, he would have seen Madame Merle.

O-marking: If he came to Gardencourt, he saw Madame Merle.

The difference between the two conditionals lies in the use of X-marking in the counterfactual conditional. In other words, the use of morphological deviation gives rise to semantic deviation. The literary texts provide original counterfactuals that are used to contrast the textual actual world with its alternative. The literary context is more natural rather than a self-constructed context to elicit counterfactuals. Another difference between the two versions of the literary conditional sentence is apparently length. The length has not been a concern in previous studies on conditionals, even for self-paced reading tasks. Eye tracking is more robust in terms of length difference than self-paced reading tasks. However, length had been taken into consideration in the data analysis as a confounding variable (covariate) to control the length difference. Also, the frequency of words was controlled because both groups read the same content. The experimental group read the X-marking version, and the control group read the O-marking version of the same 40 content (see Appendix 3).

In addition, 20 fillers were used to maintain participants’ engagement and prevent them from detecting the true purpose of the experiment, reducing demand characteristics. Twenty filler items were extracted from the same literary texts and contained 20 different contents. Sentences beginning with *because* and *since* were selected as filler items due to common to all structure’s cause-and-effect relationships. For instance, see the examples below:

Since: Since you tell me that you’re lonely I’ve no right to keep you from your friends.

Because: Because they are mean is no reason why I should be.

Both sentences with *since* and *because* contain a cause-and-effect relationship. The cause is communicated by the first clause and the effect by the second clause in the same way as in experimental and control items.

Measures

As mentioned in the experimental design, measures such as working memory capacity, a test on the knowledge of English conditionals, eye tracking parameters such as fixation time, fixation count and dwell time, comprehension test, difficulty assessment task and general language questionnaire were used. Detailed information is given about each of them in the order listed respectively.

An N-back test was used to test working memory capacity, namely an auditory 2-back test. Participants listened to pre-recorded letters. They needed to decide whether they had heard the same letter two letters ago. Thus, the task integrated both recall and simple arithmetic calculation. The purpose of the working memory capacity test was to ensure that participants did not have low working memory capacity because, in accordance with some studies (e.g., Ferguson, 2015), people with low working memory capacity might experience some problems in making counterfactual inferences. Each correct letter was equal to 1 point. The test results were interpreted in the following way: low (0-3 points), average (4-6 points), and high (7-9 points). To pass the working memory capacity test, participants needed to get at least four responses (40%) correct. Participants were instructed not to write letters on the paper while listening and instead to remember them and write the correct answers only. Before the real test, a practice test was performed to ensure that participants understood how to do the test. Participants could also ask questions before the real test. However, the test was constructed in a simple manner with clear and detailed instructions (see Appendix 6).

The grammar test on the knowledge of English conditionals was similar to the English grammar test without directly revealing the target construction. It consisted of 25 questions: 10 questions regarding conditionals, and 15 questions were fillers. Each correct answer to a target question was equal to 1 point (in total, 10 points). Participants needed to get at least 6 points (60%) to take part in the further experiment. Taking 60% as a threshold ensured that the answers were not correct by chance. The purpose of the test on conditionals was to check whether participants were familiar with English conditionals. If participants were not familiar with English conditionals, it could influence their processing behaviour, thus being a confounding variable. The test was composed of multiple-choice questions with three options.

Participants were instructed to fill in the gap in the sentence by choosing the correct option, and it was also noted that there was only one correct option (see Appendix 7).

Eye tracking parameters such as fixation time, fixation count, and dwell time were taken into consideration. The parameters selected for analysis - dwell time, fixation count, and fixation time - were chosen for their reliability in reflecting cognitive load, as supported by Płużyczka (2015). These measures are independent of the unit of analysis size, unlike average fixation duration and other metrics, which were found to be unreliable with smaller units. The eye mainly performs two behaviours: saccades and fixation. Fixation is when eyes stay comparatively stable at some point. Saccades are eye movements made between fixations. Fixation count is the number of fixations made in the area of interest. Fixation time is the sum of all fixation durations; that is, how long all fixations lasted. Dwell time (or gaze duration) is the sum of fixation time plus the sum of time spent for saccades. The area of interest is a portion of stimuli or the whole stimuli in which a researcher is interested. As eye-tracking parameters are used in different fields of research, there is no equivocal standard for its interpretation. In applied linguistics, these parameters are associated with cognitive load (e.g., Płużyczka, 2015). According to Holmquist et al. (2011), fixation count also might indicate the morphological complexity in reading. As the neurocognitive model of literary reading suggests (Jacobs, 2011), deviations require increased cognitive processing that leads to a slow reading, mostly shown in increased dwell time or gaze duration. Thus, when one fixates on the area of interest many times and prolongs these fixations, impacting the overall reading time, it means that (s)he is having an increased cognitive processing.

The **comprehension test** checked whether participants could deduce the factual inference from counterfactuals and, therefore, fully understand them. The task was composed of 10 questions to target constructions. A total of ten questions was constructed because it was assumed that if a subject can deduce a factual inference from counterfactuals, then (s)he can do it notwithstanding the number of questions, whether it is 10 or 30. Bearing in mind that participants have already completed a considerable number of questionnaires, ten was chosen as an optimal option so as not to exhaust participants with lots of questions that address the same ability. Both experimental and control groups performed the test to compare whether the factual inference is generated only from counterfactuals and not from non-counterfactuals. The answer consisted of three options: Yes or No or Other. An example of the comprehension question to the literary counterfactual conditional is provided below:

Sentence: If he had come to Gardencourt, he would have seen Madame Merle.

Question: Did he see Madame Merle? Yes or No or Other

The correct answer for the above example is No. If they reply to the question correctly, they get one score. As for indicative conditionals, it is assumed that people mostly generate modus ponens. However, it is impossible to make factual inferences from indicative conditionals, and therefore, I did not count the control group's answers for comprehension. However, I did use the scores from modus tollens (factual inference of counterfactuals) to compare the two groups.

Modus tollens inference was the measure deduced from the comprehension test to check whether not p , not q inference is generated by participants is specific for counterfactuals. Based on the theoretical discussions on limitations in making inferences, it was assumed that counterfactuals are understood by modus tollens, whereas non-counterfactual conditionals prompt modus ponens p and q . For example, if one reads *if he had come to Gardencourt, he would have seen Madame Merle*, (s)he understands that he did not come to Gardencourt and, as a result, did not see Madame Merle. In contrast, when one reads *if he came to Gardencourt, he saw Madame Merle*, (s)he tends to think that he came to Gardencourt and saw Madame Merle.

The **difficulty assessment task** consisted of a 5-point Likert scale measurement of perceived difficulty. After an eye-tracking experiment, participants were asked to rate the level of difficulty of each sentence they read using a 5-point Likert scale test: 1 – very difficult, 2 – difficult, 3 – neutral, 4 – easy, 5 – very easy. The difficulty assessment task was used to determine whether counterfactual sentences are perceived to be more difficult than indicative ones. Participants were instructed to evaluate the difficulty of sentences based on their own perception. Each participant evaluated the difficulty of sixty items, that is, 40 critical items and 20 filler items.

In addition, participants filled in the **general questionnaire** composed of such demographic questions as gender and age as well as language-related questions such as first language, English proficiency level, age of English onset, length of exposure to English, the duration of stay in an English-speaking country, knowledge, and level of other foreign languages.

Experimental settings

As mentioned before, the study was composed of two stages. In the first stage, participants' working memory capacity and knowledge of conditionals were checked. In the second stage, participants took part in the eye-tracking experiment coupled with self-report questionnaires.

The first stage of the study was organised in a conference room with a capacity of up to 15 people at the Faculty of Applied Linguistics, University of Warsaw. The second stage of the study took place at the Laboratory for Experimental Eye Tracking Linguistics in the Institute of Specialized and Intercultural Communication at the Faculty of Applied Linguistics of the University of Warsaw. The laboratory is a separate dedicated room for eye-tracking experiments. During each experimental session, the experimenter and a participant occupied the room and the entrance for other people was not allowed. The distance between a participant's eyes and the monitor was around 60 cm, which is considered an optimal distance. Because of the high tolerance of the eye tracker to head movements, the head mounter was not used. This ensured that participants read in a natural and comfortable setting.

Apparatus

The SMI RED 500 remote eye tracker, which is mounted under the monitor, was used. The sampling frequency of 250 Hz was chosen because it has been proven to be accurate enough (e.g., Płużyczka, 2015, 2020). As each sentence was displayed individually on the screen, the chosen sampling frequency was sufficient. The display monitor is a 22-inch LCD screen.

Procedure

Each of the participants was given a participant number (Participant ID) that was used for anonymisation purposes. Participant ID consisting of 'P' for participants and a combination of random numbers, e.g., P015, were used throughout the study. Around a week prior before the main experiment, potential participants were invited to the Faculty of Applied Linguistics at the University of Warsaw to take the English grammar test and the test on working memory capacity. Participants could choose a suitable date from Calendly's shared booking page. They were given different options to choose from. Each testing session included 2 to 10 participants. As a venue for testing, a conference room was chosen with a capacity of 15 people. Before starting the test, they were asked to read and sign the consent on the personal data processing and the written informed consent if they agreed with what was written in the consent. The testing session started only after receiving the participants' consent (archived at the UW Laboratory for Experimental Eye Tracking Linguistics). A speaker with good sound quality was used, from which participants listened to letters in the working memory capacity test. Both the working memory capacity test and the test on the knowledge of conditionals were performed on papers (archived at the UW Laboratory for Experimental Eye Tracking

Linguistics). The whole testing session lasted around 30 minutes. Those who passed tests were invited to the UW LELO eye-tracking laboratory. The eye-tracking data was collected by meeting subjects individually in the eye-tracking laboratory. Participants were randomly assigned to one of the two conditions: (i) literary counterfactual conditionals reading ($n = 30$) and (ii) literary non-counterfactual conditionals reading ($n=30$). Subjects sat comfortably on the chair while looking at the screen of the computer, and there were no constraints on head and movement. However, participants were asked to keep their position, not to move their heads, and not to take their eyes off the screen while reading. They were also instructed that they could blink in a usual manner. Before starting the main experiment, participants performed a practice block containing five sentences unrelated to either critical or filler items and corresponding questions to familiarise a subject with the task and to check whether participants understood the procedure. The 5-point calibration was conducted before starting the experiment. To prevent the strain on the eyes, there was a short break after they finished reading the first set of 30 sentences. After a break, 5-point calibration was performed again before they started reading the second set of 30 sentences. Participants were instructed to read the sentences that they saw on the screen and answer questions afterwards. As the knowledge of conditionals was already checked before the experiment, post-stimuli questions were used as a post stimuli task to give subjects a clear purpose for reading. Eighteen questions for target constructions were general questions, and 22 questions were more specific. General questions addressed what the sentence was about, and specific questions addressed whether a particular action took place. Participants read a total of 60 sentences (40 critical items and 20 fillers) on the computer screen. After each sentence, a question appeared to which participants answered Yes or No using a computer mouse. While they were reading, their eye movements were recorded to areas of interest. Areas of interest were individual sentences (literary counterfactual verse literary non-counterfactual). Eye movements were recorded using an SMI RED 500 eye tracker at 250 Hz. The sentences were presented in black over white background in Arial font, size 24. After completion of the eye tracking experiment, participants performed difficulty assessment tasks and comprehension tests and filled in the general questionnaire. The whole experiment with questionnaires took around 30 minutes per participant. Upon completion, each participant received an email from the doctoral candidate with the appreciation of their participation in the experiment and an Empik electronic gift card for PLN 100. Participants were asked to check that they indeed received the email before leaving the laboratory.

Data analysis

The experimental data was analysed using the IBM SPSS Statistics software version 29. The data from the eye-tracking experiment was analysed using items and subjects. In analysis by items, data is averaged for each individual item, while in analysis by subjects, data is averaged for each participant. Analysis by items allows for a detailed examination of how specific linguistic features influence eye-tracking parameters, providing insights into the processing dynamics of individual sentences. Analysis by subjects enables comparison of eye-tracking patterns between participants exposed to different types of conditionals, revealing broader comprehension strategies associated with each condition. By combining analysis by items and analysis by subjects, this study offers a comprehensive understanding of how linguistic features influence eye-tracking parameters at both the individual stimulus level and the participant level, providing insights into both fine-grained processing dynamics and broader comprehension strategies.

Two data points were trimmed from all eye tracking parameters because there was no fixation count registered for them and unusually low dwell time and fixation time, i.e., one data point from the experimental group and one data point from the control group. The six data points were treated as missing data and excluded from analyses. The loss of data points accounts for 0.08% of the full dataset, which contains 7200 data points. As there is a very low percentage of data loss, it does not impact the results. Although, because of missing data, the mean by items and by subjects is not the same. The average of all participants' responses (fixation time, fixation count and dwell time) for each item of 40 items was calculated using the following formula in an Excel file: =AVERAGEIF(). Python was used to check the accuracy of the processed data. Before conducting the test, the assumptions of normality and homogeneity of variance were explored. Analysis by item passed the Shapiro-Wilk test of normality and Levene test of homogeneity of variance, and therefore parametric tests were performed. Multivariate Analysis of Variance (MANOVA) was first conducted to reveal the overall effect of the group (counterfactual versus non-counterfactual) on eye tracking parameters. It is followed by a Multivariate Analysis of Covariance (MANCOVA), taking sentence length as a confounding variable. The length of sentences was counted using the built-in LEN() function in the Excel file; it counts all characters in the sentence, including letters and spaces. Controlling for length as a confounding variable adds statistical power to analysis. Afterwards, parametric independent-sample t-tests were performed for each eye-tracking parameter. As I have a directional hypothesis, the one-sided *p*-value is reported.

For the analysis by subjects, the average of each participant's response (fixation time, fixation count and dwell time) for all 40 items was calculated using the following formula in an Excel file: =AVERAGEIF(). Python was used to check the accuracy of the processed data. Analysis by subject passed the Levene test of homogeneity of variance but not the Shapiro-Wilk test of normality, and therefore, the transformation of data was used to perform a parametric test, which is more powerful than a non-parametric test. The lg10 function was used to transform data. The assumptions of normality were checked again with the transformed data, and it passed both the Shapiro-Wilk and Levene tests. Therefore, parametric tests were conducted with Lg10 transformed data. MANOVA and independent samples t-tests were carried out. There was no need to do a MANCOVA test by subjects because the continuous variables of length are counted for each item and not for each subject.

Pearson correlation analyses by items and by subjects were performed between each pair of eye-tracking parameters to check the relationship between these variables. Before conducting Pearson correlations, its assumptions, such as linearity and homoscedasticity, were explored. After checking that these assumptions were met, the Pearson correlation was further carried out. If assumptions were not met, a non-parametric Spearman correlation was performed. In addition, Cronbach's alpha was reported to show the reliability between eye tracking parameters.

The data of perceived difficulty was also first explored to check whether it meets assumptions before conducting statistical tests. As it met assumptions, the parametric independent samples t-test was performed by item and by subjects. Furthermore, the Pearson correlation between perceived difficulty and three eye tracking parameters was carried out to see the relationship between them. Afterwards, the regression analysis with perceived difficulty as the independent variable and eye tracking parameter as the dependent variable was performed to see a possible effect of perceived difficulty on the eye tracking parameters. The data received from the comprehension test is used to show whether participants comprehended counterfactuals by making factual inferences, and then the ability of subjects to make modus tollens (not A, not B) inference was compared across two groups. As the assumption of normality was violated, a non-parametric Mann-Whitney U-test was conducted. Spearman correlation was conducted between perceived difficulty and modus tollens inference as well as between the latter and each eye tracking parameter.

6.1.4 Study 3: Results

Eye tracking data. Analysis by items

The table below shows the descriptive statistics of eye tracking parameters such as fixation count, fixation time, and dwell time by items across experimental (literary counterfactual) and control (literary non-counterfactual) groups. It includes such information as mean and standard deviation. The number of critical items was 40. While fixation count shows how often the area of interest (literary counterfactual verse literary non-counterfactual) was fixated, fixation time and dwell time are given in milliseconds, showing how long both versions were fixated and read.

Parameter	Group	Mean	Standard deviation
Fixation count	Literary counterfactual	30.58	6.54
	Literary non-counterfactual	21.87	5.02
Fixation time [ms]	Literary counterfactual	7255.76	1750.66
	Literary non-counterfactual	5613.99	1311.79
Dwell time [ms]	Literary counterfactual	8532.69	2028.81
	Literary non-counterfactual	6453.31	1519.03

Table 6.1.4.1 The descriptive statistics of the eye tracking parameters by items (n=40)

As can be seen from the table (Table 6.2.4.1), the eye tracking parameters' values by items are higher for the experimental group who read literary counterfactuals rather than the control group who read literary non-counterfactuals. A multivariate analysis of variance (MANOVA) was conducted to investigate the effects of group (literary counterfactual verse literary non-counterfactual) on a set of three dependent variables: fixation count, fixation time and dwell time. The multivariate tests revealed a significant overall effect of the group on the combined set of dependent variables, Pillai's Trace = .596, $F(3.000, 76.000) = 37.405$, $p < .001$ with a large effect size (Partial $\eta^2 = 0.596$). This indicates significant differences among the two groups across the set of dependent variables. Tests of between-subjects effects demonstrated significant main effects of group on each of the dependent variables: fixation count ($F(1, 78) = 44.688$, $p < .001$), fixation time ($F(1, 78) = 22.529$, $p < .001$), and dwell time ($F(1, 78) = 26.925$, $p < .001$). These findings indicate that the group significantly influences each dependent variable separately. The difference is associated with the following effect sizes: fixation time

(Partial $\eta^2 = 0.224$), fixation count (Partial $\eta^2 = 0.364$), and dwell time (Partial $\eta^2 = 0.257$). According to Cohen's (1988) guidelines, small effect: $\eta^2 = 0.01$; medium effect: $\eta^2 = 0.06$; large effect: $\eta^2 = 0.14$. In our case, the effect is large. Partial eta squared (η^2) values were computed to estimate effect sizes. The effect of the group accounted for approximately 22.4% of the variance in fixation time, 36.4% of the variance in fixation count and 25.7% of the variance in dwell time. The multivariate effect size (Partial η^2) was 59.6%. Overall, the results demonstrate significant effects of the group on the combined set of dependent variables and on each dependent variable separately. These findings underscore the importance of group in influencing eye tracking parameters and provide valuable insights into their relationships. However, as the sentence length could be a confounding variable in detecting the effect of counterfactuals, an additional MANCOVA analysis was carried out to control the length as a covariate. The MANCOVA yielded significant results for Pillai's Trace for both sentence length (Pillai's Trace = .716, $F[3.000, 75.000] = 62.973$, $p < .001$) and group assignment (Pillai's Trace = .645, $F[3.000, 75.000] = 45.357$, $p < .001$). The effect size of the group (literary counterfactual vs literary non-counterfactual) on eye tracking parameters while controlling for sentence length is large (Partial $\eta^2 = .645$). In the test of the between-subjects effects corrected model, both sentence length and group assignment were found to be significant predictors of eye-tracking measures ($p < .001$). The difference between groups taken group as predictor and length as a covariate is associated with the following large effect sizes: fixation time (Partial $\eta^2 = 0.124$), fixation count (Partial $\eta^2 = 0.362$), and dwell time (Partial $\eta^2 = 0.170$). Partial eta squared (η^2) values were computed to estimate effect sizes. The effect of the group, while controlling for length, accounted for approximately 12.4% of the variance in fixation time, 36.2% of the variance in fixation count and 17.0% of the variance in dwell time. The multivariate effect size (Partial η^2) was 64.5%. It seems that the fixation count is more robust to the confounding effect of the length. Thus, there is a significant difference between the two groups (literary counterfactual vs literary non-counterfactual) associated with large effect size even after controlling for sentence length. Furthermore, additional independent samples t-tests were conducted to explore the difference between the two groups in relation to individual eye-tracking parameters further.

As shown in Table 6.2.4.1, the mean of the experimental group that read literary counterfactuals ($M=30.58$, $SD=6.54$) is higher for **fixation count** than the mean of the control group that read literary non-counterfactuals ($M=21.87$, $SD=5.02$). The result of the independent samples t-test confirmed the significance of the difference between the two groups ($p < .001$). The result is reported in the following way: $t(78) = 6.685$, $p < .001$ one-sided, 95%

CI[6.121, 11.313], Cohen's $d = 1.495$, 95% CI [.994, 1.988]. The 95% CI shows that we are 95% confident that the true population mean of the difference lies between 6.121 and 11.313. The significant difference between the two groups can be further analysed in terms of effect size. According to the benchmarks of Cohen (1988), an effect size is considered small, if $d = 0.2$; an effect size is medium, if $d = 0.5$; an effect size is large, if $d = 0.8$. Thus, the effect size is considered large if Cohen's $d = 0.8$. In our case, the effect size is considerably larger than the benchmark, Cohen's $d = 1.495$, indicating an even larger effect size. 95% CI suggests that we are 95% confident that the true population effect size (Cohen's d) lies within the range of .994 to 1.988. In practical terms, this indicates that the observed effect size of 1.495 is statistically significant and unlikely to be due to random chance alone. It suggests a substantial difference between the two groups being compared, with the lower bound of the confidence interval (.994) still indicating a large effect size and the upper bound (1.988) indicating an even larger effect size.

As shown in Table 6.2.4.1, the mean of the experimental group that read literary counterfactuals ($M=7255.76$, $SD=1750.66$) is higher for **fixation time** [ms] than the mean of the control group that read literary non-counterfactuals ($M=5613.99$, $SD=1311.79$). The result of the independent samples t-test confirmed the significance of the difference between the two groups ($p < .001$). The result is reported in the following way: $t(78) = 4.746$, $p < .001$, one-sided, 95% CI[953.149, 2330.378], Cohen's $d = 1.061$, 95% CI [.590, 1.527]. The 95% CI shows that we are 95% confident that the true population mean difference lies between 953.149 ms and 2330.378 ms. The significant difference between the two groups can be further analysed in terms of effect size. The effect size is considered large if Cohen's $d = 0.8$. In this case, the effect size is considerably higher than the benchmark, Cohen's $d = 1.061$ indicating a large effect size. 95% CI suggests that we are 95% confident that the true population effect size (Cohen's d) lies within the range of .590 to 1.527. The observed effect size of 1.061 is statistically significant and unlikely to be due to random chance alone. It suggests a substantial difference between the two groups being compared, with the lower bound of the confidence interval (.590) indicating a moderate effect size and the upper bound (1.527) indicating a large effect size.

As shown in Table 6.2.4.1, the mean of the experimental group that read literary counterfactuals ($M=8532.69$, $SD=2028.81$) is higher for **dwell time** [ms] than the mean of the control group that read literary non-counterfactuals ($M=6453.31$, $SD=1519.03$). The result of the independent samples t-test confirmed the significance of the difference between the two groups ($p < .001$). The result is reported in the following way: $t(78) = 5.189$, $p < .001$, one-

sided, 95% CI[1281.582, 2877.185], Cohen's $d = 1.160$, 95% CI [.683, 1.632]. The 95% CI shows that we are 95% confident that the true population mean difference lies between 1281.582 ms and 2877.185 ms. Cohen's $d = 1.160$ indicates a large effect size. 95% CI suggests that we are 95% confident that the true population effect size (Cohen's d) lies within the range of .683 to 1.632. The observed effect size of 1.160 is statistically significant and unlikely to be due to random chance alone. It suggests a substantial difference between the two groups being compared, with the lower bound of the confidence interval (.683) indicating a moderate effect size and the upper bound (1.632) indicating a large effect size.

Pearson correlation analysis by items was conducted to examine the relationship between fixation time, fixation count, and dwell time. The positive correlation between fixation time and dwell time was found to be statistically significant, $r = .998$, $p < 0.001$, two-tailed. Fixation count was positively correlated with dwell time, $r = .981$, $p < 0.001$, two-tailed. Also, fixation count was positively correlated with fixation time, $r = .970$, $p < 0.001$, two-tailed. Thus, all three eye-tracking parameters are positively correlated with each other. Pearson's correlation coefficient ranges from -1 to 1, where a value closer to -1 or 1 indicates a stronger relationship between the variables. All three correlation coefficients indicate a very strong positive correlation between eye-tracking parameters. In addition, the internal consistency analysis using Cronbach's alpha demonstrated acceptable reliability ($\alpha = 0.747$) for the three eye-tracking parameters: dwell time, fixation count, and fixation time. Hence, they are all related to each other, measuring the same cognitive processes.

Eye tracking data. Analysis by subjects

The table below shows the descriptive statistics of eye tracking parameters such as fixation count, fixation time, and dwell time by subjects across experimental (literary counterfactual) and control (literary non-counterfactual) groups. It includes such information as mean and standard deviation. The number of subjects per group was 30. While fixation count shows how often the area of interest (literary counterfactual verse literary non-counterfactual) was fixated, fixation time and dwell time are given in milliseconds, showing how long both versions were fixated and read.

Parameter	Group	Mean	Standard deviation
Fixation count	Literary counterfactual	30.59	12.02
	Literary non-counterfactual	21.86	9.94
Fixation time [ms]	Literary counterfactual	7256.74	3568.05
	Literary non-counterfactual	5611.30	2681.94
Dwell time [ms]	Literary counterfactual	8534.10	3885.77
	Literary non-counterfactual	6450.13	3028.67

Table 6.1.4.2 The descriptive statistics of the eye tracking parameters by subjects (n=30)

As can be seen from the table (Table 6.1.4.2), the mean of the eye tracking parameters by subjects is higher for the experimental group who read literary counterfactuals rather than the control group who read literary non-counterfactuals. Analysis by subjects was performed in a similar manner to the analysis by items. A multivariate analysis of variance (MANOVA) was conducted to investigate the effects of group (literary counterfactual versus literary non-counterfactual) on a set of three dependent variables: fixation count, fixation time and dwell time. The multivariate tests revealed a significant overall effect of the group on the combined set of dependent variables, Pillai's Trace = .260, $F(3.000, 56.000) = 6.562$, $p < .001$ with a large effect size $\eta^2 = 0.260$. This indicates significant differences among the two groups across the set of dependent variables. Tests of between-subjects effects demonstrated significant main effects of group on each of the dependent variables: fixation count ($F(1, 58) = 12.519$, $p < .001$), fixation time ($F(1, 58) = 4.542$, $p = .037$), and dwell time ($F(1, 58) = 6.843$, $p = .011$). These findings indicate that the group significantly influences each dependent variable separately. The difference is associated with the following effect sizes: fixation time (Partial $\eta^2 = 0.073$), fixation count (Partial $\eta^2 = 0.178$), and dwell time (Partial $\eta^2 = 0.106$). According to Cohen's (1988) guidelines, small effect: $\eta^2 = 0.01$; medium effect: $\eta^2 = 0.06$; large effect: $\eta^2 = 0.14$. In our case, the effect is medium-to-large. Partial eta squared (η^2) values were computed to estimate effect sizes. The effect of the group accounted for approximately 7.3% of the variance in fixation time, 17.8% of the variance in fixation count and 10.6% of the variance in dwell time. The multivariate effect size (Partial η^2) was 26%. Overall, the results demonstrate significant effects of the group on the combined set of dependent variables and on each dependent variable separately. Furthermore, the additional

independent samples t-tests were conducted to further explore the difference between groups in relation to individual eye tracking parameters.

As shown in Table 6.1.4.2, the mean of the experimental group that read literary counterfactuals ($M=30.59$, $SD=12.02$) is higher for **fixation count** than the mean of the control group that read literary non-counterfactuals ($M=21.86$, $SD=9.94$). The result of the independent samples t-test confirmed the significance of the difference between the two groups ($p < .001$). For the Lg10 transformed fixation count, the result is reported in the following way: $t(58) = 3.538$, $p < .001$, one-sided, Cohen's $d = .914$, 95% CI [.377, 1.443]. The 95% CI of true population mean difference is not reported because it contains transformed numbers. Cohen's $d = .914$ indicates a large effect size. 95% CI suggests that we are 95% confident that the true population effect size (Cohen's d) lies within the range of .377 to 1.443. This indicates that the observed effect size of .914 is statistically significant and unlikely to be due to random chance alone. It suggests a substantial difference between the two groups being compared, with the lower bound of the confidence interval (.377) indicating a small-to-medium effect size and the upper bound (1.443) indicating a large effect size.

As it is shown in Table 6.1.4.2, the mean of the experimental group that read literary counterfactuals ($M=7256.74$, $SD=3568.05$) is higher for **fixation time [ms]** than the mean of the control group that read literary non-counterfactuals ($M=5611.30$, $SD=2681.94$). The result of the independent samples t-test confirmed the significance of the difference between the two groups ($p < .001$). For the Lg10 transformed fixation time, the result is reported in the following way: $t(58) = 2.131$, $p = .019$, one-sided, Cohen's $d = .550$, 95% CI [.032, 1.064]. Cohen's $d = .550$ indicates a moderate effect size. 95% CI suggests that we are 95% confident that the true population effect size (Cohen's d) lies within the range of .032 to 1.064. The observed effect size of .550 is statistically significant and unlikely to be due to random chance alone. It suggests a substantial difference between the two groups being compared, with the lower bound of the confidence interval (.032) indicating a small effect size and the upper bound (1.064) indicating a large effect size.

As shown in Table 6.1.4.2, the mean of the experimental group that read literary counterfactuals ($M=8534.10$, $SD=3885.77$) is higher for **dwelt time [ms]** than the mean of the control group that read literary non-counterfactuals ($M=6450.13$, $SD=3028.67$). The result of the independent samples t-test confirmed the significance of the difference between the two groups ($p < .001$). For the Lg10 transformed dwelt time, the result is reported in the following way: $t(58) = 2.616$, $p = .006$, one-sided, Cohen's $d = .675$, 95% CI [.152, 1.193]. Cohen's $d = .675$ indicates a moderate effect size. 95% CI suggests that we are 95% confident that the true

population effect size (Cohen's d) lies within the range of .152 to 1.193. The observed effect size of .675 is statistically significant and unlikely to be due to random chance alone. It suggests a substantial difference between the two groups being compared, with the lower bound of the confidence interval (.152) indicating a small effect size and the upper bound (1.193) indicating a large effect size.

Pearson correlation analysis by subjects with Lg10 transformed data was conducted to examine the relationship between fixation time, fixation count, and dwell time. The positive correlation between fixation time and dwell time was found to be statistically significant, $r = .989$, $p < .001$, two-tailed. Fixation count was positively correlated with dwell time, $r = .945$, $p < .001$, two-tailed. Also, fixation count was positively correlated with fixation time, $r = .906$, $p < .001$, two-tailed. Pearson's correlation coefficient ranges from -1 to 1, where a value closer to -1 or 1 indicates a stronger relationship between the variables. All three correlation coefficients indicate a very strong positive correlation between eye-tracking parameters. Thus, all three eye-tracking parameters are positively correlated with each other. The internal consistency analysis using Cronbach's alpha demonstrated high reliability ($\alpha = 0.981$) for three eye-tracking parameters. The high Cronbach's alpha coefficient of .981 indicates excellent internal consistency among three eye-tracking parameters (dwell time, fixation count, and fixation time), suggesting that they are highly interrelated measures tapping into a common underlying cognitive process.

Thus, the group (literary counterfactual versus literary non-counterfactual) effect on the eye tracking parameters (fixation count, fixation time, dwell time) is significantly proven by both the analysis by items and the analysis by subjects. In addition, both analyses (by item and by subject) confirm that eye-tracking parameters such as fixation count, fixation time and dwell time are highly positively correlated, measuring the same cognitive construct.

Data on the perceived difficulty. Analysis by items

Table 6.1.4.3 below provides the descriptive statistics for perceived difficulty by items across the experimental group (literary counterfactual) and control group (literary non-counterfactual), including such information as mean and standard deviation.

Group	Mean	Standard deviation
Literary counterfactual	3.30	.607
Literary non-counterfactual	3.25	.535

Table 6.1.4.3 The descriptive statistics of the perceived difficulty by items (n=40)

Before the interpretation of the data, let me recall the measurement. 5-points of Likert scale rating were divided as the following: 1 – very difficult, 2 – difficult, 3 – neutral, 4 – easy, 5 – very easy. According to the descriptive statistics of the perceived difficulty by items, there is no discernible difference between the two types of conditionals, although the mean of literary counterfactuals suggests 0.05 less difficulty. The independent samples t-test did not show a statistically significant difference between the two groups: $t(78) = .387$, $p = .350$ one-sided and $p = .700$ two-sided, 95%CI[-.205, .304]. The 95% Confidence of Interval crossing 0 further confirms the non-significance of the difference. It suggests that the difference between groups (or the effect size) could plausibly be zero. This might indicate that there is no statistically significant difference between the two groups in the perceived difficulty.

Pearson correlation analysis by item was performed between the perceived difficulty and dwell time to see the relationship between the two variables. It shows the following: $r = -.547$, $p < .001$, 2-tailed. Pearson's correlation coefficient ranges from -1 to 1, where a value closer to -1 or 1 indicates a stronger relationship between the variables. The correlation coefficient between the two variables is -0.547, indicating a moderate negative linear relationship. In other words, when the 5-point rating decreased, the dwell time increased. According to the 5-point Likert scale difficulty rating, the higher the difficulty level, the less difficult it is. Thus, less difficulty is correlated with less dwell time. The dwell time was chosen for further regression analysis because it correlated well with both fixation count and fixation time. Although, I also checked the correlation between perceived difficulty and other two parameters: perceived difficulty and fixation count ($r = -.462$, $p < .001$, 2-tailed) and perceived difficulty and fixation time ($r = -.562$, $p < .001$, 2-tailed). Thus, perceived difficulty is moderately correlated with all three eye-tracking parameters.

Regression analysis by item revealed a significant relationship between perceived difficulty (independent variable) and dwell time (dependent variable) ($F(1, 78) = 33.325$, $p < .001$, $R = .547$, $R^2 = .299$, adjusted $R^2 = .290$), with the perceived difficulty showing a strong negative effect on dwell time ($\beta = -.547$, $p < .001$, $t = -5.773$). The coefficient of determination (R-squared) value of 0.299 indicates that approximately 29% of the variability in dwell time can be explained by the perceived difficulty in the regression model. This means that the perceived difficulty accounts for about 29% of the variation observed in dwell time among the sample population. It is essential to note that while R-squared gives an indication of how well the independent variable explains the variability in the dependent variable, it does not imply

neither causation nor directionality of the relationship. Additionally, other factors not included in the model may also influence dwell time. Thus, the perceived difficulty of both types of conditionals might affect the dwell time but the perceived difficulty is not associated with a specific type of conditional.

Data on the perceived difficulty. Analysis by subjects

Table 6.1.4.4 below provides the descriptive statistics for the perceived difficulty by subjects across the experimental group (literary counterfactual) and control group (literary non-counterfactual), including such information as mean and standard deviation.

Group	Mean	Standard deviation
Literary counterfactual	3.30	.474
Literary non-counterfactual	3.25	.589

Table 6.1.4.4 Descriptive statistics for perceived difficulty by subjects (n=30)

According to the descriptive statistics for the perceived difficulty by subjects, there is no discernible difference between two types of conditionals, although the mean of counterfactuals suggests 0.05 less difficulty. Analysis by subjects shows the same mean as for the analysis by items because whilst in the analysis by items the data is averaged for each item across all participants, in the analysis by subjects the data is averaged for each participant across all items. The difference between two descriptive statistics can be observed in the standard deviation. The standard deviation measures the average amount of variation or spread of data points from the mean, providing insight into the consistency or dispersion of values within a dataset. The standard deviation is less for the analysis by subjects, suggesting that the data points are closer to the mean, and therefore, there is less variability by subjects rather than by items. In other words, the responses of participants were consistent. The independent samples t-test did not show a statistically significant difference between the two groups: independent samples t-test: $t(58) = .378$, $p = .353$ one-sided, $p = .707$ two-sided, 95%CI[-.224, .329]. The 95% Confidence of Interval crossing 0 further confirms non-significance of the difference. It suggests that the difference between groups (or the effect size) could plausibly be zero. This might indicate that there is no statistically significant difference between groups.

Spearman correlation analysis by subjects was performed between the perceived difficulty and untransformed dwell time (as Spearman does not assume normality) to see the

relationship between two variables. It shows the following: $r = .105$, $p = .423$, 2-tailed. The correlation coefficient between the two variables is .105, indicating no relationship between two variables. I also checked the correlation between perceived difficulty and other two parameters: perceived difficulty and fixation count ($r = .112$, $p = .396$, 2-tailed) and perceived difficulty and fixation time ($r = .104$, $p = .427$, 2-tailed). Thus, the perceived difficulty by subjects is not correlated with any of the three eye-tracking parameters.

As observed, the results of relationship between the perceived difficulty and eye tracking parameters differ between analysis by items and analysis by subjects. It suggests that there may be different patterns or sources of variation at play. Interpreting the difference between analysis by items and analysis by subjects in correlation can provide insights into the relationship between variables and help understand potential sources of variation in the data. When conducting the analysis by items, we are examining the correlation between perceived difficulty ratings of individual items and eye-tracking parameters on those items across all subjects. A significant correlation between the perceived difficulty and eye tracking parameters in this analysis suggests that certain items are perceived as more difficult by participants, and participants spend more time on those items. This could indicate that the design or content of specific items influenced participants' perceptions of difficulty and their engagement (reflected in eye-tracking parameters). In contrast, analysis by subjects examines the correlation between each subject's overall perceived difficulty rating and their overall eye-tracking parameters across all items. A lack of significant correlation between the perceived difficulty by subjects and eye-tracking parameters suggests that, on average, participants' perceptions of overall task difficulty are not strongly related to their engagement or time spent on the task. This could indicate individual differences among participants in how they perceive and engage with the task, regardless of the perceived difficulty of individual items.

Comprehension test. Analysis by subjects

The **comprehension test** showed that participants can comprehend counterfactuals by making factual inferences. The mean of correct answers of the experimental group is $M = 9.80$ out of 10 ranging from 8 to 10 with a low standard deviation $SD = .484$ showing the consistency of the high score across participants. Thus, the comprehension of literary counterfactuals is high.

Modus tollens inference. Analysis by subjects

The table below shows the descriptive statistics of making modus tollens inference from literary counterfactuals (counterfactual conditionals) and literary non-counterfactuals (indicative conditionals). The response of one participant from the control group was not registered in the Google form, but the difference in one subject in the sample size of two groups did not impact the results of the statistical tests that were conducted.

Group	Median	Mean	Std. Deviation
Counterfactual conditional	10	9.80	.48
Indicative conditional	3	4.14	3.66

Table 6.1.4.5 Descriptive statistics of making modus tollens inference from two types of conditionals (experimental group n=30, control group n=29)

As shown in Table 6.1.4.5, whereas for counterfactuals people generate factual inference, for indicatives they seem not to do so. Interestingly, no one except one participant from the control group wrote anything in the option *Other* but chose between modus tollens and modus ponens for indicatives. One subject from the control group wrote in the *Other* option that it is “impossible to tell” for six items and chose modus ponens for four items. It seems the choice of modus ponens prevailed modus tollens for indicative conditionals. To test whether the difference in the generation of modus tollens across groups is significant, a non-parametric Mann-Whitney U test was conducted. It revealed a significant difference in modus tollens inference between the experimental group (Mdn = 10) and the control group (Mdn = 3), $U = 74.500$, $p < .001$, 2-sided.

Spearman correlation showed no relationship between modus tollens inference and untransformed dwell time ($r=.149$, $p=.261$, 2-tailed); between modus tollens inference and untransformed fixation time ($r=.080$, $p=.545$, 2-tailed). However, a significant moderate positive correlation is found between modus tollens and untransformed fixation count ($r=.276$, $p=.034$, 2-tailed). According to Holmquist et al. (2011), fixation count might indicate the morphological complexity in reading, and therefore, it suggests that the increase in morphological complexity is associated with the increase in Modus Tollens inference. In other words, the cognitive processing of the morphological deviation (X-marking) is positively correlated with the generation of modus tollens.

6.1.5 Study 3: Discussion

The results suggest that L2 reading of literary counterfactuals requires additional cognitive costs. This has been confirmed in the analysis both by items and by subjects. It is in line with the theoretical considerations discussed so far. According to the neurocognitive model of literary reading (Jacobs, 2011), deviations are associated with slow reading. Embedded counterfactuals convey an extra layer of past tense morphology (X-marking as grammatical deviation) in their morphosyntax that gives rise to semantic deviation, increasing cognitive costs. These cognitive costs have been observed in the increased eye-tracking parameters such as fixation count, fixation time and dwell time during online processing. Literary counterfactuals are processed longer than their literary non-counterfactual versions, which indicates that reading of deviations indeed leads to slow reading. However, L2 readers did not find literary counterfactuals more difficult than literary non-counterfactuals and even perceived them as neutral-to-easy. This might be explained in two ways. First, participants did not find them difficult because they could perfectly comprehend literary counterfactuals as high scores in comprehension test shows. Based on the comprehension test, participants understand factual meaning of literary counterfactuals and high scores on comprehension was consistent across all participants. Second, it might be due to positivity bias. According to the positivity bias, individuals evaluate information, events, or tasks in a more positive light than what objective measures might suggest. In the context of the difficulty assessment task, participants may have a predisposition to perceive complex sentences as not difficult due to this positive bias. It might be due to social desirability bias, as individuals may want to appear competent or intelligent, so they might be inclined to rate tasks as easier than they actually are to maintain a positive self-image. Although, it is worthy to note that perceived difficulty of individual items moderately correlated with eye tracking parameters explaining 29% variability in the eye tracking data, that is items perceived as less difficult were read with less cognitive effort by the participants of both groups. This might imply that the first interpretation of participants' perceived difficulty is valid, according to which perceived difficulty truly reflected the difficulty of items, but literary counterfactuals are not perceived as difficult because they are comprehended without difficulty. However, it has not been confirmed in the analysis by subjects as the perceived difficulty was not correlated with eye-tracking parameters. This suggests that even if participants perceived some items as more difficult than others and it is related to increased cognitive costs during processing, participants' overall perception of the difficulty of all items is not strongly related to their cognitive engagement.

Furthermore, counterfactuals are fully comprehended if the modus tollens factual inference is deduced. For example, one infers that he did not come to Gardencourt and he did not see Madam Merle from the example *if he had come to Gardencourt, he would have seen Madam Merle*. However, it is also possible that some might infer the same from non-counterfactual conditional (indicative conditional) such as *if he came to Gardencourt, he saw Madam Merle*. However, the difference between the two types of conditionals is that counterfactuals are morphologically more complex. A moderate positive correlation between modus tollens inference and fixation count suggests that an extra layer of morphology (X-marking) of counterfactuals is associated with modus tollens inference. Based on Holmquist et al. (2011) interpretation, the fixation count shows morphological complexity, and therefore, the more morphologically complex the sentence was, the more participants had fixation counts generating modus tollens. Or the more modus tollens was generated, the more morphologically complex the sentence was, and the more fixation counts were registered. In other words, participants generated more modus tollens inference from counterfactual conditionals during online processing reflected in the fixation counts, which shows their successful comprehension of the morphological deviation and its subsequent referential deviation leading to the modus tollens inference generation during online processing. In addition, the results showed that all three eye tracking parameters, fixation count, fixation time, and dwell time, are highly positively correlated, which might suggest that they measure related cognitive processes.

Overall, the results of the third study confirm the hypothesis (H₁) that L2 reading of literary counterfactual conditionals is associated with additional cognitive costs compared to L2 reading of literary non-counterfactual conditionals. It also confirms the second hypothesis (H₂) that L2 readers can fully comprehend counterfactuals but not the third hypothesis (H₃), as participants did not evaluate them as difficult. Further, I would like to discuss how the results can be put into the broader picture that exists in the literature. First, it supports the neurocognitive model of literary reading (Jacobs, 2011), which was already mentioned at the beginning of the discussion. Thus, it fits the empirical research in literary studies, suggesting that the effect of deviations can be associated with a slow reading (e.g., Miall and Kuiken, 1994). In the case of embedded counterfactuals, the deviations, such as X-marking and its semantic reference, are combined to convey a meaningful deviation. This might require additional cognitive costs because one should first deduce an extra layer of past tense morphology and then reach outside of the set of possible worlds to consider a remote textual alternative state. Only by coupling these two deviations can one comprehend the counterfactual

meaning. The study shows that second-language readers can deduce deviations and fully comprehend literary counterfactuals.

Second, it aligns with the empirical findings on counterfactuals processing in the first language. The previous studies on the first language processing of counterfactuals observed that counterfactual conditionals are processed differently than indicative conditionals. For instance, Gomez-Veiga et al. (2010) showed that for indicative conditionals, people only think of one possibility, whereas for counterfactual conditionals, people have more representations. Another study by De Vega and Urrutia (2011) suggested that people envisage counterfactual possibility while comprehending counterfactual conditionals. In the fMRI study, Kulakova et al. (2013) identified that the processing of hypothetical conditionals does not need actual world information, whilst processing of counterfactuals requires both factual information and supposition. They showed that the processing of counterfactuals needs increased mental imagery and cognitive efforts to integrate information. In an ERP study, Kulakova et al. (2014) found out that the processing of counterfactuals is cognitively costly, although it is processed as soon as the subjunctive mood appears in German counterfactuals. Thus, all these studies highlight that the processing of counterfactuals is cognitively costly. The present study supports this view also for second-language readers of English that showed additional cognitive costs in literary counterfactuals processing.

Third, it supports the studies on inferences, according to which people generate *modus tollens* from counterfactual conditionals and *modus ponens* from indicative conditionals. According to Walsh and Byrne (2007), people remember only a few possibilities, e.g., he came to Gardencourt and saw Madam Merle (*modus ponens*) from indicative conditional *if he came to Gardencourt, he saw Madam Merle*. Fillenbaum's (1974) study suggests that after reading counterfactuals, people tend to remember that they read negative assertions (presupposed fact), e.g., "he did not come to Gardencourt" and "he did not see Madam Merle" from *if he had come to Gardencourt, he would have seen Madam Merle*. The follow-up studies by Thompson and Byrne (2002) also confirmed that people conceive presupposed fact (*modus tollens*) from counterfactuals. However, the present study showed that some people might also generate *modus tollens* from indicative conditionals, even if the majority generates *modus ponens*. There might be individual preferences for generating *modus ponens* or *modus tollens* from indicative conditionals. It seems that people assess indicative conditionals to be real possibilities whilst counterfactual conditionals are to be counterfactual possibilities, as proposed by Quelhas et al. (2018). Here, the word "possible" is important as we cannot deduce factual inference from indicative conditionals. Quelhas et al. (2018) showed that when people understand indicative

conditionals, they think that it was possible, and when they understand counterfactual conditionals, they think that it was once possible but did not happen. In our study, for example, when participants read *if he came to Gardencourt, he saw Madam Merle*, (s)he understands that it was possible that he came to Gardencourt and it was possible that he saw Madam Merle. When participants read counterfactuals such as *if he had come to Gardencourt, he would have seen Madam Merle*, (s)he understands that it was once possible but did not happen that he came to Gardencourt and it was once possible but did not happen that he saw Madam Merle. The account that indicative conditionals are associated with what was possible but not necessarily factual inference might explain the variability in participants' evaluation of non-counterfactual conditionals. It fits the model theory of counterfactual and nonfactual reasoning, in accordance with which people generate more inferences from counterfactuals rather than non-counterfactuals (e.g., Byrne and Tasso, 1999).

Regarding second language hypotheses considered in the theoretical part, I would like to discuss the implications of the present study on these hypotheses. The processing of literary counterfactuals as complex grammatical structures can relate to the shallow structure hypothesis. According to the shallow structure hypothesis, second language speakers rely on lexical-semantic information rather than morpho-syntactic information while online processing. The present study does not support the shallow structure hypothesis because the underuse of morpho-syntactic information was not observed. If participants had not deduced an extra layer of morphology used in the structure, they would have shown the same cognitive processing for both types of conditionals, as the difference is marked by the X-marking. Clahsen and Felser (2006) suggested that the processing of difficult grammar might be problematic in L2. However, in their revised hypothesis, Clahsen and Felser (2018) reconsidered different aspects of the hypothesis due to empirical findings and theoretical underpinnings of linguistic processing. In the revised version of their hypothesis, they suggested that highly proficient L2 learners can process complex sentences without problems, which contrasts with their initial claim. The present study seems to support the revised version of their hypothesis, suggesting that second-language speakers process morpho-syntactic information without difficulties.

Moreover, the results can be considered in relation to the interface hypothesis. The present study does not support the interface hypothesis (Sorace and Filiaci, 2006), according to which second language speakers cannot integrate the structures at the interface of different domains, such as syntax-pragmatics or syntax-semantics, that impede the full acquisition of such structures. Counterfactual conditional involves morphology, syntax, semantics, and

pragmatics. If participants had not integrated those domains, especially morphosyntax with semantics, that is the integration of X-marking with counterfactual meaning, participants would not have made modus tollens inference from counterfactuals. In addition, if participants had not successfully integrated the morphosyntax with semantics, there would not have been a positive correlation between fixation count (responsible for morphological complexity) and modus tollens inference generation, i.e., the relationship between X-marking and modus tollens inference during online processing. The results are in line with the empirical findings, which suggest that second-language speakers can fully integrate the structures at the interface of different domains (e.g., Ivanov, 2012; Herbay et al., 2018).

In sum, the present study helps to understand how second-language readers perceive, comprehend and process literary counterfactuals. In the present study, it is found that literary counterfactuals are comprehended and processed differently than literary non-counterfactuals. People comprehend literary counterfactuals by deducing factual inferences. People make more modus tollens inference from literary counterfactuals rather than from non-counterfactuals. The processing of literary counterfactuals is cognitively demanding. Reading deviations conveyed by literary counterfactuals leads to a slow reading. However, they are not perceived to be difficult. People's perceived difficulty of individual literary counterfactuals and non-counterfactuals might affect their cognitive processing. Furthermore, second language does not impede neither the processing of counterfactual cues in the form of X-marking nor the integration of this cue with its referential semantics to fully comprehend literary counterfactuals.

6.2 Study 4: The role of L1 in L2 processing of literary counterfactuals

6.2.1 Study 4: The rationale

It has been discussed in the implications of the third study to the second language hypotheses, that participants neither relied solely on lexical-semantic information nor failed to integrate morphosyntax with semantics. However, what about language transfer theory that assumes the first language interference while processing in the second language. Does the first language influence while online processing of literary counterfactuals in L2? As discussed in the chapter on second language processing, language transfer theory suggests two types of transfer: negative and positive. On the one hand, negative transfer (interference) happens when the first language (L1) causes mistakes in the second language. On the other hand, positive transfer

(facilitation) might occur if the speaker's first language facilitates the attainment of the second language. According to Bardovi-Harlig and Sprouse (2018), the current view favours a mentalist perspective and language transfer is treated as the impact of the L1 grammar representation on the interlanguage grammar representation. In addition, the linguistic structures that are at the interface between syntax and pragmatics are found to be especially vulnerable to crosslinguistic influence (e.g., Montrul, 2010), as well as the structures at the interface between syntax and semantics (e.g., Oh, 2010). Among others, Chan (2004) illustrated that Chinese learners of English produce five common errors that relate to the lack of similar grammatical features and/or negatively transferred from their first language. It was also reported during the writing task that second language learners mostly thought initially in their first language. Chinese learners of English also used similar structures to their first language in the second language. This pattern was mostly observed among lower proficient learners. However, highly proficient learners could also show this tendency if they found some difficulties in the second language (Chan, 2004). It has been shown that L1 influences L2 in such domains as phonology, orthography, morpholexis and lexical-semantics (e.g., French-Mesrte and Pynte, 1997; Hernandez et al., 2005; Marlan and Sprvey, 2003). In the domain of morphosyntax, the findings are somewhat controversial: some show there is L1 influence (Sabourin and Havehart, 2003; Tokowicz and MacWhinney, 2005), while others suggest there is no L1 influence (McDonald, 2000; Montrul, 2004). Other researchers show there is an L1 influence on syntax (e.g., Yip and Matthews, 2000; Bernolet et al., 2013; Kim et al., 2015; Erdocia and Laka, 2018). Thus, it is far from clear whether one can observe L1 transfer effects in the second language.

If there is such a language transfer effect, then it might be shown both in online processing and in later reading, as observed by previous researchers. The influence may be positive or negative. If we observe the positive effect, L1 may facilitate the L2 processing. If we observe a negative effect, L1 may lead to grammatical mistakes. Regarding the former, it is believed that two grammars are available during bilinguals' processing. It follows that the morphosyntactic representation of the first language that is a dominant language in most cases might affect the morphosyntactic representation of the second language. Moreover, bilinguals might create interlanguage grammar that reflects the morphosyntax of both languages. If it is indeed so, then reading the morphosyntactic structure that resembles L1 grammar might facilitate its online processing. In the case of literary counterfactuals, I suppose that if participants with Polish as their first language hold in mind the L1 morphosyntactic representation of counterfactuals while reading in L2, they might read *if he would have come*

to Gardencourt, he would have seen Madam Merle faster and with less cognitive effort than if he had come to Gardencourt, he would have seen Madam Merle. The difference between two versions is that the former has counterfactuality marker *would* (equivalent of *by*) in the antecedent that resembles Polish morphosyntax of counterfactuals. The negative language transfer effect might be shown in the evaluation of the form similar to their first language as grammatically correct. In the case of literary counterfactuals, participants might evaluate the former version as grammatically sound.

6.2.2 Study 4: Research aim, questions, and hypotheses

The main aim of the fourth study is to understand whether second-language reading is influenced by the first language. As mentioned previously, the positive effect of L1 might be shown during L2 online processing. In Polish, the particle *by* (the equivalent of *would*) is used both in the antecedent and consequent, whereas in English, it is only used in the consequent. By putting it also in the antecedent, we might facilitate the processing of counterfactuals because it resembles L1 morphosyntax. And if it facilitates, then it can suggest that the morphosyntactic representation of L1 affects the processing of literary counterfactuals in L2. The following example illustrates the language transfer from L1 (Polish) to L2 (English) based on the L1 morphosyntactic representation of counterfactuals: *If you would have remembered that Hareton was your cousin as much as Master Heathcliff, you would have felt how improper it was to behave in that way.* A further negative effect would be to evaluate this structure as grammatically correct if to consider it from British English point of view. Hence, the following questions will be addressed in the second study:

- 1) Does L1 morphosyntactic representation affect literary counterfactuals processing in L2?
- 2) Is the L2 morphosyntax resembling L1 evaluated as grammatical?

As the language transfer effects of L1 morphosyntactic representation on L2 processing are far from clear, I formulate the second hypothesis in a two-sided manner. If the null hypothesis (H_0) is correct, then reading literary counterfactuals that resemble L1 morphosyntax will not facilitate L2 processing, and these structures will be evaluated as ungrammatical. If the alternative hypothesis (H_A) holds true, then L2 readers of literary counterfactuals process the version that resembles their L1 morphosyntactic representation faster and without additional cognitive efforts, and it is probable that they will also evaluate these structures as grammatically sound.

H₀: L1 morphosyntactic representation does not affect L2 reading of literary counterfactual conditionals.

H_A: L1 morphosyntactic representation affects L2 reading of literary counterfactual conditionals.

6.2.3 Study 4: Methods

Experimental design

The experimental design of the fourth study is similar to the experimental design of the third study. In a similar manner, I will first outline the overall experimental design to give a holistic overview. The study was carried out in accordance with ethical principles and received ethical approval from the University of Warsaw Rector's Committee for the Ethics of Research involving Human Participants before conducting the experiment. The ethical clearance can be found in the appendix. In accordance with the ethical guidelines, participants were provided with the information sheet about the study and signed written informed consent before participation in any stage of the study. The study is composed of two stages. The first stage included qualification tests for the experiment and the second stage encompassed an eye-tracking experiment with self-report questionnaires. Participants had at least B2 level of English language competence that has been certified. Before the eye-tracking experiment, potential participants were invited to take two kinds of tests. One test checked the grammatical knowledge of conditionals. It was necessary to check whether L2 readers have sufficient knowledge of conditionals to participate in the experiment that targets the processing of this structure. If participants did not know the conditional structures, it could be a confounding variable in the online processing. And therefore, participants took the English grammar test consisting of 25 questions 10 of which checked the grammatical knowledge of conditionals. To pass the test on conditional knowledge, one had to receive at least 6 points out of 10 points (60%). The questions about conditionals have been covered by other grammatical filler questions so as not to draw specific attention to conditionals. In addition, the test was taken a week prior to the main experiment so that readers were not primed with conditionals. The second test that has been also taken a week prior to the experiment was working memory capacity test. As discussed in the previous chapters, a low working memory capacity might impact both the comprehension of counterfactuals and L2 reading. And therefore, it was essential to check the working memory capacity of participants. The n-back recall test was used

for this purpose, that is, the combination of letter recall with counting as was previously justified. To pass the working memory capacity test, one had to receive at least 4 points out of 9 points because it was calculated that up to three points indicate low working memory capacity, from four to six - average, and from seven to nine - high. A threshold of 4 points controlled for a low working memory capacity from being a confounding variable. Those who passed both tests were invited to take part in the eye-tracking experiment. Sixty participants were divided randomly into either a group that read literary counterfactual conditionals that resemble L1 morphosyntax or a group that read literary counterfactual conditionals that do not resemble L1 morphosyntax. The design of the eye tracking experiment is between-subjects: 30 subjects read the former version and the other 30 subjects read the latter version. They read a total of 40 critical items (either in L1 similar morphosyntax or L1 dissimilar morphosyntax) and 20 filler items. Such eye tracking parameters as fixation time, fixation count and dwell time were recorded. After the experiment, participants performed a grammaticality judgement task. Also, an additional general questionnaire was filled in to give general information about participants' language competence. The data was analysed, and appropriate statistical tests were run using SPSS software provided by the University of Warsaw license. After this holistic overview of experimental design, detailed information about participants, materials, measures, experimental setting, apparatus, procedures, and data analysis will be given in the subsequent pages. Some subsections such as experimental setting and apparatus the same as for the first study, despite this, I am describing them again in the description of this study for the sake of convenience and maintaining the flow of reading.

Participants

The participants were English as second language speakers, with Polish language as the first language. They were all undergraduate students at the University of Warsaw. The participants were recruited by the advertisement at the Studenci UW group in the social media (Facebook). Each participant who took part in both stages received an Empik electronic gift card for PLN 100 immediately after participation in the second stage. The gifts for participants were funded by the Excellence Initiative – Research University (IDUB) Programme grant as the result of winning the 1st Research Competition in Action IV.4.1 – “A complex programme of support for UW PhD students” by the doctoral candidate. The inclusion criteria of participants were outlined as the following:

- English language level minimum B2;
- Polish language as the first language;
- Age range 18-34;
- No known history of reading difficulties;
- Normal eyesight (or near normal with soft lenses and spectacles);
- No participation in my previous study.

A total of 60 subjects were qualified to take part in the eye-tracking experiment. Each participant was randomly assigned to either the experimental group or the control group. The experimental group read literary counterfactual conditionals that resemble L1 morphosyntax, and the control group read literary counterfactual conditionals that do not resemble L1 morphosyntax. As a result, the experimental group consisted of 30 subjects ($M_{age} = 20.77$ years; $SD = 2.128$; 25 females, 5 males) and the control group consisted of 30 subjects ($M_{age} = 21.40$ years; $SD = 2.010$; 21 females, 9 males).

All the participants had at least B2 level of English or higher level confirmed with a language certificate or scores taken from the Oxford online placement test. In the experimental group, 7 people reported B2 level, 5 people B2/C1 level, 9 people C1 level, 3 people C1/C2 level and 6 people C2 level. In the control group, 10 people with B2, 5 people with B2/C1, 11 people with C1, 2 people with C1/C2, 2 people with C2.

All participants reported Polish language as their first language (native language). In the experimental group, participants had the age of English onset from 0 up to 12 years old; the duration of studying English from 10 up to 19 years; the duration of stay in English speaking country from 0 to 3.25 months. In the control group, participants had the age of English onset from 3 to 13 years old; the duration of studying English from 8 up to 20 years; the duration of stay in English speaking country from 0 to 6 months.

Participants of the experimental group reported knowledge of such foreign languages as German, Spanish, Japanese, French, Chinese, Russian, Italian, and Portuguese ranging from basic to C1 with approximate median at A2. In the control group, participants reported the knowledge of such foreign languages as German, Spanish, French, Italian, Russian, Portuguese, Dutch, Slovak, Swedish ranging from basic to C1/C2 with approximate median at B1/B2. As the previous research does not show the considerable effect of such language-specific information on L2 processing, they have not been further investigated. Anyway, the differences in these parameters were gradual rather than categorical, and therefore, there was no need to categorise groups into subgroups.

The admitted participants to the second stage received at least 4 points out of 9 points on the working memory test and at least 6 points out of 10 points on the test on English conditionals. Thus, the participants had an average to high working memory capacity and sufficient knowledge of the grammatical structure of conditionals, including counterfactual conditionals.

The participants voluntarily took part in both stages of the experiment with an available option to withdraw from participation at the experiment anytime. Before being invited to the first stage, participants received detailed information on the study, including all the relevant information such as procedure, duration, data analysis, and data storage that had been previously approved by the ethical committee. The study was introduced as sentence comprehension in English as a second language, not to prime participants in advance with counterfactual conditionals. However, after the experiment, the true purpose of the study was revealed, and participants' questions were answered. Before participating in the study, participants signed written informed consent forms.

Materials

The materials for the second study consisted of 40 critical items and 20 filler items. Each critical item had two versions: literary counterfactual conditional with L1 similar morphosyntax and literary counterfactual conditional with L1 dissimilar morphosyntax. The latter was the original version chosen from 35 literary texts of the Gutenberg project using a sketch engine searching tool. The list of literary texts from which the counterfactual conditionals were extracted is provided in the appendix (see Appendix 5). There was no specific parameter for choosing literary texts, although all the counterfactuals were taken from fictional literary texts rather than non-fictional ones. The main criteria for selecting counterfactuals were X-marked conditionals with past-time reference. Past-time references were preferred because they are counterfactual compared to future-less-vivid conditionals that have future references and can be regarded as non-counterfactual hypotheticals. The present-time preference was not used because it has limitations on the type of the predicate to be regarded as counterfactual, namely, it should be a static verb or subjunctive. A baseline condition was the original version of literary counterfactual conditionals, and the experimental condition was the manipulated version of the literary counterfactual conditionals to resemble L1 morphosyntax. For example, compare literary counterfactual conditional resembling L1 morphosyntax with literary counterfactual conditional that has usual L2 morphosyntax:

L1 similar morphosyntax (experimental): If he would have come to Gardencourt, he would have seen Madame Merle.

L1 dissimilar morphosyntax (control): If he had come to Gardencourt, he would have seen Madame Merle.

The difference between the two conditionals lies in the use of *would* (the equivalent of Polish *by*) in the antecedent clause. Another difference between two versions of the literary conditional sentence is apparently length that has been taken as a covariate in the analysis. Also, the frequency of words was controlled because both groups read the same content. The experimental group read the L1 similar morphosyntax version, and the control group read the L1 dissimilar morphosyntax version of the same 40 content (see Appendix 4). In addition, the same 20 fillers were used to maintain participants' engagement and prevent them from detecting the true purpose of the experiment, reducing demand characteristics. 20 filler items were extracted from the same literary texts and contained 20 different contents. Sentences beginning with *because* and *since* were selected as filler items due to common to all structures' cause-and-effect relationships.

Measures

As mentioned in the experimental design, such measures as working memory capacity, test on the knowledge of English conditionals, eye tracking parameters such as fixation time, fixation count and dwell time, grammaticality judgement task and general language questionnaire were used. Detailed information is given about each of them in the order listed respectively. The tests on working memory capacity and knowledge of English conditionals were the same as for the first study.

For testing **working memory capacity**, an N-back test was used, namely, an auditory 2-back test. Participants listened to pre-recorded letters. They needed to decide whether they had heard the same letter 2 letters ago. Thus, the task integrated both recall and simple arithmetic calculation. The purpose of the working memory capacity test was to ensure that participants did not have a low working memory capacity because, in accordance with some studies (e.g., Ferguson, 2015), people with a low working memory capacity might experience some problems in making counterfactual inferences. Each correct letter was equal to 1 point. The test results were interpreted in the following way: low (0-3 points), average (4-6 points),

and high (7-9 points). To pass the working memory capacity test, participants needed to get at least 4 responses (40%) correct. Participants were instructed not to write letters on the paper while listening and instead to remember them and write the correct answers only. Before the real test, a practice test was performed to ensure that participants understood how to do the test. Participants could also ask questions before the real test. However, the test was constructed in a simple manner with clear and detailed instructions (see Appendix 6).

The test on the knowledge of English conditionals was similar to the English grammar test without directly revealing the target construction (see Appendix 7). It consisted of 25 questions: 10 questions regarding conditionals and 15 questions were fillers. Each correct answer to a target question was equal to 1 point (in total 10 points). Participants needed to get at least 6 points (60 %) to take part in the further experiment. Taking 60% as a threshold ensured that the answers were not correct by chance. The purpose of the test on conditionals was to check whether participants knew about counterfactual conditionals. If participants were not familiar with counterfactual conditionals, it could influence their processing behaviour. The test was composed of multiple-choice questions with three options. Participants were instructed to fill in the gap in the sentence by choosing the correct option, and it was also noted that there was only one correct option.

Eye tracking parameters such as fixation time, fixation count, and dwell time were taken into consideration. As the first study showed, these three eye tracking parameters measure the same underlying construct and therefore they can be used in combination to receive a reliable estimate of cognitive processing. I could also use only one eye-tracking parameter as most researchers do, but I thought that including all three might be more reliable because if there is an increased processing cost, it should be reflected in all eye-tracking parameters. This approach can be helpful in reducing the probability of Type I false positive error.

The grammaticality judgement task was used to check whether participants find literary counterfactuals that resemble L1 morphosyntax as grammatical or not. After an eye-tracking experiment, the participants were asked to assess the grammaticality of each sentence they read by underlining grammatical or ungrammatical. Participants performed the task on the paper. In case they underline ungrammatical, they were asked to write on the paper why it is ungrammatical. For the experimental group, a score is given if they mark ungrammatical, and for the control group, a score is given if they mark grammatical because the former read and evaluated the version resembling L1 morphosyntax (ungrammatical) and the latter read and evaluated the version with L2 morphosyntax (grammatical).

In addition, participants filled in **the general questionnaire** composing of such demographic questions as gender and age as well as language related questions such as first language, English proficiency level, age of English onset, length of exposure to English, the duration of stay in an English-speaking country, the knowledge and level of other foreign languages.

Experimental settings

As mentioned before, the study was composed of two stages. In the first stage, participants' working memory capacity and knowledge of conditionals were checked. In the second stage, participants took part in the eye tracking experiment coupled with self-report questionnaires. The first stage of the study was organised at the conference room with a capacity of up to 15 people at the Faculty of Applied Linguistics, University of Warsaw. The second stage of the study took place at the Laboratory for Experimental Eye Tracking Linguistics in the Institute of Specialized and Intercultural Communication at the Faculty of Applied Linguistics of the University of Warsaw. The laboratory is a separate dedicated room for eye-tracking experiments. During each experimental session, the experimenter and a participant occupied the room and the entrance for other people was not allowed. The distance between a participant's eyes and the monitor was around 60 cm, which is considered an optimal distance. Because of the high tolerance of the eye tracker to head movements, the head mounter was not used. This ensured that participants read in a natural and comfortable setting.

Apparatus

The SMI RED 500 remote eye tracker was used that is mounted under the monitor. The sampling frequency of 250 Hz was chosen because it has been proven to be accurate enough (e.g., Płużyczka, 2015, 2020). As each sentence was displayed individually on the screen, the chosen sampling frequency was sufficient. The display monitor is a 22-inch LCD screen.

Procedure

The procedure for the fourth study resembled the procedure of the third study. Each of the participants was given a participant number that was used for anonymisation purposes. These participant numbers were used throughout the study. Around a week prior before the main

experiment, potential participants were invited to the Faculty of Applied Linguistics at the University of Warsaw to take an English grammar test and the test on working memory capacity. Participants could choose a suitable date from the shared booking page of Calendly. They were given different options to choose from. Each testing session included from 2 up to 10 participants. As a venue for testing, a conference room was chosen with a capacity of 15 people. Before starting the test, they were asked to read and sign the consent on the personal data processing and the written informed consent if they agreed with what was written in the consent. The testing session started only after receiving the participants' consent. The whole testing session lasted around 30 minutes. Those who passed tests were invited to the UW LELO eye-tracking laboratory. The eye-tracking data was collected by meeting subjects individually in the eye-tracking laboratory. Participants were randomly assigned to one of the two conditions: (i) reading literary counterfactuals with L1 similar morphosyntax ($n = 30$) and (ii) reading literary counterfactuals with L1 dissimilar morphosyntax ($n=30$). Subjects sat comfortably on the chair while looking at the screen of the computer, and there were no constraints on head and movement. However, participants were asked to keep their position, not to move their heads, and not to take their eyes off the screen while reading. They were also instructed that they can bouldnk in a usual manner. Before starting the main experiment, participants performed a practice block containing 5 sentences unrelated to either critical or filler items and corresponding questions to familiarise a subject with the task and to check whether participants understood the procedure. The 5-point calibration was conducted before starting the experiment. To prevent the strain on the eyes, there was a short break after they finished reading the first set of 30 sentences. After a break, 5-point calibration was performed again before they started reading the second set of 30 sentences. Participants were instructed to read the sentences that they saw on the screen and answer questions afterwards. As the knowledge of conditionals were already checked before the experiment, post stimuli questions were used as a post stimuli task to give subjects a clear purpose for reading. 18 questions for target constructions were general questions and 22 questions were more specific. General questions addressed what the sentence is about, and specific questions addressed whether a particular action took place. Participants read a total of 60 sentences (40 critical items and 20 fillers) on the computer screen. After each sentence, a question appeared to which participants answered Yes or No using a computer mouse. While they were reading, their eye movements were recorded. Eye movements were recorded using SMI RED 500 eye tracker at 250 Hz. The sentences were presented in black over white background in Arial font, size 24. After completion of the eye tracking experiment, participants performed a grammaticality judgement

task and filled in the general questionnaire. The whole experiment with questionnaires took around 30 minutes per participant. Upon completion, each participant received an email from the doctoral candidate with the appreciation of his/her participation in the experiment and an Empik electronic gift card for PLN 100. Participants were asked to check that they indeed received the email before leaving the laboratory.

Data analysis

The experimental data was analysed using the IBM SPSS Statistics software version 29. The data of eye tracking experiment was analysed by items and by subjects. First, the average of all participants' responses (fixation time, fixation count and dwell time) for each item of 40 items was calculated using the following formula in excel file: =AVERAGEIF(). To check the accuracy of data processing, Python was used. Two data points were trimmed from all eye tracking parameters because of the technical problem of registering eye tracking parameters for these two data points, i.e., one data point from the experimental group and one data point from the control group. These 6 data points were treated as missing data and excluded from analyses. The loss of datapoints accounts for 0.08% of full dataset that contains 7200 datapoints. As it is very low percentage of data loss, it does not impact the results. Although, because of missing data, the mean by items and by subjects is not the same. Before conducting test, the assumptions of normality and homogeneity of variance were explored. Analysis by-item passed the Shapiro-Wilk test of normality and Levene test of homogeneity of variance, and therefore parametric tests were performed. Multivariate Analysis of Covariance (MANCOVA) was conducted to reveal the overall effect of group (literary counterfactual with L1 similar morphosyntax versus literary counterfactual with L1 dissimilar morphosyntax) on eye tracking parameters while controlling for the length as a confounding variable.

Analysis by-subject passed the Levene test of homogeneity of variance, but not the Shapiro-Wilk test of normality, and therefore the transformation of data was used to perform a parametric test, which is more powerful than a non-parametric test. The natural log (Lg10) function was used to transform data. The assumptions of normality were checked again with the transformed data, and it passed both the Shapiro-Wilk and Levene tests. And therefore, parametric tests were conducted with Lg10 transformed data. Pearson correlation analyses by items and by subjects were performed between each pair of-eye tracking parameters to check the relationship between these variables. Before conducting Pearson correlations, its assumptions such as linearity and homoscedasticity were explored. Only after checking these

assumptions are met, the Pearson correlation was carried out. In addition, Cronbach's alpha was reported to show the reliability between eye tracking parameters.

The data of the grammaticality judgement task was also first explored to check whether it meets assumptions before conducting statistical tests. As it met assumptions, the parametric independent samples t-test was performed by item and by subjects. Furthermore, the Pearson correlation between the perceived grammaticality judgement task and three eye-tracking parameters was carried out to see the relationship between them. Afterwards, the regression analysis with the grammaticality judgement task as the independent variable and eye tracking parameter as the dependent variable was performed to see a possible effect of grammaticality judgement on the eye tracking parameters.

6.2.4 Study 4: Results

Eye tracking data. Analysis by items

The table below shows the descriptive statistics of the eye tracking parameters such as fixation count, fixation time, and dwell time by items and includes information about mean and standard deviation. The number of critical items was 40. The experimental group read literary counterfactuals resembling L1 morphosyntax, and the control group read literary counterfactuals with usual L2 morphosyntax that does not resemble L1.

Parameter	Group	Mean	Standard deviation
Fixation count	Literary counterfactual with L1 morphosyntax	38.11	8.24
	Literary counterfactual with L2 morphosyntax	33.92	7.70
Fixation time	Literary counterfactual with L1 morphosyntax	9620.95	2246.74
	Literary counterfactual with L2 morphosyntax	8473.75	2140.94
Dwell time	Literary counterfactual with L1 morphosyntax	11072.94	2566.50
	Literary counterfactual with L2 morphosyntax	9874.06	2438.51

Table 6.2.4.1 The descriptive statistics of the eye tracking parameters by items (n=40)

As shown in Table 6.2.4.1, values of all parameters are higher for the experimental group rather than the control group against the expectation. The MANCOVA yielded significant results for Pillai's Trace for both sentence length (Pillai's Trace = .579, $F[3.000, 75.000] = 34.391$, $p < .001$ and group assignment (Pillai's Trace = .371, $F[3.000, 75.000] = 14.754$, $p < .001$) indicating that these variables have a significant effect on the overall eye-tracking parameters. However, in the test of between-subjects effects, it shows that group (resembling L1 morphosyntax vs not resembling L1 morphosyntax) does not affect the eye tracking parameters (fixation time $p=.072$, fixation count $p=.065$, dwell time = .123). The results indicate that group assignment (whether the group resembles L1 morphosyntax or not) does not have a significant effect on eye-tracking parameters after controlling for the effect of sentence length. Overall, the MANCOVA results suggest that while both sentence length and group assignment have a significant impact on eye-tracking parameters individually, group assignment does not have a significant effect on eye-tracking behaviour when considering the influence of sentence length.

Eye tracking data. Analysis by subjects

The table below shows the descriptive statistics of eye tracking parameters such as fixation count, fixation time, and dwell time by subjects and includes information about mean and standard deviation. The number of subjects per group was 30. The experimental group read literary counterfactuals resembling L1 morphosyntax, and the control group read literary counterfactuals with usual L2 morphosyntax that does not resemble L1.

Parameter	Group	Mean	Standard deviation
Fixation count	Literary counterfactual with L1 morphosyntax	38.12	13.07
	Literary counterfactual with L2 morphosyntax	33.93	9.96
Fixation time	Literary counterfactual with L1 morphosyntax	9623.33	3424.06
	Literary counterfactual with L2 morphosyntax	8476.79	3319.67
Dwell time	Literary counterfactual with L1 morphosyntax	11075.83	3859.62

Literary counterfactual with L2 morphosyntax	9877.57	3514.89

Table 6.2.4.2 The descriptive statistics of the eye tracking parameters by subjects (n=30)

As shown in Table 6.2.4.2, values of all parameters are higher for the experimental group rather than the control group against the expectation. A multivariate analysis of variance (MANOVA) was conducted to investigate the effects of L1 morphosyntax resemblance on a set of three dependent variables: fixation count, fixation time and dwell time. The multivariate tests revealed a non-significant overall effect of the group on the combined set of dependent variables, Pillai's Trace = .064, $F(3.000, 56.000) = 1.284$, $p = .289$. This indicates non-significant differences among the 2 groups across the set of dependent variables. Tests of between-subjects effects also demonstrated non-significant main effects of group on each of the dependent variables (Lg10 transformed): fixation count ($F(1, 58) = 1.774$, $p = .188$), fixation time ($F(1, 58) = 2.134$, $p = .149$), and dwell time ($F(1, 58) = 1.684$, $p = .199$). Thus, both analyses by items and by subjects confirm that there is no effect of group (resembling L1 morphosyntax or usual L2 morphosyntax) on the eye tracking parameters.

Grammaticality judgement task. Analysis by items

First, the responses of participants were contrasted between two groups. The table below (Table 6.2.4.3) shows the descriptive statistics of grammaticality judgement task between experimental and control groups. It should be noted that whereas the experimental group evaluated the grammatically incorrect (literary counterfactuals with L1 morphosyntax) version, the control group evaluated the grammatically correct version (literary counterfactuals with L2 morphosyntax). Therefore, a score was given when a subject from the experimental group chose the option 'ungrammatical', and a subject from the control group chose the option 'grammatical'.

Group	Mean	Standard deviation
Literary counterfactuals with L1 morphosyntax	13.75	1.61
Literary counterfactuals with L2 morphosyntax	29.48	.78

Table 6.2.4.3 The descriptive statistics of the grammaticality judgement task between groups by items (n=40)

As can be observed, the items (n=40) were grammatically judged correctly by the experimental group (M=13.75, SD=1.613) less rather than by the control group (M=29.48, SD=.784). The maximum number is 30 because there are 30 subjects per group. In other words, 13.74 subjects from the experimental group and 29.48 subjects from the control group judged the grammaticality of items (n=40) correctly. As it passed assumptions of normality, the independent samples t-test was conducted which showed a significant difference between groups $t(56.451)=-55.447$ (equal variances not assumed), $p<.001$ two-sided, 95%CI[-16.290, -15.160], with Cohen's $d=-12.398$, 95%CI[-14.385,-10.404]. Hence, there is a significant difference between groups with a huge effect size ($d=12.398$).

Furthermore, as there was binary option, it was checked that the responses of the experimental group are not by chance because almost half of all subjects chose one option over another. For the one-sample t-test, a new variable was generated that is the result of incorrect response minus correct response (M=2.50, SD=3.226). The result of the one-sample t-test is significant $t(39)=3.920$, $p<.001$ (two-sided) 95%CI[.97,3.03] with a moderate effect size Cohen's $d=.620$ 95%CI[.278,.955], which shows that it is statistically different from a 50% chance (0.5). Hence, the responses were obtained not because participants guessed and chose one option just by chance. They chose one option over another after giving it a thought. Moreover, the responses of the experimental group were explored further to contrast how many subjects responded correctly (detected 'ungrammatical') and how many subjects responded incorrectly (did not detect 'ungrammatical') across all 40 items. The table below shows the descriptive statistics of responses of the experimental group.

The responses of the experimental group	Mean	Standard deviation
Correct	13.75	1.61
Incorrect	16.25	1.61

Table 6.2.4.4 The descriptive statistics of the grammaticality judgement of the experimental group by items (n=40)

Based on the table, it seems that more subjects did not detect 'ungrammatical' (M=16.25, SD=1.613) rather than detected (M=13.75, SD=1.613). The difference is statistically significant as the result of the paired samples t-test suggests $t(39)=-4.900$, $p<.001$ two-sided, 95%CI [-3.532,-1.468] with a moderate effect size Cohen's $d=-.775$ 95%CI[-1.125,-.417].

Grammaticality judgement task. Analysis by subjects

The table below shows the descriptive statistics of the analysis by subjects between two groups, including mean and standard deviation (SD) as well as median (because of nonparametric test).

Group	Mean	Median	SD
Literary counterfactual with L1 morphosyntax	18.33	11.50	17.05
Literary counterfactual with L2 morphosyntax	39.30	40.00	2.26

Table 6.2.4.5 The descriptive statistics of both groups by subjects (n=30)

Based on the table (Table 6.2.4.5), 18.33 items from 40 were evaluated correctly across participants (n=30) who read sentences resembling L1 morphosyntax. In contrast, 39.30 items out of 40 items were evaluated correctly across participants (n=30) who read sentences with usual L2 morphosyntax. As the assumptions were violated in by subjects analysis and transformation did not help to correct the violations, a nonparametric test was conducted. The result of Mann-Whitney U suggests that there is a statistically significant difference between experimental group (Median=11.50) and control group (Median=40.00) $U=761.500$, $p<.001$.

Furthermore, the responses of the experimental group were explored further to contrast how many items were correctly evaluated (as ‘ungrammatical’) and how many items were evaluated incorrectly (as ‘ungrammatical’) across all 40 items. The table below shows the descriptive statistics of responses of the experimental group across subjects, including mean, median and standard deviation.

The responses of the experimental group	Mean	Median	Standard deviation
Correct	18.33	11.50	17.05
Incorrect	21.67	28.50	17.05

Table 6.2.4.6 The descriptive statistics of the grammaticality judgement of the experimental group by subjects (n=30)

Based on the table (Table 6.2.4.6), it seems that more items were not detected for ‘ungrammaticality’ (M=21.67, SD=17.05) rather than were detected (M=18.33, SD=17.05).

Because of violations of assumptions, the nonparametric test was conducted to compare the median of correct responses (11.50) with incorrect responses (28.50). The result of the related-samples Wilcoxon Signed Rank test suggests retaining the null hypothesis as there is no statistical significance $W=246.500$, $p=.771$.

There is a difference between experimental and control group both in by items and by subjects analyses in grammaticality judgement scores. Those who read literary counterfactuals resembling L1 morphosyntax scored less in grammaticality judgement task rather than the participants who read literary counterfactuals with usual L2 morphosyntax. This might suggest that L1 morphosyntactic representation negatively affects grammaticality judgement. However, when the responses of the experimental group analysed to identify whether participants evaluated the version resembling L1 morphosyntax as more ‘ungrammatical’ (correct) rather than ‘grammatical’ (incorrect), the statistical significance diverges in the analyses by items and by subjects. Whereas, in the analysis by items, it shows that items are mostly judged as ‘grammatical’ (incorrect) that is statistically significant, in the analysis by subjects, it shows that subjects mostly judge as ‘grammatical’ (incorrect) but it is not statistically significant. In other words, the results of the grammaticality judgement of the experimental group reveal a significant difference in participants’ grammaticality judgments at the item level, as evidenced by a moderate effect size (Cohen's $d = -0.775$) in the paired t-test analysis. However, this difference was not consistently reflected in the by subjects analysis, suggesting that while certain items may elicit distinct responses, individual variability among participants may mitigate the overall significance.

Thus, the negative effect of L1 morphosyntax on L2 reading that is decreasing grammaticality judgement of the experimental group compared to the control group is statistically significant. This negative effect is further found in contrasting correct and incorrect responses of the experimental group in the item level but not in the subject level. Thus, L1 negative effect is partially true. The effect is shown in the decreasing grammaticality judgement of participants. However, evaluating sentences that resemble L1 morphosyntax as ‘grammatical’ (L1 negative effect) is not statistically significant overall when we account for individual variability among participants. Hence, the decrease in grammaticality judgement was not strong enough to be reflected in the responses of the experimental group consistently.

6.2.5 Study 4: Discussion

Based on the language transfer theory, it was hypothesised that L1 morphosyntactic representation might affect L2 online processing. However, as the results of the study suggest, there is no positive L1 transfer effect. It has been shown that resemblance to L1 morphosyntax does not facilitate L2 processing. The fourth study seems to be in line with previous studies that did not find the L1 transfer effect (e.g., McDonald, 2000; Montrul, 2004). It might also be explained in terms of the reduced ability to generate an expectation hypothesis. According to the hypothesis, people are limited in the prediction while L2 online processing. The use of a counterfactuality marker (resembling L1 morphosyntax) in the antecedent clause might not facilitate the processing of the consequent clause because L2 readers have a reduced ability to predict the upcoming input. This implies that participants had L1 morphosyntax representation while L2 processing, but its positive effect is not observed because of the reduced ability to generate expectations in L2. Although, it might be also possible that they have acquired English counterfactuality marker so well that they predicted the consequent with the insert of X-marking. This would imply that L1 morphosyntax does not affect L2 processing and L2 readers can predict. There is also the third possible interpretation, according to which there is no L1 morphosyntactic representation while L2 processing regardless of L2 readers' ability to predict. This explanation is valid because to see the facilitation effect of L1, it is not necessary to account for prediction. The morphosyntax resembling L1 should decrease the cognitive costs of L1 inhibition if there is L1 influence. As it was not the case in the results, it suggests that there is no L1 influence during L2 processing of literary counterfactuals. Based on these considerations, one can infer that the acceptance of the null hypothesis (H_0) is inevitable that states L1 morphosyntactic representation does not affect L2 reading of literary counterfactual conditionals.

The results of the grammaticality judgement task showed that the exposure to interlanguage morphosyntax (L2 resembling L1) decreases the grammaticality judgement of participants. This negative effect can be observed in evaluating literary counterfactuals that convey L1 morphosyntax as grammatical. However, this evaluation is not consistent across participants, some participants find them as grammatical, whereas others think that they are ungrammatical. Hence, the negative language transfer effect is not strong enough to be universal across participants. This partial negative effect suggests that the alternative hypothesis (H_A) is only partially true, and L1 morphosyntactic representation affects L2 reading of literary counterfactuals at a reduced amount. The negative effect observed in the

decrease of grammaticality judgement and finding literary counterfactuals resembling L1 morphosyntax as grammatical might be related to the exposure to American English literature, in which such morphosyntax can be used as grammatical constructions. It would make sense why the variation in the individual responses of participants was observed. This prevents one from accepting the alternative hypothesis as true without accounting for individual differences such as exposure to American English literature. The fourth study illustrated that second-language readers switch to second-language morphosyntax without the need for activation of the first-language morphosyntactic representation. In addition, second-language readers might judge the interlanguage morphosyntax as grammatical based on the context, but this judgement might vary across participants.

6.3 Summary

The sixth chapter was devoted to the empirical investigations into the L2 reading of literary counterfactuals. Two studies were conducted to explore how L2 readers process, perceive, comprehend, and evaluate literary counterfactuals. Each study was described in detail including rationale, scientific aim, questions, hypotheses, method, and results. The method section included experimental design, participants, materials, measures, experimental setting, apparatus, and procedure. After a detailed description of the study and thorough analyses, each study was discussed in relation to theoretical accounts and hypotheses. In subsequent paragraphs, I will summarise each study separately.

In the third study, I explored the cognitive costs of literary counterfactuals processing by L2 readers. The main hypothesis of the third study (H_1) was that L2 reading of literary counterfactual conditionals is associated with additional cognitive costs compared to L2 reading of literary non-counterfactual conditionals. Based on the results of an eye-tracking experiment, this was confirmed as participants who read literary counterfactuals showed increased cognitive processing reflected in the eye-tracking parameters such as fixation count, fixation time and dwell time. Despite the increased cognitive costs during online processing, L2 readers did not find the literary counterfactuals more difficult than literary non-counterfactuals. However, the perceived difficulty of individual items was correlated with eye-tracking parameters regardless of whether participants read literary counterfactual or literary non-counterfactual. Moreover, L2 readers showed a high level of comprehension and could successfully deduce the textual actual world state (factual inference) from literary counterfactuals. Full comprehension of literary counterfactuals explained why participants did not perceive them as difficult. A positive correlation was found between the ability to make

modus tollens inference and fixation counts (responsible for morphological complexity based on Holmquist, 2011) that was interpreted as the association of X-marking (an extra layer of morphology) with the generation of the modus tollens. The comparison of modus tollens inference generation between literary counterfactuals and literary non-counterfactuals showed that participants indeed generated more modus tollens for literary counterfactuals with X-marking rather than for literary non-counterfactuals without X-marking. It was explained as a necessary step in full comprehension of counterfactuals. Thus, the first study revealed that L2 reading of literary counterfactuals is associated with additional cognitive costs in comparison to L2 reading of literary non-counterfactuals. These cognitive costs were interpreted as costs for processing deviation that is conveyed by literary counterfactuals, namely X-marking (an extra layer of morphology) that gives access to far-reached possible worlds (alternative textual states). The results were discussed in relation to the neurocognitive model of literary reading (Jacobs, 2011), inference hypotheses and second language processing hypotheses. The results supported the neurocognitive model of literary reading proposed by Jacobs (2011) because deviation indeed led to a slow reading (increased dwell time/gaze duration). Furthermore, the results also supported inference hypotheses, according to which modus tollens (not *p* not *q*) is generated from counterfactual conditionals and not from indicative conditionals. However, the results did not support second language processing hypotheses such as shallow structure hypothesis and interface hypothesis because L2 readers could successfully process complex structure deducing morpho-syntactic cues and integrating the domains of morphosyntax and semantics.

The fourth study addressed language transfer theory. Based on the theory, it was hypothesised (H_A) that L1 morphosyntactic representation affects L2 reading of literary counterfactual conditionals. However, as the results of the previous empirical finding were not equivocal in whether it holds true, the null hypothesis (H_0) was formulated that L1 morphosyntactic representation does not affect L2 reading of literary counterfactual conditionals. The results of eye tracking experiment showed that there is no positive L1 language effect while L2 processing. Participants did not represent interlanguage grammar (resembling L1 morphosyntax) while processing the structure of literary counterfactuals that could facilitate processing. Therefore, the null hypothesis was accepted regarding the L1 positive effect, namely, L1 morphosyntactic representation does not positively affect the L2 reading of literary counterfactuals. Hence, while L2 processing, people can switch to the L2 grammar without the need to represent L1 grammar or interlanguage grammar in mind. However, a negative L1 language transfer effect was found in the grammaticality judgement

task. L2 readers who were exposed to the structure resembling L1 morphosyntax, judged them as grammatically correct even if based on British English it was not grammatical. The difference in the proportion of correct and incorrect responses showed that in the analysis across items there was negative L1 influence as the structure resembling L1 morphosyntax was judged as grammatically correct. However, the same was not statistically significant in the analysis across subjects. Therefore, the results were interpreted with caution because they could have been mitigated by the exposure to American literature of individual participants and American literature would be used in the antecedent as well as in the consequent. Thus, the alternative hypothesis was partially accepted regarding L1 negative effect. That is L1 might negatively affect L2 reading of literary counterfactuals but vary among individuals.

7 Conclusions and future directions

I am concluding the doctoral dissertation by organising the chapter into three main sections, each addressing the objectives set out at the beginning of writing the dissertation. Those objectives were three-fold: (i) to understand the cognitive engagement with counterfactuals in literature; (ii) to acknowledge the potential of counterfactuals as a literary device; (iii) to explore counterfactuals processing by L2 readers. The first section on literary counterfactuals concludes the work on the investigation of counterfactuals as a literary device. The second section on the cognitive engagement with literary counterfactuals concludes the work on how literary counterfactuals are processed. The third section on L2 processing of counterfactuals concludes the work on the second language processing. The conclusions are reasoned in terms of the results of theoretical considerations and empirical studies. The contributions of the work in the respective fields are also explained in each section. Afterwards, I discuss the limitations and further directions of the present work before summarising the chapter.

7.1 Counterfactuals in literature: embedded counterfactuals and counterfactual historical fiction

By literary counterfactuals, I referred to counterfactuals that are used in literature as a literary device. The concept includes both embedded counterfactuals inside the textual universe and the textual universe as counterfactual, aka counterfactual historical fiction. It has been noted that counterfactuals should not be equated to hypotheticals as the two are different. Besides being hypothetical in nature, counterfactuals convey dual meanings (suppositional meaning and factual meaning). This is achieved due to referential deviation. While uttering a counterfactual conditional, one refers to what *might have been* instead of usual *what it is*, and therefore widens the scope of set of possible worlds near to the referential world accessing far reaching possible worlds. Whereas the points of divergence have been explained as semantic deviations, embedded counterfactuals combine both semantic and grammatical deviation: the referential deviation is marked by the morphological deviation, X-marking (an extra layer of morphology). The use of embedded counterfactuals was illustrated in the example of *The Snows of Kilimanjaro* (1936) by Ernest Hemingway. Both characters, Harry and Helen, used linguistic markers to reach remote alternative textual worlds where their hopes and wishes were featured. It seems that the processing of such linguistic deviation is cognitively costly, as the results of the third study suggest. Based on the results, literary counterfactuals were processed longer rather than their non-counterfactual counterparts, irrespective of the length. Although,

participants did not perceive literary counterfactuals as difficult. In addition, participants could fully comprehend them by deducing factual inference. Moreover, the processing of X-marking was associated with the generation of modus tollens inference that can be illustrative of factual inference deduction, i.e., their full comprehension, during online processing. It can be assumed that recognising X-marking and accessing remote worlds require processing costs, but it has been successfully accomplished by participants without perceived difficulty.

Furthermore, counterfactuals perform aesthetic functions in literature, making the literary text semantically complex and emotional. Literary counterfactuals map the textual actual world state to its alternative textual state, as the result of the first study suggests. The use of counterfactuals as a literary device adds emotional depth to the literary text, as has been illustrated in the analysis of the short story *The Snows of Kilimanjaro* (1936) by Ernest Hemingway. This was also confirmed in the first study as participants found literary counterfactuals to be more emotional than their literary non-counterfactual counterparts. The results of the study are in line with the current research on foregrounding, according to which deviations as foregrounding are associated with slow reading and emotional engagement. The first point of divergence is also associated with the emotional response, such as surprise, in the case of counterfactual historical fiction.

This is the first work (to the best of my knowledge) that recognised the problem of treating counterfactuals as hypotheticals in the literary field and identified literary counterfactuals consisting of deviations. This is also the first work that empirically investigated counterfactuals as a literary device. Both theoretical considerations and empirical investigations into literary counterfactuals are important in acknowledging counterfactuals as a literary device with linguistic specificities including formal and/or semantic deviations that are processed longer with more cognitive resources. This suggests that counterfactuals can indeed be treated as a foregrounding element in a literary text. In a broader scope, the results of the dissertation support the neurocognitive model of Jacobs (2011), according to which foregrounding is processed slowly and appreciated aesthetically.

7.2 The cognitive engagement with literary counterfactuals

In the scope of the dissertation, Ryan's model of possible worlds was revised to explain the cognitive processing of fiction. The revision was necessary to accommodate the model to conceptualising literary counterfactuals processing. The revised model includes subjective

representations of the actual world (RK-world and AK-world) and of the textual actual world (CK-world). Whereas the former is regarded as Reader's knowledge world (by Raghunath, 2017) and Author's knowledge world (by the author, 2024), the latter is defined as Character's knowledge worlds (by Ryan, 1991). The inclusion of the subjective models of the actual world helped to clarify the ontological status of fiction as a possible world and explain the role of the referential textual universe as a mental construct where events take place as imagined by the author that is influenced to some extent by his/her AK-world. Also, it helped to clarify fictional recentring process while reading. According to the revised model, a reader recentres himself/herself to the textual actual world mentally by recentring RK-world from the actual world to the textual actual world. For the moment of reading, the textual actual world is a central world that encompasses character's/narrator's worlds. Furthermore, Ryan's principle of minimal departure was explained from cognitive perspective, according to which the reception of the textual universe is influenced by schemas of the RK-world. It is suggested that readers activate schemas generated as a result of experiencing the actual world during reading and make alterations as described in the text to construct the textual actual world. However, whenever there is a gap in the text such as a lack of details, it is filled in with the relevant schemas from the RK-world. The 'actuality' of the textual world is explained as the combination of the evocation of schemas from real-world experiences and conscious make-believe. A reader can also create textual possible worlds (RP-worlds) co-creating the textual universe as was illustrated in the example of *The Snows of Kilimanjaro*. The revised model was further applied to depict the cognitive engagement with literary counterfactuals. To accommodate the revised model to embedded counterfactuals, Eco's textual states were incorporated with the addition of the alternative textual states.

In the proposed model of the cognitive engagement with embedded counterfactuals based on a revised model of possible worlds, it was shown that readers imagine both the textual actual world state and textual alternative state, giving prominence to the latter as they shift attention to the alternative world state by recentring RK-world. Two possible worlds are compared to each other to evaluate whether the textual actual world is better or worse. This, in turn, leads to emotional response towards embedded counterfactuals. The results of the first study confirmed that readers indeed imagine both the textual actual world state and alternative textual state focusing more on the latter. Furthermore, it was also confirmed that embedded counterfactuals are more emotional compared to literary non-counterfactuals, as the result of the first study suggests.

Regarding counterfactual historical fiction, it has been shown that readers contrast between

the actual world and textual actual world with the introduction of the first point of divergence. After that, it is likely that readers recentre to the textual actual world playing make-believe and suspending the contradictory historical knowledge. Taking the RK-world model as a template and creating a new world for the text, altering some elements based on the text stimulates comparison between two worlds and re-evaluation of the RK-world based on the textual actual world. As the results of the second study suggest, readers' agreement with fascism decreased, and their satisfaction with the present state of politics increased. This re-evaluation and exposure to literary text might help to increase critical thinking by reducing superstitious beliefs. The use of schemas from the RK-world might affect the perception of both counterfactual historical fiction and historical fiction as real rather than unreal. Furthermore, the former is perceived with less perceived realism in factuality as it contradicts historiography and both texts were perceived with no disenable difference in perceived plausibility as they depict possible scenarios from the RK-world.

The results have also been interpreted from the cognitive scientific perspective. The results support the mental model theory, according to which people imagine dual meaning (suppositional meaning and factual meaning) to comprehend counterfactuals. Furthermore, participants generated more modus tollens (not p not q) while comprehending literary counterfactuals rather than literary non-counterfactuals. It supports the inference theory according to which people generate the factual inference from the counterfactual conditionals. Overall, results indicate that people keep in mind two inferences for counterfactual conditionals and only one for indicative conditionals, as has been shown in previous studies. Thus, the results of the study fit within the cognitive accounts of counterfactuals comprehension.

This is the first work (to the best of my knowledge) that highlights the combination of the subjective representations of the actual world, such as the reader's, author's and character's/narrator's in the interpretation of the fiction reading process. This is also the first work that proposes a model of cognitive engagement with literary counterfactuals including both embedded counterfactuals and counterfactual historical fiction based on the possible world framework. Moreover, the doctoral dissertation provides empirical evidence of how readers cognitively process literary counterfactuals that have not been previously investigated. Both theoretical considerations and empirical findings contribute to the literary field in better understanding of how literary counterfactuals are cognitively processed. In addition, the revised model of Ryan's possible worlds applied to fiction reading helps to clarify the ontological status of fiction, thus contributing to the possible world framework in literary theory. The explanation of Ryan's fictional recentring and minimal departure from the

cognitive perspective makes the fiction reading process more comprehensive, enhancing its future prospect of broad application in the field of literary theory.

7.3 L2 processing of literary counterfactuals

As the results of the third study suggest, L2 readers can fully comprehend counterfactuals by deducing factual inference. This implies that people do not rely solely on lexical-semantic domain while processing sentences in L2 as originally proposed by shallow structure hypothesis but rather apt for processing morpho-syntactic information as well. Furthermore, participants could process the structure at the interface of such domains as syntax-semantics-pragmatics. It suggests that L2 speakers can successfully process the structures at the interplay of different interfaces in contrast to the interface hypothesis. Moreover, L2 processing is not constrained by L1 morpho-syntactic representation. As the results of the fourth study showed, there is no L1 positive effect in L2 online processing. However, the L1 negative effect was revealed in the grammaticality judgement task as the result of exposure to interlanguage grammar.

From the cognitive perspective, it has been revealed that L2 speakers make the same inferences shown in previous studies with L1 speakers. Namely, they deduce two inferences for counterfactual conditionals and only one for indicative conditionals. The visual world paradigm showed that whereas L2 speakers think of both factual meaning and suppositional meaning for counterfactual conditionals, they think of only suppositional meaning for indicative conditionals. Thus, L2 speakers showed the same pattern as was previously shown with L1 speakers. People can deduce factual inference in L2 the same way as in L1 shown in previous studies. It has been found that L2 speakers generate modus tollens (not p not q) the same way as L1 speakers did in previous research. Overall, the results of studies show that processing in L2 is not qualitatively different from processing in L1, as shown in previous studies confirmed both by online and later processing.

This is the first study (to the best of my knowledge) that investigates the L2 processing of literary counterfactuals. The doctoral dissertation contributes to the extension of second language psycholinguistic research to sentences with complex morphosyntax, semantics and pragmatics. The implications of the dissertation might apply to the second language classroom to better explain counterfactual conditionals that possess complex linguistic features. By incorporating the linguistic peculiarities of counterfactuals, such as X-marking and dual meaning, with the model of their cognitive processing, teachers of the second language

classroom can provide a thorough understanding of the construction.

7.4 Limitations and further directions

In the first study, the result of focusing more on the alternative textual world state was interpreted as tentative support for Ryan's proposal that readers recentre from the textual actual world state to the alternative textual world state; however, it might relate to the prolonged processing of literary counterfactuals and deducing the factual inference at the later stage. Further research implementing online incremental processing is needed to validate that readers indeed focus more on the alternative textual world state because of recentring and not because of prolonged processing. In the second study, the effects of fiction about Nazi on readers are tentative as it should be further validated with the control group reading an expository text. The studies conducted with L2 speakers would benefit from the comparative analysis between L1 and L2 speakers to reveal differences. I assume the differences would be rather quantitative than qualitative, but it would still be interesting to discover any quantitative limitations of L2 processing, such as processing speed. In the discussion of the results of the fourth study, L1 negative effect was interpreted with caution because it might be due to American literature exposure of individual participants. In future studies, it is advisable to control for this confounding variable.

A possible future direction is to extend the study of counterfactuals from conditionals to other structures, such as wish sentences and obligations where X-marking (extra layer of morphology) is used. In a similar vein, counterfactuality might be conveyed through other forms, such as negation and contextual clues. It would be advantageous to establish any link between all these constructions and their contribution to the counterfactual meaning.

Furthermore, the proposed model may be extended to counter-fictions such as *Sliding Doors*, in which two versions of the story are represented as true but contradict each other (p and not p), i.e., the violation of the logical principle of non-contradiction. It might help to explain such postmodern fiction that does not want to accept one objective reality (textual actual world) existing in the textual universe. It seems that counter-fiction is common, but there is a lack of theoretical framework to deal with this type of literary text. Literary scholars may benefit from the model based on the possible world framework.

Another possible future direction is to conduct qualitative research. It would be fruitful to explore how people evaluate the textual actual world state and its alternative state using interviews or think-aloud protocols to see whether there are any patterns and individual

differences in responses.

It would also be interesting to contrast upward counterfactuals, how things could have been better with downward counterfactuals, how things could have been worse, and to see whether there is a difference in their cognitive processing. The positive and negative valence may be entertained differently because the associated emotions, such as relief and regret, might have a different effect on readers. Downward counterfactuals that convey the emotion of relief might not be as strong as upward counterfactuals that convey the emotion of regret.

Thus, the present work can follow the path of different directions, including linguistics, literature and, psychology or the combination of all three. The dissertation is multidisciplinary, and I suppose the further directions might be multidisciplinary as well.

7.5 Summary

To summarise the conclusions of the doctoral dissertation, I would like to highlight the key findings, contributions, and some further directions.

The first objective of the doctoral dissertation revealed the cognitive processing of literary counterfactuals. To accommodate Ryan's model of possible worlds, her model was revised, and a new model was proposed on the cognitive engagement with literary counterfactuals. The revised model highlights the subjective representations of the objective reality, be it our reality or textual one, especially the role of the reader's representation of the actual world on fictional recentring and realisation of Ryan's principle of minimal departure as well as shows how the reader participates in the co-creation of the textual universe by creating reader's possible world. It clarifies the ontological status of fiction as a mental construct that is conceived through the recentring RK-world (reader's knowledge world that is a reflection of the objective reality composed of schemas generated as a result of interaction with the external world) to the textual actual world. In the scope of the dissertation, I proposed to include AK-world (author's knowledge world) and RP-world (reader's possible world) into the vocabulary of the possible world theory as well as to extend the definition of the RK-world (reader's knowledge world) to the representation of the real world by the reader. I explained important concepts in the possible world framework, such as fictional recentring and the principle of minimal departure using cognitive schemas. In addition, I defined the ontological status of the textual actual world providing arguments for the need to have a clear stance. These steps were necessary to fill the gaps in the application of possible world theory in the literary domain. As a result, an improved model clearly defines the role of the referential universe (that was achieved by incorporating

AK-world), recognises the role of the reader in co-creating the textual universe (that was achieved by adding RP-worlds), explains the perceived realism of the textual actual world (achieved by extending the definition of the RK-world and cognitive explanations of fictional recentring), provides comprehensive understanding of reading processes such as fictional recentring and principle of minimal departure (achieved through application of cognitive schemas), avoids being extravagant (achieved by taking moderate realism approach).

An improved model applied to embedded counterfactuals maps the textual actual world state to its textual alternative state and highlights such cognitive processes as imagination, comparison, evaluation, and emotion while reading embedded counterfactuals. The empirical findings support the new model by showing that readers indeed imagine both the textual actual world state and textual alternative state, focusing more on the latter and finding them emotionally engaging. The proposed model applied to counterfactual historical fiction showed that readers contrast the textual actual world with the actual world with the first point of divergence while reading the text and then recentre to the textual actual world, suspending the contradictory knowledge. Moreover, the study on counterfactual historical fiction shows the tendency to re-evaluate RK-world after exposure to the literary text, which in turn might improve the cognitive processes. It has been acknowledged that it is the first work that considered the cognitive processing of literary counterfactuals at both micro and macro levels based on the possible worlds and provided empirical evidence.

To fulfil the second objective, I investigated the linguistic makeup of counterfactuals and singled out X-marking (an extra layer of morphology) and dual meaning as deviations that can be used for literary purposes. It has been noted that embedded counterfactuals should not be generalised into hypotheticals but treated as a special kind of disnarration. The processing of counterfactual conditionals is cognitively costly, which has been interpreted by its linguistic features. The points of divergence applied in counterfactual historical fiction were described as semantic deviation, referring to what might have been rather than what it is. The complexity, coupled with emotionality, gives aesthetic value to literary counterfactuals. It has been acknowledged that it is the first work that drew attention to counterfactuals as deviations in the literary text and empirically investigated their processing.

The third objective showed that L2 readers can fully comprehend literary counterfactuals with no considerable L1 positive effect while processing literary counterfactuals by second language readers. It might be explained as the switch to L2 without the reliance on the L1 morphosyntactic representation. However, some L1 negative effects were noted in post-reading. Based on the results of experiments, it has been concluded that second-language

readers' processing of literary counterfactuals is not shallow or limited but rather deep and full. It has been noted that it is the first work that studied L2 processing of literary counterfactuals thus extending second language research to a more complex sentence.

Thus, the doctoral dissertation contributes to the disciplines of literary theory and linguistics. Whilst the investigation into second language processing of literary counterfactuals adds to the applied linguistics field by extending the current research to complex sentences at the interface of morphology-semantics-syntax-pragmatics, linguistic considerations of the form and meaning of literary counterfactuals as well as their cognitive processing adds to the literary field by advancing the understanding of counterfactuals as a literary device. Overall, the empirical study of counterfactuals as a literary device adds to the stylistics that is at the intersection of literary theory and linguistics.

It has been suggested, among others, to extend the research to counter-fictions and the contrastive study of downward and upward counterfactuals in future studies. Whilst the purpose of the doctoral dissertation in the revision of Ryan's model of possible worlds was modest to explain the cognitive processing of counterfactuals as a literary device, the revised model can find its application in a broader context of interpreting fiction reading and the potential effect of recentring RK-world (reader's knowledge world) to the textual actual world and shifting from RK-world to CK-worlds (character's knowledge world) on the change of readers' view towards the actual world be it short-term or long-term effect.

Ethical clearance

Three studies (Study 1, 3, 4) received a positive opinion of the University of Warsaw Rector's Committee for the Ethics of Research Involving Human Participants. The application number 138/2022. One study (Study 2) on counterfactual historical fiction received approval from the University of Verona Ethics of Research with Human Participants – Comitato di Approvazione della Ricerca sulla Persona (CARP). The protocol number 36/2023.

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Appendices

Appendix 1. The experimental material of the Study 1

1. If you had one, I should think she was a pretty, timid, little, bright-eyed sort of girl. / If you had had one, I should think she would have been a pretty, timid, little, bright-eyed sort of girl.

HAVING
&
PRETTY GIRL

NOT HAVING
&
NO PRETTY GIRL

BUYING
&
NICE CAR

NOT BUYING
&
NO NICE CAR

2. If he had succeeded in reaching me unawares it would have been easy enough for him to sling me overboard with a sudden heave. / If he succeeded in reaching me unawares it was easy enough for him to sling me overboard with a sudden heave.

JOURNEY
&
FUNNY

SUCCESS
&
EASY

NO SUCCESS
&
NOT EASY

NO JOURNEY
&
NOT FUNNY

3. If you looked at it, sir, you saw at a glance what the errand is on which I have come to you this morning. / If you had looked at it, sir, you would have seen at a glance what the errand is on which I have come to you this morning.

LISTENING
&
WRITING

NOT LOOKING
&
NOT SEEING

NOT LISTENING
&
NOT WRITING

LOOKING
&
SEEING

4. If there had been anything worth her taking, it would surely have been locked up. / If there was anything worth her taking, it was surely locked up.

NOTHING WORTH
&
NOT LOCKED UP

SOMETHING HEAVY
&
THROWN DOWN

ANYTHING WORTH
&
LOCKED UP

NOTHING HEAVY
&
NOT THROWN DOWN

5. if it was the old major I swung for him with a light heart. / If it had been the old major I would have swung for him with a light heart.

OLD MAJOR
&
SWINGING

SHORT WOMAN
&
SEEING

NOT SHORT WOMAN
&
NOT SEEING

NOT OLD MAJOR
&
NOT SWINGING

6. If we did it the day after the Lusitania, that was right. / If we had done it the day after the Lusitania, that would have been right.

NOT TWO WEEKS
&
NOT LONG

TWO WEEKS
&
LONG

improper it was to behave in that way.

NOT REMEMBERING
&
NO FEELING

NOT JOGGING
&
NOT RUNNING

NOT THE DAY AFTER
&
NOT RIGHT

THE DAY AFTER
&
RIGHT

7. If you wished to throw the treasure into the Thames it was easier for you to have thrown box and all. / If you had wished to throw the treasure into the Thames it would have been easier for you to have thrown box and all.

REMEMBERING
&
FEELING

JOGGING
&
RUNNING

10. If she saw me hurt, it made her sorrowful. / If she had seen me hurt, it would have made her sorrowful.

WISHING
&
THROWING ALL

NOT WISHING
&
NOT THROWING ALL

NOT LOOKIING SMART
&
NOT CAREFUL

SEEING HURT
&
SORROWFUL

NOT HOPING
&
NOT THINKING ABOUT

HOPING
&
THINKING ABOUT

LOOKING SMART
&
CAREFUL

NOT SEEING HURT
&
NOT SORROWFUL

8. If I had begun with any appetite, he would have taken it away. / If I began with any appetite, he took it away.

NO BAG
&
NOT PUT DOWN

APPETITE
&
TAKEN AWAY

NOT NEAR
&
NO CHANCE

NO JOY
&
NO LAUGH

NO APPETITE
&
NOT TAKEN AWAY

BAG
&
PUT DOWN

JOY
&
LAUGH

NEAR
&
CHANCE

9. If you had remembered that Hareton was your cousin as much as Master Heathcliff, you would have felt how improper it was to behave in that way. / If you remembered that Hareton was your cousin as much as Master Heathcliff, you felt how

12. If I was easier with Joe, Joe was easier with me. / If I had been easier with Joe, Joe would have been easier with me.

EASIER WITH JOE
&
EASIER WITH ME

NOT EASIER WITH JOE
&
NOT EASIER WITH ME

JOGGING
&
MORE ENERGY

NOT HELPING
&
NO BETTER CHANCE

TALLER THAN SAM
&
TALLER THAN BEN

NOT TALLER THAN SAM
&
NOT TALLER THAN BEN

NOT JOGGING
&
NO MORE ENERGY

HELPING
&
BETTER CHANCE

13. If Ladislav had a spark of honor he went out of the country at once. / If Ladislav had had a spark of honor he would have gone out of the country at once.

16. If Ridgeway had been the thief the case would have been charming. / If Ridgeway was the thief the case was charming.

PATIENCE
&
ADVANCEMENT

NO PATIENCE
&
NO ADVANCEMENT

NOT THE THIEF
&
NOT CHARMING

THE MASTER
&
ATTENTIVE

HONOR
&
DISAPPEARANCE

NO HONOR
&
NO DISAPPEARANCE

THE THIEF
&
CHARMING

NOT THE MASTER
&
NOT ATTENTIVE

14. If he had retorted or openly exasperated me, it would have been a relief and a justification. / If he retorted or openly exasperated me, it was a relief and a justification.

17. If you had married this girl you would have been wretched. / If you married this girl you were wretched.

CREATIVITY
&
IDEA

RETORTION
&
RELIEF

MARRIED
&
WRETCHED

EATEN
&
POISONED

NO RETORTION
&
NO RELIEF

NO CREATIVITY
&
NO IDEA

NOT EATEN
&
POISONED

NOT MARRIED
&
NOT WRETCHED

15. If you helped justice, you had a better chance at your trial. / If you had helped justice, you would have had a better chance at your trial.

18. If he came to Gardencourt he saw Madame Merle. / If he had come to Gardencourt he would have seen Madame Merle.

NOT COOKING
&
NOT EATING

COOKING
&
EATING

it there, it was a valuable point in his
favour.

NOT LOOKING
&
NOT HIS FAVOUR

NOT TALKING
&
NOT HER REGRET

NOT COMING
&
NOT SEEING

COMING
&
SEEING

19. If there was a real dinner party the
curtains were drawn as soon as the
light began to fail. / If there had
been a real dinner party the curtains
would have been drawn as soon as
the light began to fail.

LOOKING
&
HIS FAVOUR

TALKING
&
HER REGRET

22. If she had been in great pain one
would have excused it. / If she was
in great pain one excused it.

DINNER PARTY
&
CURTAINS DRAWN

NO DINNER PARTY
&
NO CURTAINS DRAWN

NO FISH
&
NO CATCH

PAIN
&
EXCUSE

NO SPECIAL LUNCH
&
NO SUIT WORN

SPECIAL LUNCH
&
SUIT WORN

FISH
&
CATCH

NO PAIN
&
NO EXCUSE

20. If you had told Sycorax that her son
Caliban was as handsome as
Apollo, she would have been
pleased. / If you told Sycorax that
her son Caliban was as handsome as
Apollo, she was pleased.

NOT STUDYING
&
NOT BEING PRODUCTIVE

TELLING
&
BEING PLEASED

NO STEAMER
&
NOT FAST

NO FLOWERS
&
NOT HAPPY

23. If they came from Pondicherry in a
steamer they arrived almost as soon
as their letter. / If they had come
from Pondicherry in a steamer they
would have arrived almost as soon
as their letter.

NOT TELLING
&
NOT BEING PLEASED

STUDYING
&
BEING PRODUCTIVE

FLOWERS
&
HAPPY

STEAMER
&
FAST

21. If anyone had chanced to look this
morning before his return, and seen
it there, it would have been a
valuable point in his favour. /
If anyone chanced to look this
morning before his return, and saw

24. If it was Tertius who stood opposite
to her, that look of misery was a
pang to him. / If it had been Tertius
who stood opposite to her, that look
of misery would have been a pang
to him.

TERTIUS
&
PANG

NOT TERTIUS
&
NO PANG

LISTENING
&
PAYING ATTENTION

NO WRITING
&
NO MORE PARTICULARS

GEORGE
&
TIRED

NOT GEORGE
&
NOT TIRED

NOT LISTENING
&
NOT PAYING ATTENTION

WRITING
&
MORE PARTICULARS

25. if they had been merely after plunder they would at least have made some attempt to search for it. / If they were merely after plunder they at least made some attempt to search for it.

28. If anybody had asked Amy what the greatest trial of her life was, she would have answered at once, "My nose." / If anybody asked Amy what the greatest trial of her life was, she answered at once, "My nose."

FOR WIFE
&
WORKING

NOT FOR WIFE
&
NOT WORKING

NO QUESTION
&
NO ANSWER

ENTRY
&
EXIT

AFTER PLUNDER
&
SEARCHING

NOT AFTER PLUNDER
&
NOT SEARCHING

QUESTION
&
ANSWER

NO ENTRY
&
NO EXIT

26. If he had been so very agreeable, he would have talked to Mrs. Long. / If he was so very agreeable, he talked to Mrs. Long.

29. if it was open my pencil rolled inside. / if it had been open my pencil would have rolled inside.

CHEERFUL
&
SMILE

AGREEABLE
&
TALK

OPEN
&
ROLLING INSIDE

SHARP
&
STICKING OUT

NOT AGREEABLE
&
NO TALK

NOT CHEERFUL
&
NO SMILE

NOT SHARP
&
NOT STICKING OUT

NOT OPEN
&
NOT ROLLING INSIDE

27. If he wrote to you, there were more particulars. / If he had written to you, there would have been more particulars.

30. If I had taken part in it I would have done it better than this, and have written a sensible note. / If I took part in it I did it better than this, and wrote a sensible note.

NO ENJOYMENT
&
NO SONG

ENJOYMENT
&
SONG

NO PARTICIPATION
&
NO NOTE

PARTICIPATION
&
NOTE

Appendix 2. The experimental material of the Study 2²

All the questionnaires were presented in Italian as well as the excerpts from the book.

General questionnaire for pre-test

Gender:

Age:

Please choose how many books you read last year:

- a) none;
- b) one;
- c) from 2 to 12;
- d) from 13 to 24;
- e) more than 25.

Comprehension questionnaire (post-test)

1. What is the text about?
 - a) father and son
 - b) love story
 - c) grandchildren
2. What is the setting of the story?
 - a) Modern Germany
 - b) Nazi Germany
 - c) The United States
3. Which activity did the characters attend?
 - a) city tour
 - b) zoo
 - c) theatre
4. What is the name of the ex-wife?
 - a) Sara
 - b) Petra
 - c) Klara
5. At what age were you allowed to become Pimpf?
 - a) 10
 - b) 20
 - c) 30
6. What political figure was mentioned in the text?
 - a) Adolf Hitler
 - b) George Bush
 - c) Angela Merkel
7. Who is Erich Helfferich to Pili?
 - a) grandfather
 - b) teacher
 - c) uncle
8. What animal was mentioned in the text?
 - a) cat

² In the Appendix 2, I have included copyrighted excerpts and images from Robert Harris' *Fatherland* (1992). According to the Copyright, Designs and Patent Act 1988, I have explicit permission to use these materials as data. Section 29(1) of the Act allows for Fair Dealing, which is an exception to copyright law permitting the use of images and extracts from published novels for the purposes of research and private study.

- b) dog
- c) lizard
- 9. Why were the streets unnaturally quiet?
 - a) government statement
 - b) mourning day
 - c) pandemic situation
- 10. Which national anthem did people sing?
 - a) American
 - b) German
 - c) Italian

Correct answers: 1a, 2b, 3a, 4c, 5a, 6a, 7c, 8b, 9a, 10b.

Perceived reality measurement (post-test)

Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree

1. The relationship between father and son in the narrative portrayed possible real-life situations.
2. The historical background described in the narrative had actually happened.
3. The dialogue between father and son in the narrative is realistic and believable.
4. The narrative was based on historical facts.
5. The map describes the territory of the German empire in a realistic way.

Aesthetic appreciation items (post-test)

Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree

1. Creative
2. Suspenseful
3. Tragic
4. Dramatic
5. Surprising
6. Well-written

Fascism receptivity questionnaire (pre-test and post-test) adapted from F-scale test

<https://www.anesi.com/fscale.htm>

Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree

1. Obedience and respect for authority are the most important virtues children should learn.
2. A person who has bad manners, habits, and breeding can hardly expect to get along with decent people.
3. Every person should have complete faith in some supernatural power whose decisions he obeys without question.
4. Young people sometimes get rebellious ideas, but as they grow up they ought to get over them and settle down.
5. What this country needs most, more than laws and political programs, is a few courageous, tireless, devoted leaders in whom the people can put their faith.

6. What the youth needs most is strict discipline, rugged determination, and the will to work and fight for family and country.
7. It is best to use some methods of fascism and nazism to keep order and prevent chaos.
8. Most people don't realize how much our lives are controlled by plots hatched in secret places.
9. The true Italian way of life is disappearing so fast that force may be necessary to preserve it.

Superstition (pre-test and post-test) adapted from subcategory *Superstition and Stereotyp* of the F-scale test

1. Someday it will probably be shown that astrology can explain a lot of things.

Political evaluation questionnaire (pre-test and post-test)

Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree

1. I am satisfied with the current political situation in my country.
2. I am satisfied with life quality in my country.
3. I live in a democratic country.
4. I feel lucky living in present time.

Historical knowledge questionnaire (post-test)

1. When did the World War II end?
 - a) 1941
 - b) 1945
 - c) 1964
2. What was the outcome of the World War II?
 - a) Germany lost
 - b) Germany won
 - c) No outcome
3. When did Hitler die?
 - a) 1941
 - b) 1945
 - c) 1964
4. Which countries were included into the Allies during the World War II?
 - a) Great Britain, the United States, and the Soviet Union
 - b) Germany, Italy, and Japan
 - c) France, Germany, Austria
5. When did Nazi Germany occupy the outskirts of Moscow?
 - a) 1941
 - b) 1943
 - c) 1945
6. Which country collaborated with Germany during the World War II?
 - a) England
 - b) Italy
 - c) France
7. Which country collaborated with Germany during the World War II?
 - a) America
 - b) Japan
 - c) The Soviet Union
8. What does the term *Cold War* mean?
 - a) a nuclear stalemate between Germany and America

- b) large-scale fighting between two superpowers
- c) geopolitical tension between the United States and the Soviet Union
- 9. Who was Hermann Göring?
 - a) a nazi
 - b) an athlete
 - c) a scientist
- 10. Who was Heinrich Himmler?
 - a) a singer
 - b) a leader of SS
 - c) a German writer
- 11. When did Adolf Hitler and J.F. Kennedy meet?
 - a) 1944
 - b) 1963
 - c) Never
- 12. Who was Albrecht Speer?
 - a) an architect
 - b) a German sportsman
 - c) a painter

Correct answers: 1b, 2a, 3b, 4a, 5a, 6b, 7b, 8c, 9a, 10b, 11c, 12a.

Familiarity check (post-test)

Have you read this story before?

Original text in English from *Fatherland* (1992) (points of divergence/areas of interest are in bold)

"Construction of the Arch of Triumph was commenced in 1946 and work was completed in time for the Day of National Reawakening in 1950. The inspiration for the design came from the **Führer** and is based upon original drawings made by him during the Years of Struggle."

The passengers on the tour bus—at least those who could understand—digested this information. They raised themselves out of their seats or leaned into the aisle to get a better view. Xavier March, halfway down the bus, lifted his son onto his lap. Their guide, a middle-aged woman clad in the dark green of the **Reich** Tourist Ministry, stood at the front, feet planted wide apart, back to the windshield. Her voice over the address system was thick with cold.

"The arch is constructed of granite and has a capacity of two million, three hundred and sixty-five thousand, six hundred and eighty-five cubic meters." She sneezed. "The Arc de Triomphe in Paris will fit into it forty-nine times."

For a moment, the arch loomed over them. Then, suddenly, they were passing through it—an immense stone-ribbed tunnel longer than a football pitch, higher than a fifteen-story building, with the vaulted, shadowed roof of a cathedral. The headlights and taillights of eight lanes of traffic danced in the afternoon gloom.

"The arch has a height of one hundred and eighteen meters. It is one hundred and sixty-eight meters wide and has a depth of one hundred and nineteen meters. On the inner walls are carved the names of the three million soldiers who fell in defence of the Fatherland in the wars of 1914 to 1918 and **1939 to 1946.**"

She sneezed again. The passengers dutifully craned their necks to peer at the Roll of the Fallen. They were a mixed party. A group of Japanese, draped with cameras; an American couple with a little girl Pili's age; some German settlers, from Ostland or the Ukraine, in Berlin for the **Führertag**. March looked away as they passed the Roll of the Fallen. Somewhere on it were the names of his father and both his grandfathers. He kept his eyes on the guide. When

she thought no one was looking, she turned away and quickly wiped her nose on her sleeve. The coach reemerged into the drizzle.

"Leaving the arch, we enter the central section of the Avenue of Victory. The avenue was designed by *Reichsminister* Albert Speer and was completed in **1957**. It is one hundred and twenty-three meters wide and five-point-six kilometers in length. It is both wider, and two and a half times longer, than the Champs Elysées in Paris."

Higher, longer, bigger, wider, more expensive... even in victory, thought March, Germany has a parvenu's inferiority complex. Nothing stands on its own, Everything has to be compared with what the foreigners have . . .

"The view from this point northward along the Avenue of Victory is considered one of the wonders of the world."

"One of the wonders of the world," repeated Pili in a whisper.

And it was, even on a day like this. Dense with traffic, the avenue stretched before them, flanked on either side by the glass-and-granite walls of Speer's new buildings: ministries, offices, big stores, cinemas, apartment blocks. At the far end of this river of light, rising as gray as a battleship through the spray, was the Great Hall of the Reich, its dome half hidden in the low clouds.

Pili wriggled out of his father's grasp and walked unsteadily to the front of the coach. March pinched the bridge of his nose between thumb and forefinger, a nervous habit he had picked up—when?—in the U-boat service, he supposed, when the crews of the British warships sounded so close the hull shook and you never knew if their next depth charge would be your last. He had been invalided out of the navy in 1948 with suspected TB and spent a year convalescing. Then, for want of anything better to do, he had joined the *Marineküstenpolizei*, the Coastal Police, in Wilhelmshaven as a lieutenant. That year he had married Klara Eckart, a nurse he had met at the TB clinic. In 1952, he had joined the Hamburg Kripo. In 1954, with Klara pregnant and the marriage already failing, he had been promoted to Berlin. Paul—Pili—had been born exactly ten years and one month ago.

What had gone wrong? He did not blame Klara. She had not changed. She had always been a strong woman who wanted certain simple things from life: home, family, friends, acceptance. But March: he *had* changed. After ten years in the navy and twelve months in virtual isolation, he had stepped ashore into a world he barely recognized. As he went to work, watched television, ate with friends, even—God help him—slept beside his wife, he sometimes imagined himself aboard a U-boat still: cruising beneath the surface of everyday life; solitary, watchful.

He had picked Pili up at noon from Klara's place—a bungalow on a dreary postwar housing estate in Lichtenrade, in the southern suburbs. Park in the street, sound the horn twice, watch for the twitch in the parlor curtain. This was the routine that had evolved, unspoken, since their divorce five years ago—a means of avoiding embarrassing encounters; a ritual to be endured one Sunday in four, work permitting, under the strict provisions of the Reich Marriages Act. It was rare for him to see his son on a Tuesday, but this was a school vacation: **since 1959, children had been given a week off for the Führer's birthday, rather than for Easter.**

The door had opened and Pili had appeared, like a shy child actor being pushed out onto a stage against his will. Wearing his new *Pimpf* uniform—crisp black shirt and dark blue shorts—he had climbed wordlessly into the car. March had given him an awkward hug.

"You look smart. How's school?"

"All right."

"And your mother?"

The boy shrugged.

"What would you like to do?"

He shrugged again.

They had lunch in Budapester-Strasse, opposite the zoo, in a modern place with vinyl seats and a plastic-topped table: father and son, one with beer and sausages, the other with apple juice and a hamburger. They talked about the *Pimpfen* and Pili brightened. Until you were a Pimpf you were nothing, "a nonuniformed creature who has never participated in a group meeting or a route march." You were allowed to join when you were ten and stayed until you were fourteen, when you passed into the full **Hitler Youth**.

"I was top in the initiation test."

"Good lad."

"You have to run sixty meters in twelve seconds," said Pili. "Do the long jump and the shot put. There's a route march—a day and a half. Written stuff. Party philosophy. And you have to recite the 'Horst Wessel Lied.' "

For a moment, March thought he was about to break into song. He cut in hurriedly, "**And your dagger?**"

Pili fumbled in his pocket, a crease of concentration on his forehead. How like his mother he is, thought March. The same wide cheekbones and full mouth, the same serious brown eyes set far apart. Pili laid the dagger carefully on the table before him. He picked it up. It reminded him of the day he had gotten his own—when was it? '34? The excitement of a boy who believes he's been admitted to the company of men. He turned it over and the swastika on the hilt glinted in the light. He felt the weight of it in his hand, then gave it back.

"I'm proud of you," he lied. "What do you want to do? We can go to the cinema. Or the zoo."

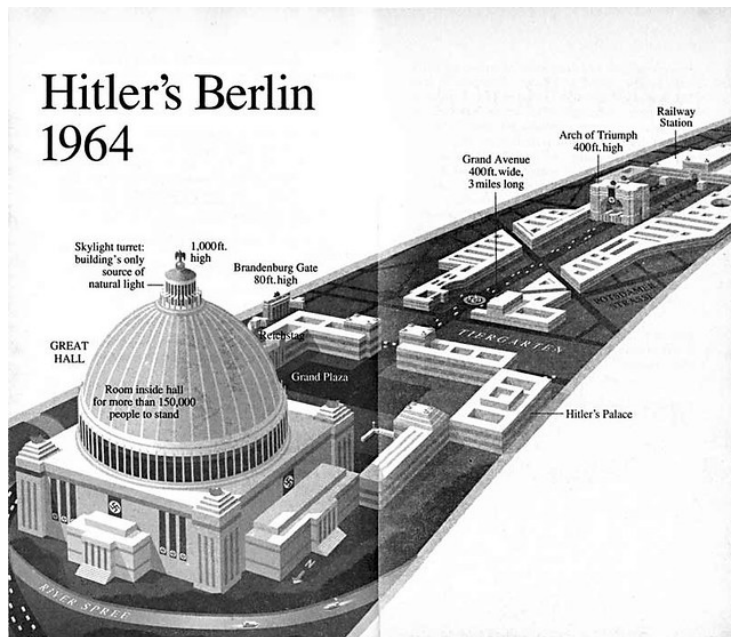
"I want to go on the bus."

"But we did that last time. And the time before."

"Don't care. I want to go on the bus."

"The Great Hall of the Reich is the largest building in the world. It rises to a height of more than a quarter of a kilometer, and on certain days—observe today—the top of its dome is lost from view. The dome itself is one hundred and forty meters in diameter, and St. Peter's in Rome will fit into it sixteen times."

They had reached the top of the Avenue of Victory and were entering **Adolf-Hitler-Platz**. To the left, the square was bounded by the headquarters of the Wehrmacht High Command, to the right by the new Reich Chancellery and **Palace of the Führer**. Ahead was the hall. Its grayness had dissolved as their distance from it had diminished. Now they could see what the guide was telling them: that the pillars supporting the frontage were of red granite, mined in Sweden, flanked at either end by golden statues of Atlas and Tellus, bearing on their shoulders spheres depicting the heavens and the earth.



Pili had returned to his seat and was bouncing up and down in excitement. "**Are we going to see the Führer, Papa?**"

He said, "I don't think so."

The guide again: "On the right is the Reich Chancellery and **residence of the Führer**. Its total facade measures exactly seven hundred meters, exceeding by one hundred meters the façade of Louis XIV's palace at Versailles."

The coach dropped them back at its pickup point outside the Götterland railway station.

The entrance to the station was disgorging people— soldiers with kit bags walking with girlfriends and wives, foreign workers with cardboard suitcases and shabby bundles tied with string, settlers emerging after two days' traveling from the steppes, staring in shock at the lights and the crowds. Uniforms were everywhere. Dark blue, green, brown, black, gray, khaki. It was like a factory at the end of a shift. There was a factory sound of shunting metal and shrill whistles, and a factory smell of heat and oil, stale air and steel dust. Exclamation marks clamored from the walls. "Be vigilant at all times!" "Attention! Report suspicious packages at once!" "Terrorist alert!"

From here, trains as high as houses, with a gauge of four meters, left for the outposts of the **German Empire— for Götterland (formerly the Crimea) and Theodorichshafen (formerly Sevastopol); for the Generalkommissariat of Taurida and its capital, Melitopol; for Volhynia-Podolia, Zhitomir, Kiev, Nikolayev, Dnepropetrovsk, Kharkov, Rostov, Saratov... it was the terminus of a new world.**



Announcements of arrivals and departures punctuated the "Coriolan Overture" on the public address system. March tried to take Pili's hand as they wove through the crowd, but the boy shook him away.

It took fifteen minutes to retrieve the car from the underground car park and another fifteen to get clear of the clogged streets around the station. They drove in silence. It was not until they were almost back at Lichtenrade that Pili suddenly blurted out, "You're an asocial, aren't you?"

It was such an odd word to hear on the lips of a ten-year-old, and so carefully pronounced, that March almost laughed out loud. An asocial: one step down from traitor in the Party's lexicon of crime. A noncontributor to Winter Relief. A nonjoiner of the endless National Socialist associations. The NS Skiing Federation. The Association of NS Ramblers. The Greater German NS Motoring Club. The NS Criminal Police Officers' Society. He had even one afternoon come across a parade in the Lustgarten organized by the NS League of Wearers of the Lifesaving Medal.

"That's nonsense."

"Uncle Erich says it's true."

Erich Helfferich. So he had become "Uncle" Erich now, had he? A zealot of the worst sort, a full-time bureaucrat at the Party's Berlin headquarters. An officious, bespectacled scoutmaster ... March felt his hands tightening on the steering wheel. Helfferich had started seeing Klara a year ago.

"He says **you don't give the Führer salute** and you make jokes about the Party."

"And how does he know all this?"

"He says there's a file on you at Party headquarters and it's only a matter of time before you're picked up." The boy was almost in tears with the shame of it. "I think he's right."

"Pili!"

They were drawing up outside the house.

"I hate you." This was delivered in a calm, flat voice. He got out of the car. March opened his door, ran around and followed him up the path. He could hear a dog barking inside the house.

"Pili!" he shouted once more.

The door opened. Klara stood there in the uniform of the *NS-Frauenschaft*. Lurking behind her, March glimpsed the brown-clad figure of Helfferich. The dog, a young German shepherd, came running out and leapt up at Pili, who pushed his way past his mother and disappeared into the house. March wanted to follow him, but Klara blocked his path.

"Leave the boy alone. Get out of here. Leave us all alone."

She caught the dog and dragged it back by its collar. The door slammed on its yelping.

Later, as he drove back toward the center of Berlin, March kept thinking about that dog. It was the only living creature in the house, he realized, that was not wearing a uniform.

Had he not felt so miserable, he would have laughed.

The streets on the way back into central Berlin seemed unnaturally quiet, and when March reached Werderscher-Markt he discovered the reason. A large notice board in the foyer announced there would be a government statement at 4:30. Personnel were to assemble in the staff canteen. Attendance: compulsory. He was just in time.

They had developed a new theory at the Propaganda Ministry that the best time to make big announcements was at the end of the working day. News was thus received communally, in a comradely spirit: there was no opportunity for private skepticism or defeatism. Also, the broadcasts were always timed so that the workers could go home slightly early—at 4:50, say, rather than 5:00—fostering a sense of contentment, subliminally associating the regime with good feelings. That was how it was these days. The snow-white propaganda palace on Wilhelmstrasse employed more psychologists than journalists.

The Werderscher-Markt staff were filing into the canteen: officers and clerks, typists and drivers, shoulder to shoulder in a living embodiment of the National Socialist ideal. The four television screens, one in each corner, were showing **a map of the Reich with a swastika superimposed**, accompanied by selections from Beethoven. Occasionally, a male announcer would break in excitedly: "People of Germany, prepare yourselves for an important statement!" In the old days, on the radio, you got only the music. Progress again.

How many of these events could March remember? They stretched away behind him, islands in time. In '38, he had been called out of his classroom to hear that German troops were entering Vienna and that Austria had returned to the Fatherland. The headmaster, who had been gassed in the First War, had wept on the stage of the little gymnasium, watched by a gaggle of uncomprehending boys.

In '39, he had been at home with his mother in Hamburg—a Friday morning, eleven o'clock, the Führer's speech relayed live from the Reichstag: *"I am from now on just the first soldier of the German Reich. I have once more put on that uniform that was most sacred and dear to me. I will not take it off until victory is secured, or I will not survive the outcome."* A thunder of applause. This time his mother had wept—a hum of misery as her body rocked backward and forward. March, seventeen, had looked away in shame, sought out the photograph of his father—splendid in the uniform of the Imperial German Navy—and had thought, Thank God. War at last. Maybe now I will be able to live up to what you wanted.

He had been at sea for the next few broadcasts. Victory over Russia in the spring of '43—a triumph for the Führer's strategic genius! The Wehrmacht summer offensive of the year before had cut Moscow off from the Caucasus, separating the Red armies from the Baku oilfields. Stalin's war machine had simply ground to a halt for want of fuel.

Peace with the British in '44—a triumph for the Führer's counterintelligence genius! March remembered how all U-boats had been recalled to their bases on the Atlantic coast to be equipped with a new cipher system: the treacherous British, they were told, had been reading the Fatherland's codes. Picking off merchant shipping had been easy after that. England was starved into submission. Churchill and his gang of warmongers had fled to Canada.

Peace with the Americans in '46—a triumph for the Führer's scientific genius! When America had defeated Japan by detonating an atomic bomb, the Führer had sent a V-3 rocket to explode in the skies over New York to prove he could retaliate in kind if struck. After that, the war had dwindled to a series of bloody guerrilla conflicts at the fringes of the new German Empire: a nuclear stalemate the diplomats called the Cold War.

But still the broadcasts had gone on. **When Göring had died in '51**, there had been a whole day of solemn music before the announcement was made. **Himmler had received similar treatment when he had been killed in an aircraft explosion in '62.** Deaths, victories, wars,

exhortations for sacrifice and revenge, the dull struggle with the Reds on the Urals Front with its unpronounceable battlefields and offensives—Oktyabrskoye, Polunochoye, Alapayevsk...

March looked at the faces around him. Forced humor, resignation, apprehension. People with brothers and sons and husbands in the East. They kept glancing at the screens.

"People of Germany, prepare yourselves for an important statement!"

What was coming now?

The canteen was almost full. March was pressed up against a pillar. He could see Max Jaeger a few meters away, joking with a bosomy secretary from VA₁, the legal department. Max spotted him over her shoulder and gave him a grin. There was a roll of drums. The room became still. A newsreader said, "We are now going live to the Foreign Ministry in Berlin."

A bronze relief glittered in the television lights. A Nazi eagle clutching the globe shot off rays of illumination like a child's drawing of a sunrise. Before it, with his thick black eyebrows and shaded jowls, stood the Foreign Ministry spokesman, Drexler. March suppressed a laugh: you would have thought that in the whole of Germany, Goebbels could have found one spokesman who did not look like a convicted criminal.

"Ladies and gentleman, I have a brief statement for you from the Reich Ministry for Foreign Affairs." Drexler was addressing an audience of journalists, who were off camera. He put on a pair of glasses and began to read.

"In accordance with the long-standing and well-documented desire of the **Führer and People of the Greater German Reich** to live in peace and security with the countries of the world, and following extensive consultations with our allies in the European Community, the Reich Ministry for Foreign Affairs, **on behalf of the Führer**, has today issued an invitation to the president of the United States of America to visit the Greater German Reich for personal discussions aimed at promoting greater understanding between our two peoples. This invitation has been accepted. We understand that the American administration has indicated this morning that **Herr Kennedy** intends to meet the Führer in Berlin in September. **Heil Hitler!** Long live Germany!"

The picture faded to black and another drumroll signaled the start of the national anthem. The men and women in the canteen began to sing. March pictured them at that moment all over Germany—in shipyards and steelworks and offices and schools—the hard voices and the high merged together in one great bellow of acclamation rising to the heavens.

Deutschland, Deutschland über Alles!

Über Alles in der Welt!

Manipulated version of the text (points of divergence/areas of interest are in bold)

"Construction of the Arch of Triumph was commenced in 1936 and work was completed in time for the Day of National Reawakening in 1940. The inspiration for the design came from the **Führer** and is based upon original drawings made by him during the Years of Struggle."

The passengers on the tour bus—at least those who could understand—digested this information. They raised themselves out of their seats or leaned into the aisle to get a better view. Xavier March, halfway down the bus, lifted his son onto his lap. Their guide, a middle-aged woman clad in the dark green of the **Reich** Tourist Ministry, stood at the front, feet planted wide apart, back to the windshield. Her voice over the address system was thick with cold.

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"The arch has a height of one hundred and eighteen meters. It is one hundred and sixty-eight meters wide and has a depth of one hundred and nineteen meters. On the inner walls are carved the names of the three million soldiers who fell in defence of the Fatherland in the wars of 1866-1871 and **1914 to 1918**."

She sneezed again. The passengers dutifully craned their necks to peer at the Roll of the Fallen. They were a mixed party. A group of Japanese, draped with cameras; an American couple with a little girl Pili's age; some German settlers, from Ostland or the Ukraine, in Berlin for the *Führertag*. March looked away as they passed the Roll of the Fallen. Somewhere on it were the names of his father and both his grandfathers. He kept his eyes on the guide. When she thought no one was looking, she turned away and quickly wiped her nose on her sleeve. The coach reemerged into the drizzle.

"Leaving the arch, we enter the central section of the Avenue of Victory. The avenue was designed by *Reichsminister* Albert Speer and was completed in **1939**. It is one hundred and twenty-three meters wide and five-point-six kilometers in length. It is both wider, and two and a half times longer, than the Champs Elysées in Paris."

Higher, longer, bigger, wider, more expensive... even in victory, thought March, Germany has a parvenu's inferiority complex. Nothing stands on its own, Everything has to be compared with what the foreigners have . . .

"The view from this point northward along the Avenue of Victory is considered one of the wonders of the world."

"One of the wonders of the world," repeated Pili in a whisper.

And it was, even on a day like this. Dense with traffic, the avenue stretched before them, flanked on either side by the glass-and-granite walls of Speer's new buildings: ministries, offices, big stores, cinemas, apartment blocks. At the far end of this river of light, rising as gray as a battleship through the spray, was the Great Hall of the Reich, its dome half hidden in the low clouds.

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What had gone wrong? He did not blame Klara. She had not changed. She had always been a strong woman who wanted certain simple things from life: home, family, friends, acceptance. But March: he *had* changed. After ten years in the navy and twelve months in virtual isolation, he had stepped ashore into a world he barely recognized. As he went to work, watched television, ate with friends, even—God help him—slept beside his wife, he sometimes imagined himself aboard a boat still: cruising beneath the surface of everyday life; solitary, watchful.

He had picked Pili up at noon from Klara's place—a bungalow on a dreary postwar housing estate in Lichtenrade, in the southern suburbs. Park in the street, sound the horn twice, watch for the twitch in the parlor curtain. This was the routine that had evolved, unspoken, since their

divorce five years ago—a means of avoiding embarrassing encounters; a ritual to be endured one Sunday in four, work permitting, under the strict provisions of the Reich Marriages Act. It was rare for him to see his son on a Tuesday, but this was a school vacation: **since 1939, children had been given a week off for the Führer's birthday, rather than for Easter.**

The door had opened and Pili had appeared, like a shy child actor being pushed out onto a stage against his will. Wearing his new *Pimpf* uniform—crisp black shirt and dark blue shorts—he had climbed wordlessly into the car. March had given him an awkward hug.

"You look smart. How's school?"

"All right."

"And your mother?"

The boy shrugged.

"What would you like to do?"

He shrugged again.

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"I was top in the initiation test."

"Good lad."

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For a moment, March thought he was about to break into song. He cut in hurriedly, "**And your dagger?**"

Pili fumbled in his pocket, a crease of concentration on his forehead. How like his mother he is, thought March. The same wide cheekbones and full mouth, the same serious brown eyes set far apart. Pili laid the dagger carefully on the table before him. He picked it up. It reminded him of the day he had gotten his own—when was it? '11? The excitement of a boy who believes he's been admitted to the company of men. He turned it over and the swastika on the hilt glinted in the light. He felt the weight of it in his hand, then gave it back.

"I'm proud of you," he lied. "What do you want to do? We can go to the cinema. Or the zoo."

"I want to go on the bus."

"But we did that last time. And the time before."

"Don't care. I want to go on the bus."

"The Great Hall of the Reich is the largest building in the world. It rises to a height of more than a quarter of a kilometer, and on certain days—observe today—the top of its dome is lost from view. The dome itself is one hundred and forty meters in diameter, and St. Peter's in Rome will fit into it sixteen times."

They had reached the top of the Avenue of Victory and were entering **Adolf-Hitler-Platz**. To the left, the square was bounded by the headquarters of the Wehrmacht High Command, to the right by the new Reich Chancellery and **Palace of the Führer**. Ahead was the hall. Its grayness had dissolved as their distance from it had diminished. Now they could see what the guide was telling them: that the pillars supporting the frontage were of red granite, mined in Sweden, flanked at either end by golden statues of Atlas and Tellus, bearing on their shoulders spheres depicting the heavens and the earth.



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The guide again: "On the right is the Reich Chancellery and **residence of the Führer**. Its total facade measures exactly seven hundred meters, exceeding by one hundred meters the façade of Louis XIV's palace at Versailles."

The coach dropped them back at its pickup point outside the Götterland railway station.

The entrance to the station was disgorging people— soldiers with kit bags walking with girlfriends and wives, foreign workers with cardboard suitcases and shabby bundles tied with string, settlers emerging after two days' traveling from the steppes, staring in shock at the lights and the crowds. Uniforms were everywhere. Dark blue, green, brown, black, gray, khaki. It was like a factory at the end of a shift. There was a factory sound of shunting metal and shrill whistles, and a factory smell of heat and oil, stale air and steel dust. Exclamation marks clamored from the walls. "Be vigilant at all times!" "Attention! Report suspicious packages at once!" "Terrorist alert!"

From here, trains as high as houses, with a gauge of four meters, left for the outposts of the **German Empire**— for Götterland (formerly the Crimea) and Theodorichshafen (formerly Sevastopol); for the *Generalkommissariat* of Taurida and its capital, Melitopol; for Volhynia-Podolia, Zhitomir, Kiev, Nikolayev, Dnepropetrovsk, Kharkov, Rostov, Saratov... it was the terminus of a new world.



Announcements of arrivals and departures punctuated the "Coriolan Overture" on the public address system. March tried to take Pili's hand as they wove through the crowd, but the boy shook him away.

It took fifteen minutes to retrieve the car from the underground car park and another fifteen to get clear of the clogged streets around the station. They drove in silence. It was not until they were almost back at Lichtenrade that Pili suddenly blurted out, "You're an asocial, aren't you?"

It was such an odd word to hear on the lips of a ten-year-old, and so carefully pronounced, that March almost laughed out loud. An asocial: one step down from traitor in the Party's lexicon of crime. A noncontributor to Winter Relief. A nonjoiner of the endless National Socialist associations. The NS Skiing Federation. The Association of NS Ramblers. The Greater German NS Motoring Club. The NS Criminal Police Officers' Society. He had even one afternoon come across a parade in the Lustgarten organized by the NS League of Wearers of the Lifesaving Medal.

"That's nonsense."

"Uncle Erich says it's true."

Erich Helfferich. So he had become "Uncle" Erich now, had he? A zealot of the worst sort, a full-time bureaucrat at the Party's Berlin headquarters. An officious, bespectacled scoutmaster ... March felt his hands tightening on the steering wheel. Helfferich had started seeing Klara a year ago.

"He says **you don't give the Führer salute** and you make jokes about the Party."

"And how does he know all this?"

"He says there's a file on you at Party headquarters and it's only a matter of time before you're picked up." The boy was almost in tears with the shame of it. "I think he's right."

"Pili!"

They were drawing up outside the house.

"I hate you." This was delivered in a calm, flat voice. He got out of the car. March opened his door, ran around and followed him up the path. He could hear a dog barking inside the house.

"Pili!" he shouted once more.

The door opened. Klara stood there in the uniform of the *NS-Frauenschaft*. Lurking behind her, March glimpsed the brown-clad figure of Helfferich. The dog, a young German shepherd, came running out and leapt up at Pili, who pushed his way past his mother and disappeared into the house. March wanted to follow him, but Klara blocked his path.

"Leave the boy alone. Get out of here. Leave us all alone."

She caught the dog and dragged it back by its collar. The door slammed on its yelping.

Later, as he drove back toward the center of Berlin, March kept thinking about that dog. It was the only living creature in the house, he realized, that was not wearing a uniform.

Had he not felt so miserable, he would have laughed.

The streets on the way back into central Berlin seemed unnaturally quiet, and when March reached Werderscher-Markt he discovered the reason. A large notice board in the foyer announced there would be a government statement at 4:30. Personnel were to assemble in the staff canteen. Attendance: compulsory. He was just in time.

They had developed a new theory at the Propaganda Ministry that the best time to make big announcements was at the end of the working day. News was thus received communally, in a comradely spirit: there was no opportunity for private skepticism or defeatism. Also, the broadcasts were always timed so that the workers could go home slightly early—at 4:50, say, rather than 5:00—fostering a sense of contentment, subliminally associating the regime with good feelings. That was how it was these days. The snow-white propaganda palace on Wilhelmstrasse employed more psychologists than journalists.

The Werderscher-Markt staff were filing into the canteen: officers and clerks, typists and drivers, shoulder to shoulder in a living embodiment of the National Socialist ideal. The four television screens, one in each corner, were showing **a map of the Reich with a swastika superimposed**, accompanied by selections from Beethoven. Occasionally, a male announcer would break in excitedly: "People of Germany, prepare yourselves for an important statement!" In the old days, on the radio, you got only the music. Progress again.

How many of these events could March remember? They stretched away behind him, islands in time. In '38, he had been called out of his office to hear that German troops were entering Vienna and that Austria had returned to the Fatherland. The colleague, who had been gassed in the First War, had wept on the hall of the little criminal department, watched by a gaggle of uncomprehending comrades.

In '39, he had been at home with his mother in Hamburg—a Friday morning, eleven o'clock, the Führer's speech relayed live from the Reichstag: *"I am from now on just the first soldier of the German Reich. I have once more put on that uniform that was most sacred and dear to me. I will not take it off until victory is secured, or I will not survive the outcome."* A thunder of applause. This time his mother had wept—a hum of misery as her body rocked backward and forward. March, forty, had looked away in shame, sought out the photograph of his father—splendid in the uniform of the Imperial German Navy—and had thought, Thank God. War at last. Maybe now I will be able to live up to what you wanted.

He had been at sea for the next few broadcasts. Victory over Russia in the spring of '41—a triumph for the Führer's strategic genius! The Wehrmacht summer offensive of the year before had cut Moscow off from the Caucasus, separating the Red armies from the Baku oilfields. Stalin's war machine had simply ground to a halt for want of fuel.

Peace with the French in '40—a triumph for the Führer's counterintelligence genius! March remembered how all U-boats had been recalled to their bases on the Atlantic coast to be equipped with a new cipher system: the treacherous French, they were told, had been reading the Fatherland's codes. Picking off merchant shipping had been easy after that. France was starved into submission. Reynaud and his gang of warmongers had fled to Canada.

The balanced relationship with the Americans in '40—a triumph for the Führer's scientific genius! If America had defeated Japan by detonating an atomic bomb, the Führer would have sent a V-3 rocket to explode in the skies over New York to prove he could retaliate in kind if struck. After he had done that, the war would have dwindled to a series of bloody guerrilla conflicts at the fringes of the new German Empire: a nuclear stalemate the diplomats would have called the Silent War.

But still the broadcasts had gone on. **When Göring had married in '39**, there had been a whole day of cheerful music before the announcement was made. **Himmler had received similar treatment when he had been praised with an aircraft exhibition in '40.** Deaths, victories, wars, exhortations for sacrifice and revenge, the dull struggle with the Reds on the Urals Front with its unpronounceable battlefields and offensives—Oktyabrskoye, Polunochoye, Alapayevsk...

March looked at the faces around him. Forced humor, resignation, apprehension. People with brothers and sons and husbands in the East. They kept glancing at the screens.

"People of Germany, prepare yourselves for an important statement!"

What was coming now?

The canteen was almost full. March was pressed up against a pillar. He could see Max Jaeger a few meters away, joking with a bosomy secretary from VA(1), the legal department. Max spotted him over her shoulder and gave him a grin. There was a roll of drums. The room became still. A newsreader said, "We are now going live to the Foreign Ministry in Berlin."

A bronze relief glittered in the television lights. A Nazi eagle clutching the globe shot off rays of illumination like a child's drawing of a sunrise. Before it, with his thick black eyebrows and shaded jowls, stood the Foreign Ministry spokesman, Drexler. March suppressed a laugh: you would have thought that in the whole of Germany, Goebbels could have found one spokesman who did not look like a convicted criminal.

"Ladies and gentleman, I have a brief statement for you from the Reich Ministry for Foreign Affairs." Drexler was addressing an audience of journalists, who were off camera. He put on a pair of glasses and began to read.

"In accordance with the long-standing and well-documented desire of the **Führer and People of the Greater German Reich** to live in peace and security with the countries of the world, and following extensive consultations with our allies in the European Community, the Reich Ministry for Foreign Affairs, **on behalf of the Führer**, has today issued an invitation to the president of the United States of America to visit the Greater German Reich for personal discussions aimed at promoting greater understanding between our two peoples. This invitation has been accepted. We understand that the American administration has indicated this morning that **Herr Roosevelt** intends to meet the Führer in Berlin in September. **Heil Hitler!** Long live Germany!"

The picture faded to black and another drumroll signaled the start of the national anthem. The men and women in the canteen began to sing. March pictured them at that moment all over Germany—in shipyards and steelworks and offices and schools—the hard voices and the high merged together in one great bellow of acclamation rising to the heavens.

Deutschland, Deutschland über Alles!

Über Alles in der Welt!

Appendix 3. The experimental material of the Study 3

1. If she had been in great pain one would have excused it./ If she was in great pain one excused it.
2. If you had had one, I should think she would have been a pretty, timid, little, bright-eyed sort of girl. / If you had one, I should think she was a pretty, timid, little, bright-eyed sort of girl.
3. If he had scolded her, or even shaken her, it would not have broken her heart like those few words. / If he scolded her, or even shook her, it did not break her heart like those few words.
4. If he had told them at first, they wouldn't have started away. / If he told them at first, they didn't start away.
5. If it had been Sid, she would have had no misgivings to alloy her delight. / If it was Sid, she had no misgivings to alloy her delight.
6. If I had known as much this morning, I certainly would not have called on him. / If I knew as much this morning, I certainly did not call on him.
7. If he had written to you, there would have been more particulars. / If he wrote to you, there were more particulars.
8. If he had drawn her towards him, she would never have surveyed him. / If he drew her towards him, she never surveyed him.
9. If Rebecca had not gone on her knees to General Tufto, Crawley would have been sent back to England. / If Rebecca did not go on her knees to General Tufto, Crawley was sent back to England.
10. If he had retorted or openly exasperated me, it would have been a relief and a justification. / If he retorted or openly exasperated me, it was a relief and a justification.
11. If she had done such a deed she would be safer where she was. / If she did such a deed she is safer where she was.
12. If it had not been Charles, it would have been another. / If it was not Charles, it was another.
13. If I had been easier with Joe, Joe would have been easier with me. / If I was easier with Joe, Joe was easier with me.
14. If he had come to Gardencourt he would have seen Madame Merle. / If he came to Gardencourt he saw Madame Merle.
15. If we had done it the day after the Lusitania, that would have been right. / If we did it the day after the Lusitania, that was right.
16. If she had seen me hurt, it would have made her sorrowful. / If she saw me hurt, it made her sorrowful.
17. If you had had a suitable fortune, he would have come down with something more. / If you had a suitable fortune, he came down with something more.
18. If you had told Sycorax that her son Caliban was as handsome as Apollo, she would have been pleased. / If you told Sycorax that her son Caliban was as handsome as Apollo, she was pleased.
19. If I had been able to carry my point in going to Brighton, with all my family, this would not have happened. / If I was able to carry my point in going to Brighton, with all my family, this did not happen.
20. If there had not been a Netherfield ball to prepare for and talk of, the younger Miss Bennets would have been in a very pitiable state. / If there was not a Netherfield ball to prepare for and talk of, the younger Miss Bennets was in a very pitiable state.
21. If they had come from Pondicherry in a steamer they would have arrived almost as soon as their letter. / If they came from Pondicherry in a steamer they arrived almost as soon as their letter.

22. If there had been no stony obstruction there the labor would have been useless still. / If there was no stony obstruction there the labor was useless still.
23. If you had remembered that Hareton was your cousin as much as Master Heathcliff, you would have felt how improper it was to behave in that way. / If you remembered that Hareton was your cousin as much as Master Heathcliff, you felt how improper it was to behave in that way.
24. If Dorothea had kept near her uncle, there would have been some chance. / If Dorothea kept near her uncle, there was some chance.
25. If anybody had asked Amy what the greatest trial of her life was, she would have answered at once, "My nose." / If anybody asked Amy what the greatest trial of her life was, she answered at once, "My nose."
26. If he had entered with a pistol in his hand he would scarcely have disturbed her trust in his protectiveness. / If he entered with a pistol in his hand he scarcely disturbed her trust in his protectiveness.
27. If she had not known him to be in town she would not have written to him. / If she did not know him to be in town she did not write to him.
28. If reading had not been taught, Mrs. Radcliffe would have written in vain. / If reading was not taught, Mrs. Radcliffe wrote in vain.
29. If she had not come inside the week he would have gone to London himself to fetch her. / If she did not come inside the week he went to London himself to fetch her.
30. If he had been so very agreeable, he would have talked to Mrs. Long. / If he was so very agreeable, he talked to Mrs. Long.
31. If he had not been shy he wouldn't have effected that gradual, subtle, successful conversion of it. / If he was not shy he didn't effect that gradual, subtle, successful conversion of it.
32. If there had not been so much anger, there would have been desperate awkwardness. / If there was not so much anger, there was desperate awkwardness.
33. If it hadn't been for that cousin Louisa would never have invited her to the dinner for the Duke. / If it wasn't for that cousin Louisa never invited her to the dinner for the Duke.
34. If I had begun with any appetite, he would have taken it away. / If I began with any appetite, he took it away.
35. If I had happened to have fallen into their hands, I knew what would have been my lot. / If I happened to have fallen into their hands, I knew what was my lot.
36. If they had not become intimate it would have been almost a breach of good manners. / If they did not become intimate it was almost a breach of good manners.
37. If I had taken part in it I would have done it better than this, and have written a sensible note. / If I took part in it I did it better than this, and wrote a sensible note.
38. If Ladislav had had a spark of honor he would have gone out of the country at once, and never shown his face in it again. / If Ladislav had a spark of honor he went out of the country at once, and never showed his face in it again.
39. If you had married this girl you would have been wretched. / If you married this girl you were wretched.
40. If it had been Tertius who stood opposite to her, that look of misery would have been a pang to him. / If it was Tertius who stood opposite to her, that look of misery was a pang to him.

Appendix 4. The experimental material of the Study 4

1. If she would have been in great pain one would have excused it. / If she had been in great pain one would have excused it.
2. If you would have had one, I should think she would have been a pretty, timid, little, bright-eyed sort of girl. / If you had had one, I should think she would have been a pretty, timid, little, bright-eyed sort of girl.
3. If he would have scolded her, or even shaken her, it would not have broken her heart like those few words. / If he had scolded her, or even shaken her, it would not have broken her heart like those few words.
4. If he would have told them at first, they wouldn't have started away. / If he had told them at first, they wouldn't have started away.
5. If it would have been Sid, she would have had no misgivings to alloy her delight. / If it had been Sid, she would have had no misgivings to alloy her delight.
6. If I would have known as much this morning, I certainly would not have called on him. / If I had known as much this morning, I certainly would not have called on him.
7. If he would have written to you, there would have been more particulars. / If he had written to you, there would have been more particulars.
8. If he would have drawn her towards him, she would never have surveyed him. / If he had drawn her towards him, she would never have surveyed him.
9. If Rebecca would not have gone on her knees to General Tufto, Crawley would have been sent back to England. / If Rebecca had not gone on her knees to General Tufto, Crawley would have been sent back to England.
10. If he would have retorted or openly exasperated me, it would have been a relief and a justification. / If he had retorted or openly exasperated me, it would have been a relief and a justification.
11. If she would have done such a deed she would be safer where she was. / If she had done such a deed she would be safer where she was.
12. If it would not have been Charles, it would have been another. / If it had not been Charles, it would have been another.
13. If I would have been easier with Joe, Joe would have been easier with me. / If I had been easier with Joe, Joe would have been easier with me.
14. If he would have come to Gardencourt he would have seen Madame Merle. / If he had come to Gardencourt he would have seen Madame Merle.
15. If we would have done it the day after the Lusitania, that would have been right. / If we had done it the day after the Lusitania, that would have been right.
16. If she would have seen me hurt, it would have made her sorrowful. / If she had seen me hurt, it would have made her sorrowful.
17. If you would have had a suitable fortune, he would have come down with something more. / If you had had a suitable fortune, he would have come down with something more.
18. If you would have told Sycorax that her son Caliban was as handsome as Apollo, she would have been pleased. / If you had told Sycorax that her son Caliban was as handsome as Apollo, she would have been pleased.
19. If I would have been able to carry my point in going to Brighton, with all my family, this would not have happened. / If I had been able to carry my point in going to Brighton, with all my family, this would not have happened.
20. If there would not have been a Netherfield ball to prepare for and talk of, the younger Miss Bennets would have been in a very pitiable state. / If there had not been a Netherfield ball to prepare for and talk of, the younger Miss Bennets would have been in a very pitiable state.

21. If they would have come from Pondicherry in a steamer they would have arrived almost as soon as their letter. / If they had come from Pondicherry in a steamer they would have arrived almost as soon as their letter.
22. If there would have been no stony obstruction there the labor would have been useless still. / If there had been no stony obstruction there the labor would have been useless still.
23. If you would have remembered that Hareton was your cousin as much as Master Heathcliff, you would have felt how improper it was to behave in that way. / If you had remembered that Hareton was your cousin as much as Master Heathcliff, you would have felt how improper it was to behave in that way.
24. If Dorothea would have kept near her uncle, there would have been some chance. / If Dorothea had kept near her uncle, there would have been some chance.
25. If anybody would have asked Amy what the greatest trial of her life was, she would have answered at once, "My nose." / If anybody had asked Amy what the greatest trial of her life was, she would have answered at once, "My nose."
26. If he would have entered with a pistol in his hand he would scarcely have disturbed her trust in his protectiveness. / If he had entered with a pistol in his hand he would scarcely have disturbed her trust in his protectiveness.
27. If she would not have known him to be in town she would not have written to him. / If she had not known him to be in town she would not have written to him.
28. If reading would not have been taught, Mrs. Radcliffe would have written in vain. / If reading had not been taught, Mrs. Radcliffe would have written in vain.
29. If she would not have come inside the week he would have gone to London himself to fetch her. / If she had not come inside the week he would have gone to London himself to fetch her.
30. If he would have been so very agreeable, he would have talked to Mrs. Long. / If he had been so very agreeable, he would have talked to Mrs. Long.
31. If he would not have been shy he wouldn't have effected that gradual, subtle, successful conversion of it. / If he had not been shy he wouldn't have effected that gradual, subtle, successful conversion of it.
32. If there would not have been so much anger, there would have been desperate awkwardness. / If there had not been so much anger, there would have been desperate awkwardness. / If there was not so much anger, there was desperate awkwardness.
33. If it wouldn't have been for that cousin Louisa would never have invited her to the dinner for the Duke. / If it hadn't been for that cousin Louisa would never have invited her to the dinner for the Duke.
34. If I would have begun with any appetite, he would have taken it away. / If I had begun with any appetite, he would have taken it away.
35. If I would have happened to have fallen into their hands, I knew what would have been my lot. / If I had happened to have fallen into their hands, I knew what would have been my lot.
36. If they would not have become intimate it would have been almost a breach of good manners. / If they had not become intimate it would have been almost a breach of good manners.
37. If I would have taken part in it I would have done it better than this, and have written a sensible note. / If I had taken part in it I would have done it better than this, and have written a sensible note.
38. If Ladislav would have had a spark of honor he would have gone out of the country at once, and never shown his face in it again. / If Ladislav had had a spark of honor he would have gone out of the country at once, and never shown his face in it again.

39. If you would have married this girl you would have been wretched. / If you had married this girl you would have been wretched.
40. If it would have been Tertius who stood opposite to her, that look of misery would have been a pang to him. / If it had been Tertius who stood opposite to her, that look of misery would have been a pang to him.

Appendix 5. The list of literature from Project Gutenberg

1. *Wuthering Heights* by Emily Bronte
2. *The Adventures of Huckleberry Finn* by Mark Twain
3. *Pride and Prejudice* by Jane Austen
4. *Jane Eyre* by Charlotte Bronte
5. *The Life and Adventures of Robinson Crusoe* by Daniel Defoe
6. *Gulliver's Travels into Several Remote Nations of the World* by Jonathon Swift
7. *Great Expectations* by Charles Dickens
8. *The Picture of Dorian Gray* by Oscar Wilde
9. *Persuasion* by Jane Austen
10. *Emma* by Jane Austen
11. *David Copperfield* by Charles Dickens
12. *Little women* by Lousisa May Alcott
13. *The Sun also Rises* by Ernest Hemingway
14. *Middlemarch* by George Eliot
15. *Sense and Sensibility* by Jane Austen
16. *Oliver Twist* by Charles Dickens
17. *Vanity Fair* by William Makepeace Thackeray
18. *Great Gatsby* by Scott Fitzgerald
19. *A tale of two cities* by Charles Dickens
20. *The grapes of wrath* by John Steinbeck
21. *Northanger Abbey* by Jane Austen
22. *A Christmas Carol* by Charles Dickens
23. *The Adventures of Sherlock Holmes* by Arthur Conan Doyle
24. *The Time machine* by Wells
25. *Treasure Island* by Robert-Louis Stevanson
26. *The Adventures of Tom Sawyer* by Mark Twain
27. *White Fang* by Jack London
28. *Tess of the d'Urbervilles: A Pure Woman* by Thomas Hardy
29. *The Portrait of a lady* by Henry James
30. *Mansfield Park* by Jane Austen
31. *Joy in the morning* by Mary Raymond Shipman Andrews
32. *Mrs Dalloway in Bond Street* by Virginia Woolf

33. *The Age of Innocence* by Edith Wharton
34. *The Good Soldier* by Ford Madox Ford
35. *The History of Mr Polly* by H.G. Wells
36. *The Sign of the Four* by Arthur Conan Doyle
37. *Poirot Investigates* by Agatha Christie
38. *The Murder on the Links* by Agatha Christie
39. *The Return of Sherlock Holmes* by Arthur Conan Doyle
40. *The Mysterious Affair at Styles* by Agatha Christie
41. *The Man in the Brown Suit* by Agatha Christie
42. *The Memoirs of Sherlock Holmes* by Arthur Conan Doyle
43. *The Valley of Fear* by Arthur Conan Doyle
44. *A Study in Scarlet* by Arthur Conan Doyle

Appendix 6. The working memory capacity test

Participant ID: _____

Test 1

Instruction:

You will listen to letters. If you heard the same letter 2 letters ago counting from the currently heard letter, please write this letter down.

Example: A P ² N ¹ P C ² D ¹ C A D ² G ¹ D

Correct example answer: P C D

Before conducting a real test, you will do a practice test. You will hear 14 letters for practice. Write down below the letters that you heard 2 letters ago counting from the currently heard letter.

You can write down your practice test answer here: _____

Your practice test answer will not be counted. Please check your practice test answer with the correct answer from recording to understand whether everything is clear. If something is not clear, please ask the instructor to explain.

Now you are ready to do the test.

You will hear in total 27 letters and you should write down 9 **letters** that you heard 2 letters ago counting from the currently heard letter. Please write 9 letters in the table provided below in the correct order.

Your answer:

Appendix 7. The grammar test on conditionals

Participant ID: _____

Test 2

Please choose an appropriate option to fill the gap. Only ONE option is correct.

1. I'll never forget _ her for the first time.

- a) meeting
- b) to have met
- c) to meet

5. If she comes, I _ call you.

- a) will
- b) would
- c) would have

2. Where _?

- a) works John
- b) John does work
- c) does John work

6. I _ for you all day yesterday.

- a) looked
- b) was looking
- c) have been looking

3. What would you do if it _ on your wedding day?

- a) rained
- b) would rain
- c) will rain

7. If he _ strawberries, he got sick.

- a) eats
- b) ate
- c) will eat

4. I like _ early in summer.

- a) get up
- b) to getting up
- c) getting up

8. Let's take an umbrella. _.

- a) It rains
- b) It rained
- c) It's raining

9. If they _ the car, I would have driven you.

- a) had not taken
- b) didn't take
- c) have not taken

10. Sorry, I can't meet you tonight. I _ with some friends.

- a) will go out
- b) go out
- c) am going out

11. When I _ home, I _ to bed straight away.

- a) got/had gone
- b) got/went
- c) was getting/went

12. If you _ water, it _ to ice.

- a) freeze/turns
- b) will freeze/turns
- c) froze/will turn

13. Last week I stayed with my sister _ a few days.

- a) for
- b) since
- c) during

14. If I _ the opportunity, I would have gone to the university.

- a) had
- b) had had
- c) have had

15. I _ on the computer all day. My eyes are sore.

- a) have been working
- b) was working
- c) had been working

16. If you _ at the embassy, you met the ambassador.

- a) worked
- b) work
- c) will work

17. Peter should spend _ time on the computer

- a) less
- b) a few
- c) fewer

18. If you _ me, we would have been both happy.

- a) had married
- b) have married
- c) married

19. He wanted to know _.

- a) who I was waiting for.
- b) for who I was waiting
- c) who was I waiting for

20. If he _ language exam, he passed it for sure.

- a) took
- b) takes
- c) would take

21. There's something you want to say, _?

- a) does it
- b) is it
- c) isn't there

22. If your computer_, you lost unsaved work.

- a) crashes
- b) crashed
- c) will crash

23. I really _ give up eating chocolate.

- a) must
- b) need
- c) ought

24. What was the last film _ you saw?

- a) that
- b) who
- c) what

25. The student apologised _ the professor _ being late.

- a) to/of
- b) to/for
- c) for/of