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**Big Five Personality Traits, Achievement Emotions, and Emotion Regulation:
Interplay in Learning Contexts for Children, Adolescents, and Adults**

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General Abstract in English

Personality, achievement emotions, and emotion regulation are constructs that have been widely investigated in the psychological literature, considering different age stages. However, their link has been rarely studied, especially in learning contexts. Using well-established theoretical frameworks such as the Big Five Model (BFM; Goldberg, 1993), the Control-Value Theory of achievement emotions (CVT; Pekrun, 2006, 2024), the Process Model of Emotion Regulation (PMER; Gross, 1998, 2015), and the Emotion Regulation in Achievement Situations model (ERAS; Harley et al., 2019), in this dissertation the aim is to examine in depth the relation between these constructs by taking into account different age groups (children, adolescents, and adults) and various learning contexts (school, university, and an intervention focused on emotional competence). Moreover, the prerequisite for studying such relations is the availability of valid, reliable, and age-appropriate measurement instruments.

Accordingly, the aim of the five studies described here has been to answer to three methodological, theoretical, and applied research questions: (1) “How can the Big Five personality traits be measured validly and reliably in children and adolescents?”; (2) “How are the Big Five personality traits and emotion regulation strategies related to the achievement emotions experienced by children, adolescents, and adults in learning contexts?”; (3) “How are the Big Five personality traits associated with learning in an intervention designed to enhance adolescents’ emotional competence?”.

We addressed the first research question in Studies 1 and 4, the second research question in Studies 2 and 3, and the third research question in Study 5.

Study 1 comprises a systematic review that identified articles describing the development or validation of self-report questionnaires for measuring Big Five traits in children and/or adolescents. We selected 24 articles about 10 questionnaires. This study permitted the description of the main characteristics of these instruments and the available evidence on their structural validity and internal consistency.

Study 2 investigated how sex, age, Big Five traits, and four emotion regulation strategies were associated with 10 school-related achievement emotions in a sample of 330 fourth, sixth, and seventh-graders in Italy. In line with the CVT, all the examined factors showed significant relations to the considered emotions. Among personality traits, Extraversion, Conscientiousness, and Openness (but not Neuroticism) were found to be protective factors for emotional well-being at school. Regarding emotion regulation strategies, some

revealed adaptive patterns (Actively Approaching and Positive Refocusing), while others showed maladaptive ones (Withdrawal and Catastrophizing).

Involving 754 university students in Italy and the United Kingdom, Study 3 examined the relation among Big Five traits, four emotion regulation strategies, and 10 study-related achievement emotions, also investigating the mediational role of emotion regulation strategies between the other two constructs and how these relations vary based on gender and country. Consistent with the hypotheses, Extraversion, Agreeableness, Conscientiousness, and Openness were generally associated positively with adaptive strategies (Actively Approaching and Refocus on Planning) and positive emotions, and negatively with maladaptive strategies (Withdrawal and Catastrophizing) and negative emotions (with some exceptions), and vice versa for Neuroticism. Moreover, Actively Approaching demonstrated positive relations to some positive emotions, Withdrawal a positive link to boredom, and Catastrophizing positive associations with hope and some negative emotions. These strategies were also found to be significant mediators of some indirect paths between Big Five traits and emotions. Additionally, we found some differences between Italy and the United Kingdom.

Study 4 led to the development of the *15-item Dichotomous Big Five Inventory-2* (BFI-2-15D), a brief, self-report, dichotomous questionnaire designed to assess the Big Five traits in children and/or adolescents. Involving a sample of 970 second, fourth, sixth, and seventh-graders, the new questionnaire has been adapted from Soto and John's (2017b) *Big Five Inventory-2* (BFI-2). Despite some issues with internal consistency due to the instrument's characteristics, the BFI-2-15D demonstrated good psychometric properties. Study 5 evaluated the efficacy of an evidence-based intervention designed to promote emotional competence in adolescence, also examining how the Big Five traits (as measured by readapting the BFI-2-15D) can impact learning in this context. Involving 265 sixth and seventh-graders, divided into an experimental and a control group, we documented the efficacy of the training program in increasing knowledge of facial expressions of emotions, emotional lexicon, and emotion regulation strategies. Moreover, emotional vocabulary learning was greater among participants with high levels of Agreeableness and Conscientiousness, whereas the learning of emotion regulation strategies was greater among those with high levels of Neuroticism.

In conclusion, beyond providing researchers and practitioners with instruments to assess personality in young people, this dissertation emphasizes the importance of understanding personality traits and emotion regulation strategies in education,

suggesting that equipping students with effective regulation skills is key to their emotional well-being and, more generally, academic success.

Keywords: personality, Big Five, achievement emotions, emotion regulation, emotional competence

General Abstract in Italian

Personalità, emozioni di riuscita e regolazione delle emozioni sono costrutti ampiamente indagati nella letteratura psicologica, prendendo in considerazione differenti fasce di età. Tuttavia, il loro legame, soprattutto all'interno di contesti di apprendimento, è stato studiato raramente. Utilizzando cornici teoriche ben consolidate come il Modello dei Big Five (BFM; Goldberg, 1993), la Teoria del Controllo-Valore delle emozioni di riuscita (CVT; Pekrun, 2006, 2024), il Modello Processuale della Regolazione delle Emozioni (PMER; Gross, 1998, 2015), e il modello sulla Regolazione delle Emozioni in Situazioni di Riuscita (ERAS; Harley et al., 2019), in questa tesi si intende approfondire la relazione tra questi costrutti prendendo in esame diverse fasce di età (bambini/e, adolescenti e adulti/e) e diversi contesti di apprendimento (scuola, università e un intervento sulla competenza emotiva). Inoltre, requisito preliminare per lo studio di tali relazioni è la disponibilità di strumenti di misura validi, attendibili e adeguati all'età dei/le partecipanti.

Pertanto, l'obiettivo dei cinque studi qui descritti è stato quello di rispondere a tre domande di ricerca di natura metodologica, teorica, e applicativa: (1) "Come si possono misurare i tratti di personalità Big Five in modo valido e attendibile in bambini/e e adolescenti?"; (2) "Come si legano i Big Five e le strategie di regolazione delle emozioni alle emozioni di riuscita di bambini/e, adolescenti e adulti/e nei contesti di apprendimento?"; (3) "Come si associano i Big Five all'apprendimento in un intervento volto a promuovere la competenza emotiva degli/le adolescenti?". La prima domanda di ricerca è stata affrontata negli Studi 1 e 4, la seconda negli Studi 2 e 3 e la terza nello Studio 5.

Lo Studio 1 consiste in una revisione sistematica tramite cui sono stati identificati gli articoli sullo sviluppo o sulla validazione di questionari self-report per misurare i Big Five in bambini/e e/o adolescenti. Sono stati selezionati 24 articoli riguardanti 10 questionari. Questo studio ha permesso di descrivere le principali caratteristiche di tali strumenti e le evidenze disponibili rispetto alla loro validità strutturale e consistenza interna.

Lo Studio 2 ha indagato come sesso, età, Big Five e strategie di regolazione delle emozioni sono associati a 10 emozioni di riuscita riferite alla scuola in un campione di 330 studenti/esse del quarto anno di scuola primaria e del primo e secondo anno di scuola secondaria di primo grado in Italia. In linea con la CVT, tutti i fattori esaminati hanno

mostrato alcune relazioni significative con le emozioni considerate. Tra i tratti di personalità, Estroversione, Coscienziosità e Apertura Mentale (ma non Nevroticismo) sono risultati fattori protettivi del benessere emotivo a scuola. Per quanto riguarda le strategie di regolazione delle emozioni, alcune si sono rivelate adattive (Approccio Attivo e Rifocalizzazione Positiva) e altre maladattive (Ritiro e Catastrofizzazione).

Lo Studio 3, coinvolgendo 754 studenti/esse universitari/e in Italia e nel Regno Unito, ha esaminato la relazione tra Big Five, strategie di regolazione delle emozioni e emozioni di riuscita legate allo studio, indagando anche il ruolo di mediatore delle strategie di regolazione delle emozioni tra gli altri due costrutti e come queste relazioni varino in base al genere e al Paese. In linea con le ipotesi, Estroversione, Amicalità, Coscienziosità e Apertura Mentale hanno mostrato perlopiù legami positivi con le strategie adattive (Approccio Attivo e Rifocalizzazione sulla Pianificazione) e le emozioni positive e legami negativi con le strategie maladattive (Ritiro e Catastrofizzazione) e le emozioni negative (con alcune eccezioni), e viceversa per il Nevroticismo. Inoltre, l'Approccio Attivo ha mostrato relazioni positive con alcune emozioni positive, il Ritiro un legame positivo con la noia, e la Catastrofizzazione legami positivi con la speranza e alcune emozioni negative. Queste tre strategie sono risultate anche mediatori significativi in alcuni legami indiretti tra Big Five ed emozioni. Inoltre, sono emerse alcune differenze tra Italia e Regno Unito.

Lo Studio 4 ha portato allo sviluppo del *15-item Dichotomous Big Five Inventory-2* (BFI-2-15D), un breve questionario self-report a risposta dicotomica per valutare i Big Five in bambini/e e adolescenti. Coinvolgendo un campione di 970 bambini/e di classe seconda e quarta di scuola primaria, e prima e seconda di scuola secondaria di primo grado, il nuovo questionario è stato adattato a partire dal *Big Five Inventory-2* (BFI-2) di Soto e John (2017b). Nonostante alcuni problemi di consistenza interna dovuti alle caratteristiche dello strumento, il BFI-2-15-D ha dimostrato buone proprietà psicometriche.

Lo Studio 5 ha testato l'efficacia di un intervento evidence-based per promuovere la competenza emotiva in adolescenza, indagando anche come i Big Five (misurati con un riadattamento della BFI-2-15D) possano influenzare l'apprendimento in questo contesto. Coinvolgendo 265 studenti/esse di classe prima e seconda della scuola secondaria di primo grado, divisi in gruppo sperimentale e di controllo, abbiamo documentato l'efficacia del training nell'aumentare le conoscenze su espressioni facciali delle emozioni, lessico emotivo e strategie di regolazione delle emozioni. Inoltre,

l'apprendimento del lessico emotivo è risultato maggiore nei/le partecipanti con elevate Amicalità e Coscienziosità e l'apprendimento delle strategie di regolazione delle emozioni è stato maggiore in coloro con alti livelli di Nevroticismo.

In conclusione, oltre a fornire a ricercatori e professionisti strumenti per valutare la personalità nei giovani, questa tesi sottolinea l'importanza di comprendere i tratti di personalità e le strategie di regolazione delle emozioni in ambito educativo, suggerendo che dotare gli/le studenti/esse di capacità di regolazione efficaci costituisce un elemento fondamentale per il loro benessere emotivo e, più in generale, il loro successo accademico.

Parole chiave: personalità, Big Five, emozioni di riuscita, regolazione delle emozioni, competenza emotiva

Chapter 1. General Introduction

1.1 Main Theoretical Constructs

This dissertation presents a collection of five studies that grounded in three theoretical constructs: the Big Five personality traits, achievement emotions, and emotion regulation. The general aim of this project was to explore the interrelations among these constructs across various learning contexts (i.e., school, university, and an emotional competence training program) and samples (i.e., children in primary school, adolescents in middle school, and adult university students). In the following paragraphs, the theoretical framework that underpins this doctoral project is described. Additional details regarding the relevant literature supporting each study are presented in the corresponding chapters.

1.1.1 Big Five Personality Traits

Personality refers to the relatively stable tendencies of individuals to think, feel, and behave in specific ways, regardless of the situation or time (Carver & Scheier, 2012; Damian et al., 2019; Shiner et al., 2021). The Big Five Model (BFM¹; Goldberg, 1993) is among the most widespread and commonly used theoretical frameworks for describing personality. According to this framework, individuals are characterized by five bipolar, broad, and general traits, which are in turn defined by a series of more narrow and specific facets (John et al., 2008).

There are different labels for referring to the Big Five traits, mainly due to the existence of two different traditions that led to the BFM, i.e., the “lexical hypothesis” (Allport & Odbert, 1936; Galton, 1884; Norman, 1963) and the line of research based on factorial analyses of personality questionnaires (McCrae & Costa, 1985)². Factor I is generally known as Extraversion (also named Surgency or Assertiveness; Borgatta, 1964; Norman, 1963), and it describes people who have an energetic approach, especially in social relationships; it includes facets such as sociability, assertiveness,

¹ Acronyms are defined at their first occurrence in each chapter.

² In the following chapters, we use the labels from the instrument we utilized to measure personality in each study.

activity, and positive emotionality (John et al., 2008). Factor II is usually called Agreeableness (alternatively labelled as Agreeability, Benevolence, Likeability, or Friendly Compliance; Borgatta, 1964; Digman, 1990; Ruisel, 1998; Vollrath et al., 2016), and it depicts a prosocial and communal attitude towards others; it includes facets such as modesty, trust, tender-mindedness, and altruism (John et al., 2008). Factor III is frequently named as Conscientiousness (also called Responsibility or Will to Achieve; Borgatta, 1964; Digman, 1990), and it refers to the control of socially-related impulses which helps keep behaviors and cognitions focused on achieving goals; it includes facets such as order, industriousness, reliability, and self-discipline (John et al., 2008). Factor IV is usually called Neuroticism (also known as Emotionality, Emotional Instability, or Negative Emotionality; Barbaranelli et al., 2003; Borgatta, 1964; Norman, 1963; Soto & John, 2017b), and it relates to negative emotionality and emotional instability; it includes facets such as anxiety, irritability, depression, and vulnerability (John et al., 2008). Finally, Factor V is generally named Openness (but it has many different alternative labels such as Culture, Intelligence, Intellect, Open-Mindedness, or Openness to Experience; Borgatta, 1964; Costa & McCrae, 1985; Digman, 1990; Norman, 1963; Soto & John, 2017b), and it is typical of individuals with a broad, deep, original, and complex mindset and life experience; it includes facets such as intellect, aesthetics, imagination/creativity, and adventurousness (John et al., 2008).

1.1.1.1 Developmental Issues

The BFM was repeatedly confirmed as a valid framework for understanding personality in adults (Caspi et al., 2005). However, increasing evidence supports the use of this model also for describing individual differences in children and adolescents (Caspi et al., 2005; Shiner, 2010; Soto & Tackett, 2015).

Traditionally, research about personality characteristics in childhood has focused on the concept of temperament (Caspi et al., 2005). Temperament refers to variations in behavior, emotions, and emotional regulation that can be observed in early childhood (McAdams, 2019). According to Rothbart and Bates's (2006) model, it is possible to distinguish three traits, i.e., Surgency, Effortful Control, and Negative Affectivity. Nonetheless, this conceptualization closely aligns with the BFM as these dimensions exhibit significant similarities to the personality traits of Extraversion, Conscientiousness, and Neuroticism, respectively (De Pauw et al., 2009; Morizot, 2014; Rothbart & Bates, 2006; Rothbart et al., 2000; Shiner, 2010). Furthermore,

numerous studies have effectively utilized the Big Five framework to assess personality, not only in school-age children and adolescents (Barbaranelli et al., 2003; Maćkiewicz & Ciecuch, 2016; Rogers & Glendon, 2018), but also in preschoolers (De Pauw et al., 2009).

However, despite the possibility of finding a similar personality structure in adults and younger people, some authors also emphasize some differences in the phenotypical manifestation of the five traits at different ages (Barbaranelli et al., 2003; Mervielde & De Fruyt, 2000). This underlines the need for valid, reliable, and age-appropriate instruments for measuring the Big Five traits in different developmental stages.

1.1.1.2 Big Five Traits and Emotional Aspects

In the last decades, research framed within the BFM has extensively examined how the Big Five traits relate to various aspects of human life, including emotions and well-being (Busseri & Erb, 2024; Costa & McCrae, 1980; Komulainen et al., 2014; Marengo et al., 2021; Penley & Tomaka, 2002; Steel et al., 2008; Verduyn & Brans, 2012).

Among the five traits, Extraversion and Neuroticism are recognized as those characterized by the strongest emotional component (Costa & McCrae, 1980; Verduyn & Brans, 2012). Research evidence has widely documented how more extraverted and less neurotic people generally report higher levels of positive emotions and life satisfaction, and lower levels of negative emotions (Busseri & Erb, 2024; Costa & McCrae, 1980; Komulainen et al., 2014; Marengo et al., 2021; Penley & Tomaka, 2002; Steel et al., 2008; Verduyn & Brans, 2012). The other traits have less strong affective nuances, and results about their relation with emotional constructs are sometimes inconsistent. However, many studies and meta-analytic findings have shown that Agreeableness, Conscientiousness, and Openness are usually positively associated with aspects of well-being and positive affect, while being negatively associated with negative affect (Busseri & Erb, 2024; Komulainen et al., 2014; Marengo et al., 2021; Penley & Tomaka, 2002; Steel et al., 2008). In addition, as underlined by the review by Hughes et al. (2020), the Big Five traits also influence the identification of which emotions require regulation, the selection of the most appropriate strategies to manage them, and their implementation tactics. As for the relation between personality traits and emotion regulation strategies, the results from a meta-analysis indicated that higher levels of Extraversion, Agreeableness, Conscientiousness, and Open-Mindedness, and

lower levels of Neuroticism were associated with higher adaptive emotion regulation strategies (e.g., reappraisal, problem solving) and lower maladaptive ones (e.g., avoidance, suppression; Barańczuk, 2019). Such differences may originate from emotion socialization practices during infancy (Eisenberg et al., 1998). These practices can vary based on the individual's personality traits (e.g., parents might be more punitive and avoidant towards their children's negative reactions if they see them as high in negative emotionality), and they can have a differentiated impact on people with different personality characteristics. Supportive or nonsupportive socialization experiences can help explain differences in the use of adaptive or maladaptive strategies for emotion regulation (Barańczuk, 2019). Collectively, these findings suggest that Extraversion, Agreeableness, Conscientiousness, and Openness serve as protective factors for emotional well-being, while Neuroticism constitutes a risk factor.

Moreover, the BFM has been used by some authors as a framework for categorizing social, emotional, and behavioral skills (Belfi & Borghans, 2024; Chernyshenko et al., 2018; John & De Fruyt, 2015; Primi et al., 2016, 2019; Soto et al., 2021, 2022; Walton et al., 2023). Given the existence of a variety of different taxonomies for classifying such abilities – for example, one of the most famous is the one proposed by the Collaborative for Academic, Social, and Emotional Learning (CASEL, n.d.) –, the aim of this recent new framework is to use the well-consolidated Big Five structure to better organize social, emotional, and behavioral skills. However, as underlined by Soto et al. (2021, 2022), it is important to keep in mind the distinction between traits and skills. While personality is conceptualized as an array of *traits*, representing relatively stable cognitive, emotional, and behavioral tendencies that people habitually enact across different times and contexts, *skills* refer to more situated capacities that an individual can demonstrate in response to particular situations. Therefore, although theoretically related, personality traits and social, emotional, and behavioral skills should be considered different concepts. All this specified, Soto et al.'s (2021, 2022) integrative model proposes a link between personality traits and some relevant emotional skills. For example, Extraversion is believed to be connected to the capacity to communicate one's own thoughts and feelings to others; Agreeableness to the capacity of understanding others' feelings; Neuroticism to the capacity to regulate emotions and stress; and Open-Mindedness to the capacity to understand one's own thoughts and feelings. This opens new directions for research on testing the relations between personality traits and socio-emotional learning (SEL) – defined as the process

of developing core competences to understand and regulate emotions, set and reach positive goals, value others' perspectives, build and sustain positive relationships, make responsible choices, and handle social situations effectively (Elias et al., 1997).

1.1.2 Achievement Emotions

Students can experience a variety of different emotions in relation to achievement contexts such as school or university. The Control-Value Theory of achievement emotions (CVT; Pekrun, 2006, 2024; Pekrun et al., 2023) represents a conceptual framework for better understanding them, also disentangling the roles of their antecedents and outcomes.

Achievement emotions are defined as “emotions related to achievement activities or achievement outcomes, that is, activities and outcomes that are judged according to competence-based standards of quality” (Pekrun, 2024, p. 83). They can be distinguished by at least three fundamental dimensions, namely valence, arousal, and object focus (Table 1.1; Pekrun et al., 2023). Valence is the hedonic tone that allows differentiation between positive and negative emotions (Pekrun et al., 2023). It is important to clarify that, in this context, the labels “positive” and “negative” do not indicate emotions' level of functional adaptiveness; rather, they refer to the pleasantness or unpleasantness of the subjective feeling. While positive or pleasant emotions are typically regarded as good and negative or unpleasant emotions as bad, there are certain situations where this pattern can be reversed (Raccanello et al., 2025a). Arousal is the level of physiological activation associated with the experience of an emotion: it refers to indicators such as heart rate, respiration activity, or electrodermal functioning and influences the motivational perception of energy and mobilization (Pekrun et al., 2023). Based on this dimension, emotions can be considered activating (high arousal) or deactivating (low arousal). Finally, achievement emotions also vary according to their object focus, a dimension that comprises two different aspects, namely the type of object and the temporal frame (Pekrun et al., 2023). Emotions can be associated with two object types, achievement activities or achievement outcomes. In turn, while emotions felt in relation to achievement activities are usually focused on the present (e.g., the enjoyment that a student experiences while attending a class), those related to outcomes can be prospective/focused on the future (e.g., the anxiety that a student feels when expecting a bad grade) or retrospective/focused on the past (e.g., the pride that a student perceives after obtaining a good grade).

Table 1.1

Three-Dimensional Taxonomy of Achievement Emotions (Adapted From Pekrun et al., 2023)

Object focus	Valence	Arousal	
		Activating	Deactivating
Activity	Positive/Pleasant	Enjoyment Excitement	Relaxation
	Negative/Unpleasant	Anger Frustration	Boredom
Outcome/Prospective	Positive/Pleasant	Hope Anticipatory joy	Assurance
	Negative/Unpleasant	Anxiety	Hopelessness
Outcome/Retrospective	Positive/Pleasant	Pride Retrospective joy Gratitude	Relief Contentment
	Negative/Unpleasant	Shame/Guilt Anger	Disappointment Sadness

1.1.2.1 Correlates of Achievement Emotions

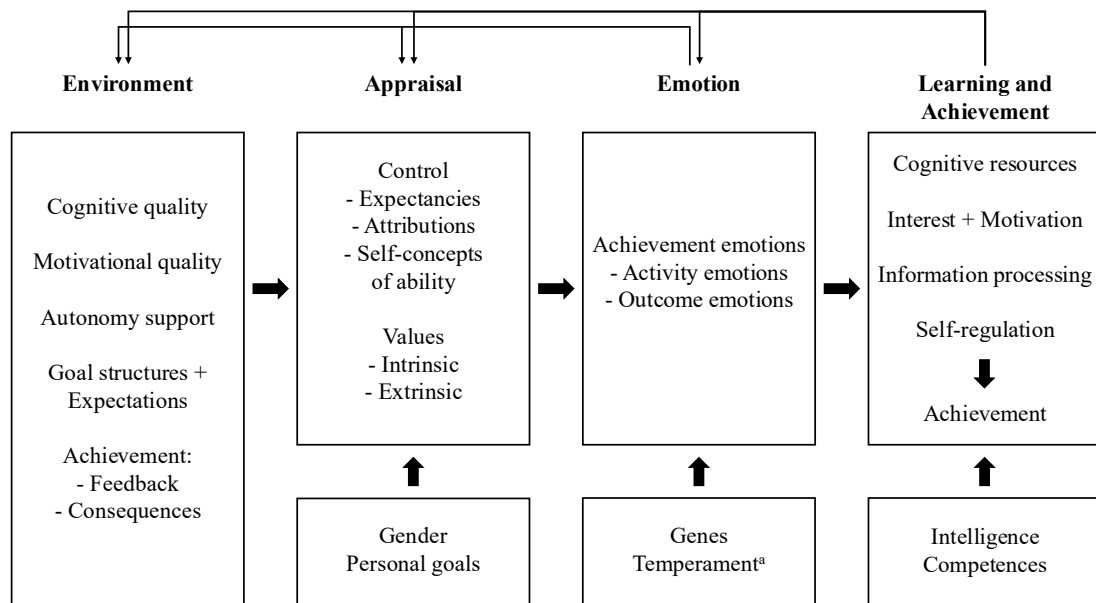
Research on achievement emotions has significantly increased over the past two decades, largely due to the CVT (Pekrun, 2006, 2024). This theory has provided a framework for a better understanding of the key antecedents and outcomes related to the emotions that students feel in learning environments (Figure 1.1).

Based on the initial version of the CVT (Pekrun, 2006), antecedents can be distinguished into proximal and distal. On the one hand, control and value appraisals are considered proximal antecedents of achievement emotions due to their direct impact on them. The perception or lack of control over an achievement activity or outcome (e.g., in terms of causal expectancies, causal attributions, or self-concepts) is thought to interact with the intrinsic or extrinsic value associated with it, resulting in different emotional states (Bieg et al., 2013; Goetz et al., 2010; Lauermann et al., 2017; Putwain et al., 2018, 2021; Raccanello et al., 2025b; Shao et al., 2020). On the other hand, other factors are assumed to influence achievement emotions both directly and indirectly through the mediation of control and value appraisals, and are therefore considered distal antecedents. Among them, there are both individual (e.g., gender, personal goals, genes, temperament) and contextual variables (e.g., cognitive/motivational quality of the context, autonomy support, goal structures, expectations, feedback, consequences of achievement). Concerning outcomes, Pekrun (2006) stated that achievement emotions can have an impact on learning and academic achievement, particularly

underlining the mediational role of other cognitive (e.g., cognitive resources, information processing), motivational (e.g., interest, motivation to learn), and regulatory factors (e.g., self-regulation).

Figure 1.1

Control-Value Theory of Achievement Emotions (Adapted From Pekrun, 2006)



Note. ^aPekrun et al. (2023) specifically included personality traits in the Control-Value Theory framework, with arrows directed both to appraisals and emotions.

In the last twenty years, this initial conceptualization of the CVT has been partially extended, while preserving its main structure (Pekrun, 2024; Pekrun & Perry, 2014; Pekrun et al., 2023). For instance, while earlier models referred to temperament as a distal antecedent of achievement emotions, Pekrun et al. (2023) specifically mentioned the Big Five personality traits, highlighting a direct link between them and both control-value appraisals and emotions. Moreover, most recently (Pekrun, 2024), the CVT has been generalized to provide a framework for understanding not only achievement emotions but also other affective constructs relevant to educational settings (e.g., epistemic emotions, social emotions, and existential emotions). In this version, the author extended the possible outcomes of emotional experiences by underlining their possible impact on health issues, beyond learning and academic performance. Furthermore, while the CVT has incorporated emotion regulation since its early conceptualizations (Pekrun, 2006), it expanded on this topic in its most recent

version (Pekrun, 2024). According to the CVT, students can manage their emotions by using five different types of regulation, which directly influence their feelings or related correlates: situation-oriented regulation focuses on environmental antecedents (e.g., selecting or modifying school-related activities); appraisal and attention-oriented regulation targets control-value proximal antecedents (e.g., changing perspective or refocusing attention); emotion-oriented regulation addresses emotions directly (e.g., suppressing the expression of an emotion); and competence-oriented regulation acts on emotion-related outcomes (e.g., increasing competencies and likelihood of success).

On the whole, research has amply proven the validity of the CVT by providing support for many of its statements. However, while the role of some correlates of achievement emotions has been widely documented (e.g., the relation of achievement emotions with control-value appraisals and academic performance; Camacho-Morles et al., 2021; Luo et al., 2016; Peixoto et al., 2017; Putwain et al., 2021), others have been underexplored and therefore need more attention (e.g., personality; Pekrun et al., 2023).

1.1.2.2 Assumptions of the Control-Value Theory

Beyond describing the antecedents and outcomes of achievement emotions, the CVT (Pekrun, 2006, 2024) includes other assumptions relevant to conducting research in this field. First, it states that achievement emotions are characterized by domain specificity. It follows that students can have very different emotional experiences in relation to different school subjects (Goetz et al., 2006; Raccanello et al., 2013). This is mainly due to the domain specificity that characterizes control and value appraisals as well: for example, meta-analytic results confirmed that the self-concepts associated with non-similar disciplines (e.g., mathematics and language) are only slightly correlated (Wan et al., 2021). In addition, achievement emotions can vary not only based on the specific domain to which they refer, but also depending on different settings of the same domain (Pekrun et al., 2011). In line with this, a student could be characterized by very diverse levels of mathematics anxiety when attending a class (non-evaluative setting) and when taking a written test (evaluative setting). On the whole, these assumptions allow us to distinguish emotions along a continuum that ranges from a state to a trait level (Pekrun et al., 2011). While, in some cases, it could be more relevant to focus on emotions elicited by specific subjects, in particular settings and time frames (state emotions), in other cases, it could be interesting to pay attention to more dispositional emotions that could occur over a longer period of time and across

different situations (trait emotions; e.g., Meyer & Schlesier, 2022; Moè et al., 2009; Obermeier et al., 2022; Raccanello et al., 2025c; Vierhaus et al., 2016).

Second, although the CVT hypothesizes specific directions in the relations between achievement emotions and their correlates, it also underlines the existence of reciprocal causation (“feedback loops”; Pekrun, 2006, 2024) among all the factors. This assumption has been supported by longitudinal studies showing how achievement emotions, control and value appraisals, and academic performance, measured at various time points, mutually influence one another (Forsblom et al., 2022; Pekrun et al., 2017).

Finally, the CVT posits that the functional associations between achievement emotions and their antecedents and outcomes are characterized by a relative universality (Pekrun, 2006, 2024; Pekrun & Goetz, 2024). It suggests that the basic mechanisms underlying the associations between emotions and their correlates should be equivalent in all human beings, regardless of gender, country, and culture (Pekrun, 2006). This does not imply that there are no gender, country, or cultural differences in these constructs; rather, it assumes that the structural patterns of relations between them remain consistent across different populations.

1.1.3 Emotion Regulation

Following Gross (1998), “emotion regulation refers to the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (p. 275). Despite the similarity with the concept of coping, the two terms indicate distinct constructs (Compas et al., 2014). One key difference is that coping focuses on stress management, while emotion regulation aims to manage both negative and positive emotions. In addition, while coping involves only controlled processes, emotion regulation includes both controlled and automatic ones.

People implement various strategies to manage their own and others’ emotions. Such strategies differ according to a range of dimensions, such as the type of processes they involve (Garnefski et al., 2001), the kind of resources they require (Phillips & Power, 2007; Thompson, 1994), and their level of adaptiveness (Garnefski et al., 2007; Putwain et al., 2025; Vierhaus et al., 2016). As regards processes, we can differentiate between behavioral and cognitive strategies (Garnefski et al., 2001). The former imply the process of “taking actions”, while the latter involve the process of “thinking”. From a developmental perspective, behavioral strategies are usually the main option for very young children (e.g., escaping from a situation behaviorally by crawling), while cognitive strategies become a valid alternative for older children, adolescents, and

adults (e.g., escaping from a situation cognitively by using distraction; Zimmer-Gembeck & Skinner, 2011). In terms of resources, there are intrapersonal strategies that rely on the individual's internal resources, and interpersonal strategies that depend on others as external resources (Phillips & Power, 2007; Thompson, 1994). While during infancy and early childhood emotion regulation depends mostly on others (e.g., a toddler needs the caregiver to stop crying), in the later stages of development, people learn progressively to rely more on themselves (e.g., an adolescent can decide to engage in a pleasant activity by their own to feel better; Crystal et al., 2008; Zimmer-Gembeck & Skinner, 2011). Finally, another debated dimension regards the goodness or level of adaptiveness of different emotion regulation strategies. Gross (1998) argued that it is not possible to decide a priori whether a strategy is good and adaptive or bad and maladaptive. In line with this position, other authors (Aldao & Nolen-Hoeksema, 2012; Vaughan-Johnston et al., 2020) suggested that the effectiveness of emotion regulation strategies depends on various factors, including the characteristics of the individual and of the situation. However, according to others (Garnefski et al., 2007; Putwain et al., 2025; Vierhaus et al., 2016), based on research evidence about their relations with negative outcomes (e.g., psychopathological symptoms), it would be possible to distinguish between generally adaptive and generally maladaptive strategies, especially when used in the long run.

1.1.3.1 Stages of Emotion Regulation

According to the Process Model of Emotion Regulation (PMER; Gross, 1998, 2015), emotions can be managed at different stages of the emotion-generative process: before their occurrence – by strategies directed to their antecedents – or once they have already emerged – by strategies directed to their expression. Gross (1998, 2015) described five families of emotion regulation strategies, namely situation selection, situation modification, attention deployment, cognitive change, and response modulation. The former four groups of strategies are considered antecedent-focused, while the latter one is response-focused.

Situation selection involves all the strategies that enable individuals to avoid or approach places, people, or objects that can elicit certain emotions (Gross, 1998, 2015). Both avoiding and approaching can be beneficial in the short term; however, in some cases, both of them can also lead to detrimental consequences in the long term. For example, a shy person may withdraw from social events due to their anxiety, achieving immediate positive effects but risking long-term isolation (Leary, 1986). At the same

time, for a sensation seeker, approaching high-adrenaline situations is particularly attractive, but it can also represent a risk for their physical health (Zuckerman, 2015).

It is not always possible to decide whether to take part or not in a situation. In cases where it is not possible, a strategy to regulate emotions is situation modification (Gross, 1998, 2015). It refers to people's efforts to change aspects of a situation in order to alter the related emotional experience. For example, if a group at the library is speaking too loudly, it is possible to ask them to lower their volume in order to recreate a more suitable environment for studying. This strategy shares common aspects with the concept of problem-focused coping proposed by Lazarus and Folkman (1984), which refers to people's efforts to modify the problem that causes stress.

Attention deployment concerns all the attempts to redirect attentional focus in order to influence emotions (Gross, 1998, 2015). It includes strategies such as distraction, concentration, and rumination. Distraction represents a way through which people focus on non-emotional elements of a situation or shift attention away from it (Gross, 1998, 2015). For example, an individual watching a boring movie can regulate their emotions by thinking about what to plan for the following weekend or by engaging in a parallel activity such as scrolling through a social network. This strategy, despite potentially having immediate beneficial effects, has an ambiguous reputation as it can be considered both adaptive and maladaptive (Wolgast & Lundh, 2017). Concentration permits the absorption of an individual's cognitive resources on a situation or task (Gross, 1998), and it is connected to Csikszentmihalyi's (2002) concept of flow – defined as a process of total involvement in an activity. Rumination involves redirecting attention to the negative feelings and consequences associated with a particular situation (Gross, 1998). Ruminating on negative emotions and aspects of an event has often been associated with the development and persistence of psychopathological disturbances and symptoms (Klonsky et al., 2021).

Cognitive change takes place when an individual modifies their appraisal of a situation to regulate their own emotions (Gross, 1998, 2015). It includes many different strategies, such as denial, isolation, intellectualization, the tendency to interpret events more positively than they actually are, downward social comparison, and reappraisal (Gross, 1998). The latter is the strategy of this family that has received much more attention from research. Reappraisal implies cognitive reframing and refers to the attempts to change the meaning of a situation that could elicit emotions (e.g., after receiving a bad grade, a student can interpret it as a push to improve rather than a

failure) or to change the self-relevance of that situation (e.g., a bystander can think that, at least, they was not personally involved in a car accident; Gross, 2015). Research results usually confirm the general goodness of this strategy in relation to resilience, mental health, and well-being (Riepenhausen et al., 2022).

Finally, response modulation is used to modify directly the physiological, experiential, or behavioral expression of an already generated emotion (Gross, 1998, 2015). This family includes the use of drugs, alcohol, cigarettes, food, physical exercise, and relaxation techniques, as well as strategies directed at regulating the expressive behavior of emotions (Gross, 1998, 2015). Among the latter, there is suppression, a frequently studied strategy that implies the inhibition of the external expression of the felt emotion, usually with detrimental effects (Chervonsky & Hunt, 2017).

In recent years, the five stages of emotion regulation described in Gross's (1998, 2015) PMER were combined with Pekrun's (2006, 2024) CVT in an integrated framework, namely the Emotion Regulation in Achievement Situations model (ERAS; Harley et al., 2019). The ERAS offered new perspectives for studying how different emotion regulation strategies impact emotions that students experience in learning settings and their antecedents (in line with the conceptualization of emotion regulation described in the latest version of the CVT; Pekrun, 2024; see paragraph 1.1.2.1).

1.1.3.2 Emotional Competence, Emotional Intelligence, and Interventions

Emotion regulation constitutes a key aspect of emotional functioning and is included in definitions of both emotional competence and emotional intelligence³.

On the one hand, emotional competence can be defined as the ability to express, understand, and regulate emotions (Denham, 1998, 2023; Denham et al., 2014). Emotional expression regards the capacity to adequately use and decode non-verbal (e.g., facial expressions, vocal bursts, body movement, and posture; Ekman, 1993;

³ In Study 5 of this dissertation, we refer to emotional competence, consistent with the most common conceptualization in developmental psychology (Denham, 1998, 2023; Denham et al., 2014).

Brooks et al., 2023; Reed et al., 2020) and verbal cues (e.g., emotional lexicon; Hunter, 2014) related to emotions. Emotion comprehension refers to the wealth of knowledge that people possess regarding the characteristics of emotions, their causes, and the potential for controlling them (Pons et al., 2004).

On the other hand, emotional intelligence as conceptualized by Mayer and Salovey (1995; Salovey & Mayer, 1990) includes four branches of skills: perceiving emotions, understanding emotions, managing emotions, and using emotions. While the former three areas share many commonalities with the three dimensions of emotional competence described by Denham (1998, 2023; Denham et al., 2014), the latter one is peculiar to this model. According to the authors, using emotions refers to the capacity of people to utilize their own emotional states for problem solving (Salovey & Mayer, 1990). For example, certain emotions can facilitate flexible planning, creative thinking, redirecting attention, and motivation in performing challenging tasks.

While various socialization processes influence the development of emotional competence or intelligence, individuals can also enhance their emotion-related skills through targeted interventions (Denham et al., 2014; Lopes & Salovey, 2004; Root & Denham, 2010). Among the various contexts in which training programs can be implemented, schools are particularly suitable due to their offering several benefits (Buckley et al., 2003). They can reach a large number of children and adolescents, help reduce high dropout rates, and provide access to students with limited resources, particularly those from low socioeconomic backgrounds. Additionally, in school, the interventions focus on the entire population rather than solely on individuals at high risk of developing mental health issues. Meta-analytic results strongly document the effectiveness of SEL programs in improving young people's social and emotional competencies (including emotion regulation skills), attitudes, prosocial behaviors, and academic achievement, and diminishing behavioral problems and emotional distress (Durlak et al., 2011, 2022). Considering the importance of these abilities in both educational settings and everyday life, it is essential to promote initiatives that foster the development of these skills, especially through interventions grounded in evidence-based research (Flay et al., 2005).

1.2 Aims of the Dissertation

This doctoral dissertation aims to address the following gaps in the literature. First, although the BFM is nowadays recognized as a useful framework to describe children and adolescents' personality (Caspi et al., 2005; Shiner, 2010; Soto & Tackett,

2015), there is still a paucity of knowledge about the validity and reliability of self-report and age-appropriate instruments specifically designed for them. Second, only a few studies have investigated the interrelations among Big Five personality traits, achievement emotions, and emotion regulation strategies, either involving primary and/or secondary school students (for exceptions, see Evans et al., 2018; Hoferichter et al., 2014; Hoferichter & Raufelder, 2015; Sorić et al., 2013) or university students (for exceptions, see de la Fuente et al., 2020, 2024; Xu et al., 2024). Third, notwithstanding the spread of SEL interventions and the evidence of their effectiveness (Durlak et al., 2011, 2022), there is a need for further research examining which factors influence learning in such contexts (e.g., personality).

To address these gaps, this doctoral project was guided by three research questions (RQs):

(1) How can the Big Five personality traits be measured validly and reliably in children and adolescents?

(2) How are the Big Five personality traits and emotion regulation strategies related to the achievement emotions experienced by children, adolescents, and adults in learning contexts?

(3) How are the Big Five personality traits associated with learning in an intervention designed to enhance adolescents' emotional competence?

Such RQs permitted the advancement of knowledge on methodological, theoretical, and applied levels. Particularly, RQ1 guided Studies 1 and 4; RQ2 underpinned Studies 2 and 3; and RQ3 represented the basis for Study 5.

1.3 Overview of the Studies

1.3.1 Study 1

The first study is reported in Chapter 2. The authors of this study are Giada Vicentini, Daniela Raccanello, and Roberto Burro, and it has been published in the *Scandinavian Journal of Psychology* (Vicentini et al., 2025b). It consists of a systematic review aimed at retrieving the articles describing the development or validation of self-report questionnaires for measuring the Big Five personality traits in children and/or adolescents. The review provides an overview of the main characteristics of 10 instruments ($n = 24$ articles), also giving details about their structural validity and internal consistency. This study served as the basis for selecting a brief, valid, and reliable questionnaire to be used in two of the following studies (Studies 2 and 4).

1.3.2 Study 2

The second study is reported in Chapter 3. The authors of this study are Giada Vicentini, David W. Putwain, Roberto Burro, and Daniela Raccanello. Using a cross-sectional design, it aims at advancing knowledge on the relation between 10 school-related achievement emotions and some of their antecedents, in a sample of Italian fourth, sixth, and seventh-graders ($n = 330$). Based on the CVT (Pekrun, 2006, 2024), we examined the interplay among demographic variables (sex⁴ and age), personality traits, and four behavioral and cognitive emotion regulation strategies (Actively Approaching, Withdrawal, Positive Refocusing, and Catastrophizing) in relation to five positive (enjoyment, pride, hope, relief, and relaxation) and five negative school-related achievement emotions (anxiety, anger, shame, hopelessness, and boredom). For measuring Big Five personality traits, we used the Italian translation (obtained through back-translation) of the *Five-Factor Model – Adolescent Personality Questionnaire* (FFM-APQ; Rogers & Glendon, 2018), i.e., one of the questionnaires retrieved in Study 1.

1.3.3 Study 3

The third study is reported in Chapter 4. The authors of this study are Daniela Raccanello, Giada Vicentini, Laura J. Nicholson, David W. Putwain, and Roberto Burro. It consists of a cross-country work in which, based on the CVT (Pekrun, 2006, 2024), we examined the relations among personality traits, four behavioral and cognitive emotion regulation strategies (Actively Approaching, Withdrawal, Refocus on Planning, and Catastrophizing), and 10 achievement emotions in a sample of adult students attending university in Italy ($n = 501$) or in the United Kingdom ($n = 253$). By using a cross-sectional design, we tested the mediational role of emotion regulation in the relation between the Big Five personality traits and five positive (enjoyment, pride, hope, relief, and relaxation) and five negative achievement emotions (anxiety, anger, shame, hopelessness, and boredom) that students could have felt in relation to studying

⁴ In Studies 2, 4, and 5, we used the term “sex” to refer to the binary categorization assigned at birth, while in Study 3, we utilized the term “gender” to denote a social construct and personal identity (American Psychological Association, 2024).

at university. Additionally, we employed multi-group comparisons to assess the structural invariance of the relations across gender and country.

1.3.4 Study 4

The fourth study is reported in Chapter 5. The authors of this study are Giada Vicentini, Daniela Raccanello, and Roberto Burro. Considering the paucity of brief instruments for measuring young people's personality that emerged in Study 1, it describes the development of a new short self-report questionnaire to assess the Big Five traits in children and/or adolescents using a dichotomous response scale, i.e., the *15-Item Dichotomous Big Five Inventory-2* (BFI-2-15D). It is based on Soto and John's (2017b) *Big Five Personality Inventory-2* (BFI-2) and, particularly, on the Italian version analyzed with the Rasch model provided by Burro et al. (2025; BFI-2-R). We involved a sample ($n = 970$) of Italian children (second and fourth-graders) and adolescents (sixth and seventh-graders). We examined the structural validity and internal consistency of the BFI-2-15D, its measurement invariance across sex and age levels, and its discriminant and concurrent validity. For investigating its concurrent validity, we compared the results of the BFI-2-15D with those of one of the self-report instruments retrieved in Study 1 (i.e., FFM-APQ; Rogers & Glendon, 2018).

1.3.5 Study 5

The fifth study is reported in Chapter 6. The authors of this study are Giada Vicentini, Roberto Burro, and Daniela Raccanello. It describes the design and implementation of an intervention (entitled *A compass for emotions*) to increase emotional competence (Denham, 1998, 2023; Denham et al., 2014; Root & Denham, 2010) in a sample of adolescents attending grades 6 and 7 in Italian middle schools. The intervention comprised four units aimed at increasing students' knowledge about: (a) non-verbal expression of emotions; (b) emotional lexicon to verbally communicate affective states; (c) intensity of emotions and their antecedents; and (d) emotion regulation strategies. Among the emotion regulation strategies promoted during the intervention, we also focused on those considered most beneficial based on Studies 2 and 3. Following the standard for evidence-based research (Flay et al., 2005), we tested the efficacy of the intervention by dividing participants into an experimental ($n = 128$) and a control ($n = 137$) group, and by comparing pretests and posttests. Moreover, we explored how personality characteristics were related to learning in this intervention. For measuring the Big Five traits, we used an adaptation of the BFI-2-15D developed in Study 4.

Chapter 2. Self-Report Questionnaires to Measure Big Five Personality Traits in Children and Adolescents: A Systematic Review

2.1 Abstract

Personality can be described by referring to the so-called Big Five traits, i.e., Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. These dimensions contribute to explaining individual differences not only in adults but also in children and adolescents. Although many authors used adult or other-report instruments to assess the Big Five in young people, others developed or adapted specific self-report measures for them. A systematic overview of research articles developing or validating self-report questionnaires to measure the Big Five traits in children and/or adolescents is currently absent. Accordingly, a review of the literature seems necessary to better guide practitioners and researchers interested in this assessment. We consulted PsycINFO, PubMed, and Scopus. We extracted 20 articles from the initial 1449 records, and another 4 articles by consulting their references. They described 10 questionnaires developed for seven to 18-year-olds (with one exception). We provided detailed summaries of their language, trait labels, facets, length, item types, response scale, and item development or selection procedure. The structural validity and internal consistency of the selected questionnaires were evaluated by adapting the COSMIN guideline. All the questionnaires reflect an attempt to consider the cognitive skills and individual experiences that characterize children and/or adolescents. However, our findings highlighted some limitations in the validity or reliability of some of them. These results can provide guidance for selecting the most appropriate instrument depending on the contextual needs, and for developing or adapting new questionnaires for this age group.

Keywords: Big Five, self-report, children, adolescents, systematic review

2.2 Introduction

Personality is defined as the dynamic organization of psychophysical systems determining the pattern of thoughts, feelings, and behaviors of each individual (Carver & Scheier, 2012). The American Psychological Association (n.d.) describes it as “the enduring configuration of characteristics and behavior that comprises an individual’s unique adjustment to life”, influenced by biological and social factors.

People’s personality characteristics can be summarized in five factors, usually known as the “Big Five” traits (Goldberg, 1993; McCrae & John, 1992). A variety of studies assessed these dimensions from childhood to adulthood. However, while there are many self-report scales for measuring them in adults, only a few self-report questionnaires were developed specifically for children and/or adolescents. This systematic review aimed to describe the characteristics and some validity and reliability issues of questionnaires designed to assess self-reported Big Five in young people.

2.2.1 The Big Five Model

In the scientific literature, personality has been conceptualized by a variety of approaches. Among them, one of the most utilized is the Big Five Model (BFM; Goldberg, 1993) – alternative descriptions have been offered by the HEXACO (Ashton & Lee, 2007) or temperament models (e.g., Rothbart & Bates, 2006). This model proposes that personality can be organized into five major traits, i.e., the so-called Big Five. As reported in Goldberg’s (1993) historical reconstruction, the BFM derived from two traditions. The first concerns the “lexical hypothesis”, which enabled to determine basic individuals’ characteristics by analyzing the lexicon of many different languages (Allport & Odbert, 1936; Galton, 1884; Norman, 1963). The second originated from a series of factorial analyses on standardized questionnaires about personality, which led to the identification of three main dimensions, then integrated by two other factors (McCrae & Costa, 1985). The existence of these two traditions is among the reasons underlying the use of different labels for the same factor (John et al., 2008; McCrae & John, 1992). Following one of the most widespread nomenclatures, Factor I is Extraversion, Factor II is Agreeableness, Factor III is Conscientiousness, Factor IV is Neuroticism, and Factor V is Openness. These five traits were described as “big” (Goldberg, 1981) because they represent broad first-order dimensions that can be distinguished into a variety of more specific second-order facets (John et al., 2008): for example, sociability, assertiveness, activity, and positive emotionality for Extraversion; modesty, trust, tender-mindedness, and altruism for Agreeableness; order,

industriousness, reliability, and self-discipline for Conscientiousness; anxiety, irritability, depression, and vulnerability for Neuroticism; and intellect, aesthetics, imagination/creativity, and adventurousness for Openness (Costa & McCrae, 1992; Saucier & Ostendorf, 1999; Soto & John, 2009).

2.2.2 Big Five Traits in Children, Adolescents, and Adults

The BFM has been proven to be a valid model for adult personality studies (Caspi et al., 2005). However, an increasing amount of research applies the same model to describe also children and adolescents' personality traits (Soto & Tackett, 2015), and research evidence indicated differences and similarities between childhood, adolescence, and adulthood personality.

The first issue regards the comparability of personality characteristics of the same individual as a child and, later in life, as an adult. The Big Five traits are considered both changeable and stable over time, as they are influenced by genetics and environment (Shiner, 2010). On the one hand, in line with the maturity principle (for which, during development, the average level of each trait tends to vary; Soto & Tackett, 2015), Roberts et al.'s (2006) meta-analytic results revealed that, at increasing ages, people become more socially dominant (an aspect related to Extraversion), more agreeable, more conscientious, and less neurotic. Similarly, a recent meta-analysis of longitudinal studies found high rates of mean-level change in Agreeableness, Conscientiousness, and Neuroticism (Bleidorn et al., 2022). However, this trend does not seem to apply to the Openness factor, as people show a decline in this trait after young adulthood (Caspi et al., 2005). On the other hand, consistently with the cumulative-continuity principle (for which individuals maintain their position in the rank from the highest to the lowest for each trait; Soto & Tackett, 2015), a quantitative review suggested increasing stability of personality traits over time (Roberts & Del Vecchio, 2000). Similar results have been found in Bleidorn et al.'s (2022) meta-analysis. Coherently, a 50-year longitudinal study involving more than 1700 Americans found mean-level changes in the traits due to maturity processes but, at the same time, an almost stable personality profile from adolescence to old adulthood (Damian et al., 2019). Atherton et al. (2022), involving longitudinally for 12 years about 1100 Mexican adults, reported a certain rank-order and profile stability, and mean-level declines in all the traits. However, it is yet unclear if such principles can completely describe what happens in the transition from childhood to adolescence. According to the disruption hypothesis (Denissen et al., 2013; Soto & Tackett, 2015), in those periods, the maturity

process in personality could be characterized by temporary dips due to biological, social, and psychological changes. More research with children and adolescents is needed to better explore the processes at the basis of personality development (Laceulle et al., 2023).

A second issue concerns differences between young people's and adults' personality structures. On the one hand, some evidence suggests that the five factors are not always detectable in infants and young children. Research about temperament (a construct often used to describe individual differences during childhood; Rothbart & Bates, 2006) revealed the existence of three major traits, i.e., Surgency, Effortful Control, and Negative Affectivity (somehow similar to Extraversion, Conscientiousness, and Neuroticism; De Pauw et al., 2009; Morizot, 2014; Rothbart & Bates, 2006; Shiner, 2010). Instead, other authors proposed a six-factor model for describing youths' personality traits, calling them the "Little Six", i.e., Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience, and Activity (Soto, 2016; Soto & John, 2014). On the other hand, many studies converged in finding a similar five-trait personality structure in children (at least, from the school age) and adults (De Pauw et al., 2009; Shiner, 2010). This emerged when children's personality was assessed both through scales distinguishing five dimensions and with measures capturing a larger number of traits (Shiner, 2010). However, the Big Five factors seem to have a diverse content in children compared to adults because their behaviors and experiences are different. This could explain, for example, the low reliability and validity of the Openness trait when assessed with children and adolescents (Caspi et al., 2005; Lamb et al., 2002; Mervielde et al., 1995; Mervielde & De Fruyt, 2000). We also note that some authors prefer to use different labels for young people's personality factors, like Benevolence and Imagination instead of Agreeableness and Openness (Mervielde & De Fruyt, 1999).

2.2.3 Measuring Big Five Traits in Children and Adolescents

Measuring adults' Big Five traits with valid and reliable instruments is possible, and many self-report scales are available for this purpose. Examples are the *Big Five Inventory-2* (BFI-2; Soto & John, 2017b), the *Big Five Questionnaire* (BFQ; Caprara et al., 1993), and the *Revised NEO Personality Inventory* (NEO-PI-R; Costa & McCrae, 1992). There are also many studies which investigated the Big Five personality dimensions in children and adolescents: for example, our initial search returned more than 500 records about this topic (see the Results section).

From a developmental perspective, it is important to consider the peculiarities of children and adolescents when assessing their personality (as well as other psychological constructs) for many reasons. First, it is fundamental to take into account their attention capacities. Research evidence indicates that attention span increases with age (Simon et al., 2023). As such, it is preferable to use short and less time-consuming questionnaires with children, while the use of longer instruments is feasible with adolescents. Second, it is pivotal to focus on participants' levels of text comprehension and reading skills (Kaplan, 2013). Younger children are facilitated when items are easy to understand, consist of short statements, and include a lexicon appropriate to their age. However, despite having an increased text comprehension ability, also adolescents can benefit from questionnaires using brief sentences and simple words. Moreover, the use of picture-based instruments could be a further facilitating factor for young participants (Mpundu-Kaambwa et al., 2024). Finally, specifically regarding personality assessment, questionnaires should describe situations that are familiar to the target samples (Barbaranelli et al., 2003).

2.2.3.1 Approaches to Assessing Children and Adolescents' Big Five Traits

Youths' Big Five traits are usually assessed following three approaches, i.e., using self-report scales originally developed for adults, using other-report scales, and using self-report scales specifically designed for children and adolescents (Maćkiewicz & Cieciuch, 2016; Ortet et al., 2012).

The first approach consists of the use of instruments developed for adults to collect self-report data from children and/or adolescents without any adaptation (e.g., De Fruyt et al., 2000; Jovanović, 2019; Serrano et al., 2021). This method is useful for longitudinal designs in which the participants respond on a broad time interval or for cross-sectional studies comparing youths and adults (De Fruyt et al., 2000), but it has some limitations. For example, young participants could experience difficulties in understanding some descriptors (De Fruyt et al., 2000; McCrae et al., 2005) and the items could reflect situations and aspects frequent or typical for adults but not for children or adolescents (Maćkiewicz & Cieciuch, 2016; Vollrath et al., 2016).

The second approach is related to the use of other-report measures. In the studies following this approach, parents or teachers were often involved as relevant informants about young people's personal characteristics, both with vantage and disadvantage points (Shiner et al., 2021). Parents have many occasions to observe their offspring, but often do not have a comparison group. On the contrary, teachers have access to a wide

comparison group but have the possibility to observe the target only in a limited context and time. An example of an instrument used is the *Hierarchical Personality Inventory for Children* (HiPIC; Mervielde & De Fruyt, 1999; Vollrath et al., 2016), a questionnaire specifically developed to measure children's Big Five traits through others' reports. This approach also permits gathering data with toddlers and pre-school children who have not yet developed the ability to read and answer a questionnaire by themselves (Zupančič et al., 2003). Although this approach has some strengths, such as the reduction of socially desirable answers detectable in self-report data, informants do not have access to the entire wealth of thoughts, feelings, and behaviors of another person, so their judgment could be inaccurate (Dodorico McDonald, 2008).

The third approach regards the use of self-report measures specifically developed for young people (e.g., Lounsbury et al., 2003) or scales developed for adults but adapted for children and adolescents (e.g., McCrae et al., 2005). Notwithstanding limitations such as the possible occurrence of social desirability bias, this approach can overcome the main disadvantages of the other two measurement types. These instruments take into account the cognitive developmental level and the verbal skills of the ages for which they are designed; their contents reflect personality characteristics and behaviors specific to childhood and adolescence, and they permit children and adolescents to judge their own personality characteristics, not always detectable from the outside. In addition, a meta-analytic study comparing self and other-reports about Big Five personality traits revealed that judges were strongly similar for most of the factors, in contrast with the hypothesized self-enhancement effect (Kim et al., 2019). However, it should be noted that self-report measures are particularly challenging for very young children, due to their reduced reading skills, their difficulties in comprehension, and their possible lack of the capacities to insight and to compare with others (Shiner et al., 2021).

Acknowledging that all three approaches have strengths and weaknesses, we decided to focus this systematic review on instruments belonging solely to the third one for many reasons. First, self-report questionnaires are the most used method for measuring personality traits (Dodorico McDonald, 2008). Second, from an applied perspective, it is a very economical method (Pekrun, 2020) as it enables researchers to involve young participants in a simple and quick way (e.g., through data collection in school settings), also for longitudinal and large-scale studies. Third, young people are often easier to recruit than parents or teachers (Black et al., 2021), so, in some cases,

other-reports cannot be used. Fourth, specifically when using self-reports, age-appropriate instruments are important to facilitate item comprehension and to take into account the cognitive and experiential differences of people in various developmental stages.

2.2.3.2 Validity and Reliability of Children and Adolescents' Self-Reports

An open issue regarding the measurement of the Big Five in children and adolescents regards the evidence about the validity and reliability of their self-reports. Two types of validity and reliability that questionnaires should demonstrate are, respectively, structural validity and internal consistency. The former refers to the degree to which the scores of a questionnaire adequately reflect the dimensions of the examined construct, while the latter reflects the extent to which the items belonging to the same scale are intercorrelated (Mokkink et al., 2010).

Soto et al. (2008) investigated whether children and adolescents could provide valid and reliable Big Five self-reports with a large sample of 10-to-20-year-olds administering the BFI (John et al., 1991), a scale originally developed for adults which was understandable also for fifth graders (Benet-Martínez & John, 1998). After controlling for acquiescence – i.e., the tendency to use a response style by agreeing or disagreeing with most items – they found the same five-factor structure in all the considered age groups. Conversely, they documented age differences, with better results at age 20 compared to age 10, for within-domain coherence – i.e., the internal consistency given by high correlations between items of the same dimension – and for between-domain differentiation – i.e., the low correlations between items of different dimensions. In light of these results, it is important to consider the evidence about the structural validity and internal consistency of the self-report questionnaires specifically designed for measuring Big Five traits in young people.

2.2.4 The Current Study

The aim of this study was to conduct a systematic review of self-report questionnaires measuring Big Five personality traits in children and/or adolescents. First, we identified research articles describing the development or validation (i.e., testing the measurement properties and/or providing the translation in another language) of self-report questionnaires specifically designed for assessing youths' Big Five. Second, we described their characteristics and the evidence supporting their structural validity and internal consistency.

2.3 Method

2.3.1 Search Strategy and Inclusion/Exclusion Criteria

We conducted a systematic review considering three databases, i.e., PsycINFO, PubMed, and Scopus, in November 2022. We used the following search string, combining keywords and Boolean operators: “(*big five* AND (*child** OR *adolescen**))”. Some keywords were truncated to search for various suffixes (e.g., searching *adolescen**, we obtained the results for *adolescence*, *adolescent*, and *adolescents*). We limited the research using the following additional criteria: searching for (a) keywords only in the title and/or in the abstract; (b) journal articles published in peer-reviewed journals; (c) studies involving under-18-year-old participants; (d) English language journal articles. There were no restrictions on the time period.

We considered eligible those articles describing the development or the validation of self-report questionnaires devoted to measuring children and/or adolescents’ Big Five traits. We included articles about questionnaires: (a) developed for children and/or adolescents; and (b) originally developed for adults and then adapted for children and/or adolescents (Ortet et al., 2012). We excluded articles that: (a) were not focused on the Big Five traits; (b) used Big Five questionnaires with children and/or adolescents but did not develop or validate them; (c) validated pre-existing adult Big Five questionnaires with at least a subsample of children and/or adolescents, without modifying the original questionnaire; (d) used Big Five questionnaires with adults; (e) described reviews or qualitative articles; (f) developed and/or validated other-report questionnaires to measure children and/or adolescents’ Big Five traits; (g) described the development or the validation of Big Five instruments different from questionnaires. After selecting the eligible articles from the three databases, we consulted their references and utilized the previously reported inclusion and exclusion criteria to identify other eligible articles.

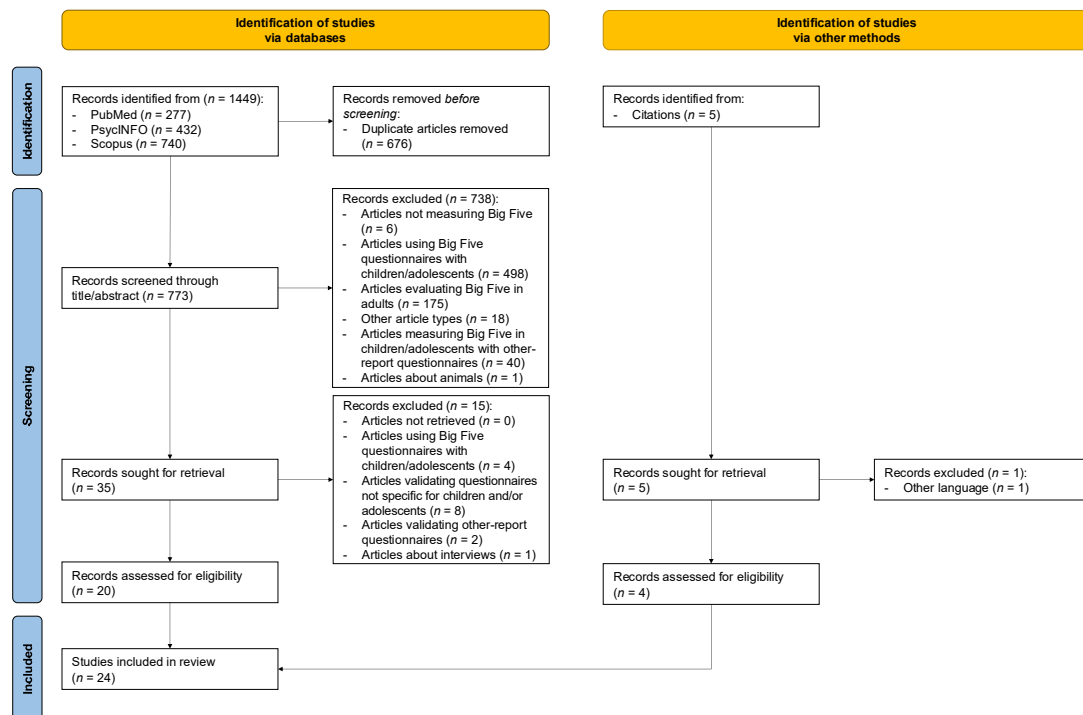
2.3.2 Analysis of the Articles

We analyzed the articles following the steps represented in the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) diagram (Page et al., 2021; Figure 2.1). A first rater conducted the identification phase downloading the references from the three databases. She found and removed duplicates using Microsoft Excel. The screening phase included different steps. The first author screened all the records based on titles and abstracts. A second rater screened the 30% of them for reliability: the agreement was very high (Cohen’s $k = .89$). Then, the first rater retrieved the full

texts and selected those eligible to be included in the review. We also identified other eligible articles by consulting the references of the records considered eligible for the review. After identifying possibly relevant references, the first rater retrieved the full texts and selected other eligible records.

For each included article, we extracted data about the questionnaire's name, author/s, publication year, sample age or grades, language, dimensions, facets, total number of items, number of items per dimension, type of items, and response scale (Tables 2.1 and 2.2). When available, we extracted data about structural validity and internal consistency to assess the quality of the questionnaires (Table 2.3).

Figure 2.1
PRISMA Diagram



2.3.3 Study Quality Assessment

We assessed the quality of the retrieved questionnaires by adapting a selection of the standards and criteria defined by the COSMIN (COnsensus-based Standards for the selection of health Measurement INstruments) guideline for systematic reviews of Patient-Reported Outcome Measures (PROMs; Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018). The COSMIN standards help to evaluate the quality of each analysis on the basis of the designs and statistical methods (with five possible ratings:

Table 2.1

Characteristics of the Selected Questionnaires. The References in Bold Indicate the Articles About the Development of the Questionnaires; the Other References Indicate the Validation Studies. If Not Differently Specified, the Questionnaires Used in the Validation Studies Have the Same Characteristics as the Original Ones

Questionnaire	Author/s and year	Sample age or grades	Original language	Dimensions	Facets	Total number of items	Number of items for each dimension	Type of items	Response scale ^a
Big Five Questionnaire - Children version (BFQ-C)	Barbarelli et al., 2003	Fourth-eighth grades	Italian	Energy/Extraversion, Agreeableness, Conscientiousness, Emotional Instability, Intellect/Openness	No	65	13	Written statements	- For elementary school: 3-point scale - For junior high school: 5-point scale (1 = <i>almost never</i> , 5 = <i>almost always</i>) 5-point scale
	Barbarelli et al., 2008	13-14	Italian	-	-	-	-	-	5-point scale
	Bore et al., 2020	11-12	English	-	-	25 ^b	5	-	3-point scale
	Bouvard & Roulin, 2017	8-12	French	-	-	-	-	-	5-point scale
	Cupani et al., 2020	12-17	Spanish	-	-	-	-	-	5-point scale
	Del Barrio et al., 2006	8-15	Spanish	-	-	-	-	-	5-point scale
	Holgado-Tello et al., 2009	8-15	Spanish	-	-	-	-	-	5-point scale
	Kokkinos & Markos, 2017	10-12	Greek	-	-	-	-	-	5-point scale
	Kokkinos et al., 2020	11-15	Greek	-	-	30	6	-	5-point scale
	Markos & Kokkinos, 2017	11-16	Greek	-	-	30	6	-	5-point scale
	Muris et al., 2005	12-17	Dutch	-	-	-	-	-	5-point scale
	Olivier & Herve, 2015	8-14	French	-	-	-	-	-	5-point scale
	Robles-Haydar et al., 2022	11-16	Spanish	-	-	30	6	-	5-point scale
Adolescent Personality Style Inventory (APSI)	Lounsbury et al., 2003	11-18	English	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	No	55	11	Written statements	5-point scale (1 = <i>strongly disagree</i> , 2 = <i>disagree</i> , 3 = <i>in-between</i> , 4 = <i>agree</i> , 5 = <i>strongly agree</i>)
Pictorial Personality Traits Questionnaire for Children (PPTQ-C)	MacKiewicz & Cieciuch, 2016	7-13	Polish	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	No	15	3	Written bipolar statements and pictures	- For 6-to-9-year-olds: 3-point scale (2 = <i>it depends</i>) - For 10-to-12-year-olds: 5-point scale (1/5 = <i>definitely yes</i> , 2/4 = <i>a little bit</i> , 3 = <i>it depends</i>)

NEO Personality Inventory-3 (NEO-PI-3)	McCrae et al., 2005	14-20	English	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	Yes	240	48	Written statements	5-point scale (1 = <i>strongly disagree</i> , 5 = <i>strongly agree</i>)
Big Five Personality Trait Short Questionnaire (BFPTSQ)	Costa et al., 2008 Morizot, 2014	12-13 12-15	- French	- Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Openness	- No	- 50	- 10	Written statements	5-point scale (0 = <i>totally disagree</i> , 1 = <i>disagree a little</i> , 2 = <i>neutral opinion</i> , 3 = <i>agree a little</i> , 4 = <i>totally agree</i>)
Junior version of the Spanish NEO Personality Inventory-Revised (JS NEO) SENNA1.0	Ortet et al., 2022 Ortet et al., 2012	12-17 12-18	Spanish Spanish	- Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	- Yes	- 240	- 48	Written statements	5-point scale (1 = <i>strongly disagree</i> , 5 = <i>strongly agree</i>)
Five-Factor Model Adolescent Personality Questionnaire (FFM-APO)	Rogers & Glendon, 2018	12-17	English	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness	No	25	5	Written statements	5-point scale (1 = <i>strongly disagree</i> , 5 = <i>strongly agree</i>)
THE WAY I AM	Ruisel, 1998	16-17	Slovak ^c	Introversion, Agreeableness, Conscientiousness, Neuroticism, Openness to New Experiences	No	60	5	Adjectives	5-point scale (1 = <i>not true for me at all</i> , 2 = <i>true for me to a small extent</i> , 3 = <i>true for me to a medium extent</i> , 4 = <i>largely true for me</i> , 5 = <i>totally true for me</i>)
-	Scholte et al., 1997	12-18	Dutch	Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Openness to Experience-Intellect	No	25	5	Written bipolar statements	7-point scale (1 = <i>Pole A very true</i> , 4 = <i>both Pole A and Pole B a little bit true</i> , 7 = <i>Pole B very true</i>)

Note. ^a We reported the anchors specified within the article. ^b The items were reduced to 20 after factor analyses. ^c Information not directly specified within the original article.

very good, adequate, doubtful, inadequate, and not applicable), and the COSMIN criteria help to assess the quality of the results (with three possible ratings: “+” if sufficient, “-” if insufficient, and “?” if indeterminate). We evaluated validity and reliability of each study in terms of structural validity and internal consistency, respectively (Table 2.3; see Appendix A for a more detailed description of the quality assessment procedure and results; see Tables A.1, A.2, and A.3 for the adapted COSMIN standards and criteria). Even though these guidelines were developed specifically for health-related research and practice, they can also be adapted to other settings (e.g., Rezai et al., 2020).

2.4 Results

2.4.1 Study Selection

The initial search yielded 1449 research articles (Figure 2.1). We found 277 articles in PubMed, 432 in PsycINFO, and 740 in Scopus. We removed 676 duplicate records, and 773 articles were screened through their title and abstract. After this screening, a total number of 738 records was excluded: six did not measure Big Five traits; 498 used adults’ Big Five questionnaires with children and/or adolescents; 175 evaluated Big Five in adults; 18 were meta-analyses, reviews, monographs, narrative reports, responses to other articles, or opening articles of special issues; 40 measured Big Five in children and/or adolescents through other-report questionnaires; and 1 was focused on animals. As a result, 35 records were sought for retrieval. Among them, we excluded 15 records: four only used Big Five questionnaires with children and/or adolescents; 8 validated questionnaires not specific for children and/or adolescents; 2 validated other-report questionnaires; and 1 described an interview-based instrument. At the end of this procedure, we considered 20 articles eligible.

After this first step, we consulted the references of these 20 articles for retrieving other eligible records. We identified 5 articles to be retrieved. One was excluded as it was not in English, and 4 were considered eligible.

In conclusion, we included in the systematic review a total number of 24 articles. Ten articles describe the development of 10 questionnaires (Table 2.1), i.e., the *Big Five Questionnaire – Children version* (BFQ-C; Barbaranelli et al., 2003), the *Adolescent Personality Style Inventory* (APSI; Lounsbury et al., 2003), the *Pictorial Personality Traits Questionnaire for Children* (PPTQ-C; Maćkiewicz & Ciecuch, 2016), the *NEO Personality Inventory-3* (NEO-PI-3; McCrae et al., 2005), the *Big Five Personality Trait Short Questionnaire* (BFPTSQ; Morizot, 2014), the *Junior version of*

Table 2.2*Summarized Description of the Selected Questionnaires*

Questionnaire	Samples	Languages	Dimensions	Facets	Length ^a	Type of items	Response scale
Big Five Questionnaire - Children version (BFC-C)	Children and adolescents	Italian, English, French, Spanish, Greek, Dutch	Energy/Extraversion, Agreeableness, Conscientiousness, Emotional Instability, Intellect/Openness	Not measured	Long (65-item version) and short (20/25 and 30-item versions)	Written statements	3 or 5-point scale
Adolescent Personality Style Inventory (APSI)	Adolescents	English	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	Not measured	Medium (55 items)	Written statements	5-point scale
Pictorial Personality Traits Questionnaire for Children (PPTQ-C)	Children and adolescents	Polish	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	Not measured	Short (15 items)	Written bipolar statements and pictures	3 or 5-point scale
NEO Personality Inventory-3 (NEO-PI-3)	Adolescents	English	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	Measured	Extra long (240 items)	Written statements	5-point scale
Big Five Personality Trait Short Questionnaire (BFPTSQ)	Adolescents	French, Spanish	Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Openness	Not measured	Medium (50 items)	Written statements	5-point scale
Junior version of the Spanish NEO Personality Inventory-Revised (JS NEO)	Adolescents	Spanish	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience	Measured	Extra long (240 items)	Written statements	5-point scale
SENNA1.0	Children and adolescents	Brazilian	Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Open-Mindedness, Locus of Control/Negative Valence	Not measured	Long (62-item version) and extra long (92-item version)	Written statements	5-point scale
Five-Factor Model Adolescent Personality Questionnaire (FFM-APQ)	Adolescents	English	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness	Not measured	Short (25 items)	Written statements	5-point scale
THE WAY I AM	Adolescents	Slovak	Introversion, Agreeability, Conscientiousness, Neuroticism, Openness to New Experiences	Not measured	Medium (60 items)	Adjectives	5-point scale
Scholte et al.'s (1997) set	Adolescents	Dutch	Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Openness to Experience-Intellect	Not measured	Short (25 items)	Written bipolar statements	7-point scale

Note. ^a We considered questionnaires with less than 30 items as short, between 31 and 60 items as medium, between 61 and 90 items as long, and with more than 90 items as extra long (e.g., Sharma, 2022).

the Spanish NEO Personality Inventory–Revised (JS NEO; Ortet et al., 2012), the *SENNA1.0* (Primi et al., 2016), the *Five-Factor Model Adolescent Personality Questionnaire* (FFM-APQ; Rogers & Glendon, 2018), the *THE WAY I AM* (Ruisel, 1998), and the set of bipolar items developed by Scholte et al. (1997). The other 14 articles describe the validation (i.e., the measurement of the psychometric properties and/or the translation in other languages) of the BFQ-C (Barbaranelli et al., 2008; Bore et al., 2020; Bouvard & Roulin, 2017; Cupani et al., 2020; del Barrio et al., 2006; Holgado-Tello et al., 2009; Kokkinos & Markos, 2017; Kokkinos et al., 2020; Markos & Kokkinos, 2017; Muris et al., 2005; Olivier & Herve, 2015; Robles-Haydar et al., 2022), the NEO-PI-3 (Costa et al., 2008), and the BFPTSQ (Ortet et al., 2022).

2.4.2 Characteristics of the Included Questionnaires

In the following paragraphs, we compared the questionnaires on the basis of their main characteristics. We took into account the samples involved in the studies, languages, dimensions, facets, number and type of items, response scale, and procedure used to develop items. Table 2.1 reports an extended description of the peculiarities of each study. A concise synthesis of the characteristics of the 10 questionnaires is reported in Table 2.2.

2.4.2.1 Samples

Participants ranged from seven (Maćkiewicz & Cieciuch, 2016) to 20-year-olds (McCrae et al., 2005). McCrae et al.'s (2005) study was the only one involving also adults: excluding it, the other samples included only children and/or adolescents, with a maximum age of 18 years (Lounsbury et al., 2003; Ortet et al., 2012; Scholte et al., 1997).

Some questionnaires were originally tested with both children and adolescents (participants were considered adolescents from 11 years or sixth grade), i.e., the BFQ-C (Barbaranelli et al., 2003), the PPTQ-C (Maćkiewicz & Cieciuch, 2016), and the SENNA1.0 (Primi et al., 2016). However, some translations of the BFQ-C were validated only with adolescents, i.e., the Dutch (Muris et al., 2005), the short English (Bore et al., 2020), the short Greek (Kokkinos et al., 2020; Markos & Kokkinos, 2017), and the short Spanish (Robles-Haydar et al., 2022) versions. Other questionnaires were developed and/or validated involving only adolescent samples, i.e., the APSI (Lounsbury et al., 2003), the NEO-PI-3 (Costa et al., 2008; McCrae et al., 2005), the BFPTSQ (Morizot, 2014; Ortet et al., 2022), the JS NEO (Ortet et al., 2012), the FFM-APQ (Rogers & Glendon, 2018), the *THE WAY I AM* (Ruisel, 1998), and the Scholte

et al.'s (1997) set.

2.4.2.2 Languages

The 10 questionnaires were developed in different languages. The original version of the BFQ-C (Barbaranelli et al., 2003, 2008) is in Italian. It was then validated in other languages, i.e., English (Bore et al., 2020), French (Bouvard & Roulin, 2017; Olivier & Herve, 2015), Spanish (Cupani et al., 2020; del Barrio et al., 2006; Holgado-Tello et al., 2009; Robles-Haydar et al., 2022), Greek (Kokkinos & Markos, 2017; Kokkinos et al., 2020; Markos & Kokkinos, 2017), and Dutch (Muris et al., 2005). The BFPTSQ (Morizot, 2014) was originally developed in French and then validated in Spanish (Ortet et al., 2022). The APSI (Lounsbury et al., 2003), the NEO-PI-3 (McCrae et al., 2005), and the FFM-APQ (Rogers & Glendon, 2018) were developed in English, while the PPTQ-C (Maćkiewicz & Cieciuch, 2016), the JS NEO (Ortet et al., 2012), the SENNA1.0 (Primi et al., 2016), and the Scholte et al.'s set (1997) are, respectively, in Polish, Spanish, Brazilian, and Dutch. As for the THE WAY I AM (Ruisel, 1998), the study does not explicitly specify the questionnaire's language. However, considering the author's affiliation we can reasonably hypothesize that it was developed in Slovak.

2.4.2.3 Dimensions

Most of the questionnaires measure only the Big Five factors, except for the SENNA1.0 (Primi et al., 2016) which also evaluates a sixth dimension called *Locus of Control/Negative Valence*. This is related to the fact that the authors did not aim to develop a personality questionnaire: they wanted to assess social and emotional skills, and, conducting factor analyses, they noticed that five out of six factors modelled on personality Big Five traits. However, even though all the questionnaires assess the same five personality factors, the authors used a variety of labels to refer to them.

Nearly all the questionnaires call Factor I *Extraversion* (Lounsbury et al., 2003; Maćkiewicz & Cieciuch, 2016; McCrae et al., 2005; Morizot, 2014; Ortet et al., 2012; Primi et al., 2016; Rogers & Glendon, 2018; Scholte et al., 1997). Similarly, Barbaranelli et al. (2003) refer to it as *Energy/Extraversion*. The questionnaire developed by Ruisel (1998) uses the label *Introversion*, emphasizing the opposite pole of the same dimension. Factor II is labelled *Agreeableness* in all the questionnaires (Barbaranelli et al., 2003; Lounsbury et al., 2003; Maćkiewicz & Cieciuch, 2016; McCrae et al., 2005; Morizot, 2014; Ortet et al., 2012; Primi et al., 2016; Rogers & Glendon, 2018; Scholte et al., 1997) with only an exception: the THE WAY I AM

(Ruisel, 1998) refers to this factor using the term *Agreeability*. As for Factor III, all the questionnaires agree to use the same label, i.e., *Conscientiousness*. For labelling Factor IV, 7 questionnaires focus on the negative characteristics of this dimension, utilizing the terms *Neuroticism* (Lounsbury et al., 2003; Maćkiewicz & Cieciuch, 2016; McCrae et al., 2005; Ortet et al., 2012; Rogers & Glendon, 2018; Ruisel, 1998) or *Emotional Instability* (Barbaranelli et al., 2003), while the other 3 questionnaires call it *Emotional Stability*, stressing the positive pole of the factor (Morizot, 2014; Primi et al., 2016; Scholte et al., 1997). Finally, Factor V appears to be the most controversial. The APSI (Lounsbury et al., 2003), the PPTQ-C (Maćkiewicz & Cieciuch, 2016), the NEO-PI-3 (McCrae et al., 2005), and the JS NEO (Ortet et al., 2012) describe it as *Openness to Experience*. Similarly, the THE WAY I AM (Ruisel, 1998) and the Scholte et al.'s (1997) set use, respectively, the label *Openness to New Experience* and *Openness to Experience-Intellect*. The SENNA1.0 (Primi et al., 2016) adopted the term *Open-Mindedness*, the BFPTSQ (Morizot, 2014) and the FFM-APQ (Rogers & Glendon, 2018) *Openness*, and the BFQ-C (Barbaranelli et al., 2003) *Intellect/Openness*. This last choice – in line with Scholte et al. (1997) – was justified by the authors focusing on the characteristics of children and young adolescents: they argue that the intellect component of the factor is more appropriate for participants of these ages as they usually have minor exposure to intellectual experiences and cultural or social opportunities than adults (Costa & McCrae, 1992).

2.4.2.4 Facets

Only 2 out of 10 questionnaires permit obtaining scores differentiated according to some facets of the Big Five factors, i.e., the NEO-PI-3 (McCrae et al., 2005) and the JS NEO (Ortet et al., 2012). They evaluate 30 facets, six for each factor: for Extraversion, warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions; for Agreeableness, trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness; for Conscientiousness, competence, order, dutifulness, achievement striving, self-discipline, and deliberation; for Neuroticism, anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability; and for Openness to Experience, fantasy, aesthetics, feelings, actions, ideas, and values. However, even though they do not provide facet-related scores, some questionnaires were developed taking them into account in selecting the items (Barbaranelli et al., 2003; Morizot, 2014; Scholte et al., 1997).

2.4.2.5 Number of Items

The questionnaires have a different number of items, both in general and for each dimension. The longest questionnaires are the NEO-PI-3 (McCrae et al., 2005) and the JS NEO (Ortet et al., 2012), with 240 items, 48 for each factor and 8 for each facet. In addition to these items, these two inventories include seven other repeated items used for preliminary controlling for random responses but excluded for calculating the total scores. Another very long measure is the SENNA1.0 (Primi et al., 2016), which comprises 92 items in the version for 10th-12th graders. This questionnaire also includes 15 items for measuring the additional dimension of *Locus of Control/Negative Valence*, so the total number of items evaluating the Big Five is 77. It is also the only questionnaire, among those included in this review, in which items are not equally distributed among the Big Five (i.e., it has 14, 15, 17, 14, and 17 items, respectively, for Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Open-Mindedness). Primi et al. (2016) also developed a reduced version for fifth graders, containing 62 items, but they did not explicit the number for each dimension. The shortest questionnaires are the PPTQ-C (Maćkiewicz & Ciecuch, 2016) – with 15 items, three for each factor –, the FFM-APQ (Rogers & Glendon, 2018), and the Scholte et al.'s (1997) set – both comprising 25 items, five for each factor. The remaining questionnaires (Barbaranelli et al., 2003; Lounsbury et al., 2003; Morizot, 2014; Ruisel, 1998) have between 50 and 65 items, equally divided for measuring each Big Five trait. Some shorter versions of the BFQ-C were validated in English (25 items, then reduced to 20; Bore et al., 2020), Greek (30 items; Kokkinos et al., 2020; Markos & Kokkinos, 2017), and Spanish (30 items; Robles-Haydar et al., 2022).

2.4.2.6 Type of Items

Comparing the questionnaires, we found different types of items. The THE WAY I AM (Ruisel, 1998) is the only questionnaire, among those selected, that uses a list of adjectives, half with positive and half with negative valence (e.g., “Timid”). Items are presented as written statements in the BFQ-C (e.g., “I like to joke”; Barbaranelli et al., 2003), the APSI (e.g., “I have a lot of energy when I am around other people”; Lounsbury et al., 2003), the NEO-PI-3 (e.g., “I act forcefully and energetically”; McCrae et al., 2005), the BFPTSQ (e.g., “I see myself as a person who... Is extraverted, sociable”; Morizot, 2014), the JS NEO (e.g., “I can't sit still in class”; Ortet et al., 2012), the FFM-APQ (e.g., “I see myself as someone who... Is very sociable”; Rogers & Glendon, 2018), and the SENNA1.0 (e.g., “Is full of energy”;

Primi et al., 2016). The Scholte et al.'s (1997) set and the PPTQ-C (Maćkiewicz & Cieciuch, 2016) have a bipolar structure: the former includes written bipolar items (e.g., “Shy, reserved/likes being with others”), while the latter combines written sentences containing bipolar adjectives with two pictures representing the same unisex character engaging in opposite behaviors (e.g., “I usually play... on my own/with others”). Maćkiewicz and Cieciuch (2016) justified their choice to develop a pictorial questionnaire considering that 7-to-11-year-old children have not entirely built the ability to reason at an abstract level yet, being more capable of thinking concretely (Piaget, 1960).

2.4.2.7 Response Scale

Focusing on the response scale, we found that the questionnaires use various formats, in some cases depending on the age group. Scholte et al. (1997) used a 7-point scale. A 5-point scale was used in the junior high school version of the BFQ-C (Barbaranelli et al., 2003), in the APSI (Lounsbury et al., 2003), in the 10-to-12-year version of the PPTQ-C (Maćkiewicz & Cieciuch, 2016), in the NEO-PI-3 (McCrae et al., 2005), in the BFPTSQ (Morizot, 2014), in the JS NEO (Ortet et al., 2012), in the SENNA1.0 (Primi et al., 2016), in the FFM-APQ (Rogers & Glendon, 2018), and in the THE WAY I AM (Ruisel, 1998). A 3-point scale was adopted for facilitating younger children in the elementary school version of the BFQ-C (Barbaranelli et al., 2003) and in the 6-to-9-year version of the PPTQ-C (Maćkiewicz & Cieciuch, 2016). All the validation studies about the BFQ-C used a 5-point scale, with the only exception of the one by Bore et al. (2020), which utilized a 3-point scale.

Moreover, most of these scales measured the level of agreement with each item (Lounsbury et al., 2003; Maćkiewicz & Cieciuch, 2016; McCrae et al., 2005; Morizot, 2014; Ortet et al., 2012; Rogers & Glendon, 2018; Ruisel, 1998; Scholte et al., 1997), and only one scale measured the frequency with which a characteristic occurs (Barbaranelli et al., 2003). For the SENNA1.0 (Primi et al., 2016), the information about the focus of the response scale was missing.

2.4.2.8 Development of the Items

The items included in the 10 questionnaires were developed or chosen taking into account different criteria. Most of the authors selected the items considering already existing measures and/or conducting a review of the literature (Barbaranelli et al., 2003; Lounsbury et al., 2003; McCrae et al., 2005; Morizot, 2014; Ortet et al., 2012; Primi et al., 2016; Ruisel, 1998; Scholte et al., 1997). For the PPTQ-C (Maćkiewicz &

Cieciuch, 2016), the authors used a deductive method, and for the FFM-APQ (Rogers & Glendon, 2018) they used both an inductive and a deductive approach. In many cases the lexicon of the items was adapted to make them more understandable (Lounsbury et al., 2003; McCrae et al., 2005; Morizot, 2014; Ortet et al., 2012; Rogers & Glendon, 2018) and to better reflect cultural aspects or descriptions more adequate for children and/or adolescents (Barbaranelli et al., 2003; Lounsbury et al., 2003; McCrae et al., 2005; Ortet et al., 2012). We briefly describe as follows the procedure utilized to develop or choose the items for each questionnaire.

Big Five Questionnaire – Children Version. It is not a mere adaptation of the adult BFQ (Caprara et al., 1993). Based on a preliminary study, Barbaranelli et al. (2003) appositely selected the items reflecting the personality-related behavioral characteristics more appropriate to describe children and adolescents rather than adults.

Adolescent Personality Style Inventory. Lounsbury et al. (2003) developed an initial pool of 91 items based on other instruments and a literature review. They also tried to make the items easy to understand for adolescents by using statements describing simply single activities, preferences, or dispositions, and by avoiding referring to certain jobs or activities typical of particular cultures. Teachers, psychologists, and students then revised the items. The authors also estimated their readability by calculating the Flesch-Kincaid grade level (equal to 3.2) and the Flesch reading ease score (equal to 88.9).

Pictorial Personality Traits Questionnaire for Children. Maćkiewicz and Cieciuch (2016) deductively developed a pool of 25 items describing behaviors and asked a professional graphic designer to draw the corresponding images. Then, they involved two personality psychologists in a validation step. The authors decided to use a combination of textual statements and pictures, considering the level of cognitive abilities of young children. Finally, they further selected the items by conducting a pilot study.

NEO Personality Inventory-3. It constitutes an adaptation for adolescents of the adult NEO-PI-R (Costa & McCrae, 1992). As a first step, McCrae et al. (2005) identified 48 potentially problematic items in the original measure. For each of them, they formulated two alternatives: an item with an easier formulation and an item with new but still relevant content. Finally, they selected the most appropriate items taking into account the relation with their facet.

Big Five Personality Trait Short Questionnaire. Morizot (2014) used the

English items of the BFI (John et al., 1991, 2008) available on the International Personality Item Pool website as a starting point, considering their formulation as short statements easily understandable by adolescents. Experts translated them into French, simplifying the language and adding descriptors to make each statement clear for 12/13-year-olds. Other adjustments were made deleting and/or replacing inappropriate items, and adding new items to cover relevant facets for each dimension.

Junior Version of the Spanish NEO Personality Inventory-Revised. Ortet et al. (2012) started to adapt the adult NEO-PI-R (Costa & McCrae, 1992) before the English adolescent version NEO-PI-3 (McCrae et al., 2005) was available. For developing the JS NEO, they identified the problematic items by administering the NEO-PI-R to four 12-year-olds and by considering problems that emerged in previous studies. They identified 132 items to be modified: forty items were adapted making them more adherent to the English version of the NEO-PI-R rather than to the Spanish version; the other 92 items were adapted using a lexicon adequate to adolescents or were made more suitable to the specific cultural context.

SENNAI.0. Primi et al. (2016) aimed to develop a questionnaire to measure socio and emotional skills in young people rather than personality. Through a literature review they identified eight instruments, i.e., the Locus of Control Scale (Nowicki & Strickland, 1973), the Rosenberg Self-Esteem Scale (Rosenberg, 1979), the Strengths and Difficulties Questionnaire (Goodman, 1997), the BFI (John et al., 1991), the Self-Efficacy Questionnaire for Children (Muris, 2001), the BFQ-C (Barbaranelli et al., 2003), the Core Self-Evaluations (Judge et al., 2003), and the Grit Scale (Duckworth & Quinn, 2009). They administered these questionnaires to a sample of children and adolescents, and through factor analyses they identified six factors and selected the best eight items for each of them.

Five-Factor Model Adolescent Personality Questionnaire. Rogers and Glendon (2018) used a four-step procedure to develop and select the items. First, they conducted focus groups with adolescents collecting personality-based descriptions, then evaluated and reduced by a group of experts. Second, they further refined this pool through item analysis. Third, they tested a pilot 50-item form through exploratory factor analysis (EFA). Fourth, they tested the remaining 30 items through a series of confirmatory factor analyses (CFA) to select the final 25 items.

THE WAY I AM. Ruisel (1998) did not describe extensively the procedure used to develop the THE WAY I AM. However, the author states that it was derived by

a list used in psychodiagnostic practice. Such a list, initially consisting of 200 adjectives, was narrowed through psychometric methods to originate this questionnaire.

Scholte et al.'s Set. Scholte et al. (1997) followed two steps. First, they identified five relevant facets for each factor. Second, they developed a bipolar item for each facet based on the items included in three older measures, i.e., a Dutch test for measuring five personality factors (Elshout & Akkerman, 1975), the Dutch version of the items for measuring Big Five in the California Child Q-set (van Lieshout & Haselager, 1994), and the Dutch version of the Goldberg's markers (1992).

2.4.3 Validity and Reliability

The structural validity of the 10 questionnaires was explored or confirmed using a variety of statistical methods, i.e., CFA, exploratory structural equation modelling (ESEM), EFA, principal component analysis (PCA), item response theory (IRT), and Rasch modelling. The internal consistency of most of the selected questionnaires was tested with Cronbach's (1951) α , ordinal α , McDonald's (1999) ω , and/or person separation index (PSI). The assessment is reported in Table 2.3. In Appendix A, we described in detail the procedure and the results of the analysis conducted in line with an adaptation of the COSMIN standards and criteria (Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018).

2.4.3.1 Summarized Evidence About Validity and Reliability

As anticipated in the Method section, for each analysis, we evaluated the quality of the designs and statistical methods (following the COSMIN standards; see Appendix A) and the quality of the results (following the COSMIN criteria; see Appendix A).

First, we focused on the structural validity. Considering the COSMIN standards, we found at least an analysis of very good quality that confirmed the hypothesized factorial structure for the BFQ-C (Bore et al., 2020; Cupani et al., 2020; del Barrio et al., 2006; Markos & Kokkinos, 2017; Robles-Haydar et al., 2022), the APSI (Lounsbury et al., 2003), the PPTQ-C (Maćkiewicz & Ciecuch, 2016), the BFPTSQ (Morizot, 2014; Ortet et al., 2022), the SENNA1.0 (Primi et al., 2016), and the FFM-APQ (Rogers & Glendon, 2018). As regards the COSMIN criteria, the results of these analyses were considered sufficient in most of the cases. For the THE WAY I AM (Ruisel, 1998) and the Scholte et al.'s (1997) set, the five factors emerged only in one analysis of adequate quality (COSMIN standards) but with indeterminate results (COSMIN criteria). Finally, the factorial structure of the NEO-PI-3 (Costa et al., 2008; McCrae et al., 2005) and the JS NEO (Ortet et al., 2012) was tested with analyses of

Table 2.3

Assessment of Each Single Analysis About Structural Validity and Internal Consistency of the Selected Questionnaires. The References in Bold Indicate the Articles About the Development of the Questionnaires; the Other References Indicate the Validation Studies

Questionnaire	Author/s and year	Language	Structural validity				Internal consistency				
			Statistical method	<i>n</i>	Methodological quality	Summarized results	(Rating) Index/es	Statistical method	<i>n</i>	Methodological quality	(Rating) Index/es
Big Five Questionnaire - Children version (BFQ-C)	Barbaranelli et al., 2003	Italian	PCA	432 (elementary school children)	Adequate	Five factors; problems with some loadings	(?)				
			PCA	968 (junior high school children)	Adequate	Five factors; problems with some loadings	(?)				
			CFA (unrestricted factor analysis)	432 (elementary school children)	Doubtful	Five factors	(+) CFI = .87; RMSEA = .030				
			CFA (unrestricted factor analysis)	968 (junior high school children)	Doubtful	Five factors	(+) CFI = .90; RMSEA = .035				
			CFA	386	Adequate	Five factors	(+) CFI = .99; RMSEA = .033; SRMR = .033				
	Bore et al., 2020	English	EFA	13707	Adequate	Five factors (25 items); problems with some loadings	(+) CFI = .98; TLI = .96; RMSEA = .03	Ordinal alpha (20-item version)	13708	Very good	EX (+): .70 AG (+): .74 CO (+): .78 NE (+): .81 OP (+): .86
			CFA	13708	Very good	Five factors (20 items)	(+) CFI = .94; TLI = .93; RMSEA = .05				
	Bouvard & Roulin, 2017	French	CFA	399	Adequate	Five factors	(+) CFI = .82; RMSEA = .049				
			EFA	399	Adequate	Five factors; problems with some loadings	(+) CFI = .92; RMSEA = .03				
	Cupani et al., 2020	Spanish	Rasch model (modifications to the original questionnaire)	1162	Very good	Five factors; some items deleted and some superitems created; reduced response scale for some dimensions	EX (-): Undimensionality: per C < 5% = 1.38% Local independence: <i>r</i> < .20 Monotonicity: disordered thresholds Model fit: $\chi^2 = 72.61$	PSI (modified questionnaire)	1162	Very good	EX (-): .66 AG (+): .74 CO (+): .78 NE (+): .74 OP (+): .71

						AG (-): Unidimensionality: per C < 5% = 4.51% Local independence: $r < .20$ Monotonicity: disordered thresholds Model fit: $\chi^2 = 43.30$ CO (+): Unidimensionality: per C < 5% = 2.76% Local independence: $r < .20$ Monotonicity: ordered thresholds Model fit: $\chi^2 = 57.51$ NE (+): Unidimensionality: per C < 5% = 2.46% Local independence: $r < .20$ Monotonicity: ordered thresholds Model fit: $\chi^2 = 89.67$ OP (-): Unidimensionality: per C < 5% = 4.06% Local independence: $r < .20$ Monotonicity: disordered thresholds Model fit: $\chi^2 = 49.48$
del Barrio et al., 2006	Spanish	CFA	not specified (8-to-11-year-olds)	Adequate	Five factors	CFI = .97; RMSEA = .072 (+)
		CFA	not specified (12-to-15-year-olds)	Adequate	Five factors; modifications to the original questionnaire	CFI = .90-.92; RMSEA = .070-.081 (-)
		CFA	487 (boys)	Very good	Five factors	CFI = .96; RMSEA = .062 (+)
		CFA	337 (girls)	Adequate	Five factors	CFI = .92; RMSEA = .08 (-)
		EFA	824	Adequate	Five factors; some items deleted; problems with some loadings	(?)
Holgado-Tello et al., 2009	Spanish	CFA	824	Very good	Four factors (56 items)	CFI = .94; RMSEA = .069 (-)

Kokkinos & Markos, 2017	Greek	CFA	1089	Very good	Bifactor model with five specific factors and a general factor	(+) CFI = .97; RMSEA = .034; SRMR = .052	Alpha	1089	Very good	EX (+): .75 AG (+): .81 CO (+): .81 NE (+): .82 OP (+): .76
Kokkinos et al., 2020	Greek	CFA	4747	Very good	Bifactor model with five specific factors and a general factor (30 items)	(+) CFI = .94; TLI = .93; RMSEA = .035	Omega (30-item version)	4747	Very good	EX (+): .85 AG (+): .79 CO (+): .80 NE (+): .77 OP (+): .79
Markos & Kokkinos, 2017	Greek	IRT	1089	Very good	Five factors; selected six items for each factor	(-) Unidimensionality: fit indexes not reported Local independence: $r < .20$ for each dimension Monotonicity: not investigated Model fit indexes: not reported	Omega	1089	Very good	EX (+): .79 AG (+): .83 CO (+): .83 NE (+): .83 OP (+): .80
		CFA	1089	Very good	Five factors; selected six items for each factor	(+) CFI = .95; TLI = .94; RMSEA = .039	Alpha	1089	Very good	EX (+): .75 AG (+): .81 CO (+): .81 NE (+): .82 OP (+): .76
		CFA	1089	Very good	Five factors (30 items)	(+) CFI = .98; TLI = .97; RMSEA = .042	Omega (30-item version)	1089	Very good	EX (+): .80 AG (+): .83 CO (+): .83 NE (+): .83 OP (+): .80
		CFA	347	Very good	Five factors (30 items)	(+) CFI = .98; TLI = .97; RMSEA = .042	Alpha (30-item version)	1089	Very good	EX (+): .76 AG (+): .81 CO (+): .82 NE (+): .80 OP (+): .77
							Omega (30-item version)	347	Very good	EX (+): .79 AG (+): .84 CO (+): .82 NE (+): .83 OP (+): .79
							Alpha (30-item version)	347	Very good	EX (+): .73 AG (+): .70 CO (+): .79 NE (+): .76 OP (+): .76

Muris et al., 2005	Dutch	PCA	222	Inadequate	Five factors; problems with some loadings	(?)	Alpha	222	Very good	EX (+): .78 AG (+): .80 CO (+): .74 NE (+): .83 OP (+): .71
Olivier & Herve, 2015	French	PCA	386	Adequate	Five factors; problems with some loadings	(?)	Alpha	386	Very good	EX (+): .75 AG (+): .77 CO (+): .79 NE (+): .80 OP (+): .78
Robles-Haydar et al., 2022	Spanish	EFA	844	Adequate	Five factors (30 items)	(?)	Alpha (30-item version)	844	Very good	EX (+): .74 AG (+): .71 CO (+): .73 NE (+): .85 OP (+): .64
		CFA	844	Very good	Five factors (30 items)	(+) CFI = 1.00; RMSEA = .053	Omega (30-item version)	844	Very good	EX (+): .75 AG (+): .73 CO (+): .74 NE (+): .85 OP (+): .65
Adolescent Personality Style Inventory (APSI)	English	CFA	1339	Very good	Five factors (56 items)	(+) RMSEA = .059	Alpha	1353	Very good	EX (+): .81 AG (+): .79 CO (+): .75 NE (+): .81 OP (+): .73
		EFA	1339	Doubtful	Five factors (56 items)	(-) TLI = .82	Alpha	222	Very good	EX (+): .82 AG (+): .81 CO (+): .82 NE (+): .79 OP (+): .81
							Alpha	1061	Very good	EX (+): .85 AG (+): .82 CO (+): .84 NE (+): .85 OP (+): .80
Pictorial Personality Traits Questionnaire for Children (PPTQ-C)	Polish	ESEM	501 (younger children)	Very good	Five factors; problems with some loadings	(+) CFI = .988; TLI = .969; RMSEA = .036	Alpha	501 (younger children)	Very good	EX (+): .60 AG (+): .69 CO (+): .65 NE (+): .69 OP (+): .48

NEO Personality Inventory-3 (NEO-PI-3)	McCrae et al., 2005	English	PCA	500	Inadequate	Five factors; problems with some loadings	(?)	Alpha	527 (older children)	Very good	EX (+): .50 AG (+): .67 CO (+): .61 NE (-): .62 OP (-): .44	
		Costa et al., 2008	English	PCA	202	Inadequate	Five factors; problems with some loadings	(?)	Alpha	202	Very good	EX (+): .89 AG (+): .87 CO (+): .92 NE (+): .91 OP (+): .89 ^a
												EX (+): .88 AG (+): .86 CO (+): .93 NE (+): .90 OP (+): .84 ^b
Big Five Personality Trait Short Questionnaire (BPTSQ)	Morizot, 2014	French	ESEM (with correlated uniqueness)	1028	Very good	Five factors; problems with some loadings	(+)	Alpha	1028	Very good	EX (+): .80 AG (+): .72 CO (+): .80 NE (+): .81 OP (+): .71	
Junior version of the Spanish NEO Personality Inventory-Revised (JS NEO)	Ortet et al., 2012	Spanish	ESEM (with correlated uniqueness)	1082	Very good	Five factors; problems with some loadings	(+)	Alpha	1082	Very good	EX (+): .80 AG (+): .74 CO (+): .78 NE (+): .80 OP (+): .77	
		Ortet et al., 2012	Spanish	PCA	983	Inadequate	Five factors; problems with some loadings	(?)	Alpha	983	Very good	EX (+): .87 AG (+): .85 CO (+): .90 NE (+): .87 OP (+): .84 ^c
												EX (+): .80 AG (+): .73 CO (+): .80 NE (+): .81 OP (+): .74
SENNAI.0	Primi et al., 2016	Brazilian	CFA	24605	Very good	Six factors	(-)	Alpha	24605	Very good	EX (+): .83 AG (+): .81 CO (+): .91 NE (+): .89 OP (+): .78	

	ESEM	24605	Very good	Six factors; problems with some loadings	(+) CFI = .915; TLI = .903; RMSEA = .036	
Five-Factor Model Adolescent Personality Questionnaire (FFM-APQ)	CFA	405	Very good	Five factors	EX (+): CFI = .994; TLI = .988; RMSEA = .036; SRMR = .021 AG (+): CFI = 1.000; TLI = 1.004; RMSEA = .000; SRMR = .014 CO (+): CFI = .978; TLI = .956; RMSEA = .061; SRMR = .032 NE (+): CFI = .977; TLI = .955; RMSEA = .072; SRMR = .030 OP (+): CFI = .965; TLI = .929; RMSEA = .067; SRMR = .033	Alpha 405 Very good EX (+): .80 AG (+): .81 CO (+): .74 NE (+): .81 OP (+): .73
THE WAY I AM	EFA	1051	Adequate	Five factors	(?)	
-	PCA	2001	Adequate	Five factors; problems with some loadings	(?)	Alpha 2001 Very good EX (+): .77 AG (+): .74 CO (+): .60 NE (+): .74 OP (+): .59
	CFA	2001	Doubtful	Five factors (oblique factors with secondary loading > .15); problems with some loadings	(-) TLI = .90	

Note. + = sufficient; ? = doubtful; - = insufficient; AG = Agreeableness; CFA = confirmatory factor analysis; CFI = comparative fit index; CO = Conscientiousness; EFA = exploratory factor analysis; ESEM = exploratory structural equation modeling; EX = Extraversion; NE = Neuroticism; OP = Openness; PCA = principal component analysis; Per C < 5% = proportion of t-tests that were significant at the level of significance .05; PSI = person separation index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residuals; TLI = Tucker Lewis index; ^a = 9 out of 30 facets have an alpha value < .70 (-); ^b = 14 out of 30 facets have an alpha value < .70 (-); ^c = 25 out of 30 facets have an alpha value < .70 (-).

inadequate quality (due to the small sample size, according to the COSMIN standards) whose results were indeterminate (following the COSMIN criteria).

Second, we examined the internal consistency. Considering the COSMIN standards, we found that the analyses were of very good quality for all the questionnaires except the THE WAY I AM (Ruisel, 1998). As for the COSMIN criteria, the results were sufficient in most of the cases. Insufficient findings emerged for all the factors of the PPTQ-C (Maćkiewicz & Cieciuch, 2016), for many facets of the NEO-PI-3 (Costa et al., 2008; McCrae et al., 2005) and the JS NEO (Ortet et al., 2012), for Energy/Extraversion and Intellect-Openness, respectively, in the Spanish modified and shorter versions of the BFQ-C (Cupani et al., 2020; Robles-Haydar et al., 2022), and for Conscientiousness and Openness to Experience-Intellect in the Scholte et al.'s (1997) set.

2.5 Discussion

In the last decades, the study of personality according to the BFM has been extended to children and adolescents (Soto & Tackett, 2015). Notwithstanding the amount of research available on this topic, there are still many open questions regarding, for example, similarities and differences between the different ages' traits and the biological and environmental processes underlying personality development. For this reason, it is of pivotal importance to have valid and reliable questionnaires for assessing the Big Five in youths.

Notwithstanding the advantages of some other-report instruments that rely on parents or teachers as relevant informants (Shiner et al., 2021), giving children and adolescents the possibility to self-evaluate their personalities is crucial as they have access to their whole repertoire of thoughts, feelings, and behaviors, not always detectable from the outside. Although many studies utilized questionnaires originally developed for adults to gather self-report data with young people, this methodology presents a series of disadvantages related to reading comprehension difficulties and descriptions not fitting with this specific age (De Fruyt et al., 2000; Maćkiewicz & Cieciuch, 2016; McCrae et al., 2005; Vollrath et al., 2016).

To our knowledge, this is the first systematic review examining self-report questionnaires designed or adapted for assessing children and/or adolescents' Big Five personality traits. We selected 24 articles describing the development or the validation of 10 questionnaires.

First, we analyzed them by taking into account a variety of descriptive

characteristics. Considering the samples involved, most questionnaires were designed specifically for adolescents (i.e., participants from 11 years old or sixth grade). Only three questionnaires were tested also with children (i.e., the BFQ-C, the PPTQ-C, and the SENNA1.0). The selected questionnaires are in nine different languages. The BFQ-C (Barbaranelli et al., 2003) is the questionnaire for which we found the highest number of validated translations. The questionnaires also differ for the labels used for referring to the main Big Five traits, reflecting different traditions in this research field (John et al., 2008; McCrae & John, 1992) and also the attempt to better take into account the specificity of these ages (e.g., making reference to the Intellect component of Openness; Barbaranelli et al., 2003; Costa & McCrae, 1992; Scholte et al., 1997). As for the structure, the questionnaires range from 15 to 240 items, to be evaluated on a 3, 5, or 7-point scale. On the one hand, the shortest questionnaires can be useful for collecting data with younger children – who are also facilitated by a reduced number of response alternatives – and in contexts with time restrictions (e.g., schools). On the other hand, the longest questionnaires – the NEO-PI-3 (McCrae et al., 2005) and the JS NEO (Ortet et al., 2012) – have the advantage of deepening the study of personality, permitting to obtain also differentiated scores for 30 second-order facets, six for each first-order factor. Finally, the 10 questionnaires include different types of items developed or selected considering already existing instruments, conducting a literature review, or following inductive and/or deductive procedures. The items consist of written statements or adjectives, sometimes presented in a bipolar format. The PPTQ-C (Maćkiewicz & Cieciuch, 2016) can be considered the most original questionnaire as it combines bipolar written sentences with pictures to make it easier for young children to understand the meaning of the items.

Second, we evaluated the selected questionnaires' structural validity and internal consistency following the COSMIN guideline (Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018). The psychometric properties of the 10 questionnaires were investigated in many studies for the BFQ-C (Barbaranelli et al., 2003). However, for the other questionnaires, only one or two studies were available. For this reason, the summarized results presented in this systematic review should be considered preliminary: more research is needed to better investigate their validity and reliability.

Structural validity was tested for each questionnaire. The hypothesized factorial structure was revealed or confirmed in most cases, with few exceptions. This result is in line with the findings of Soto et al. (2008), confirming that also children and

adolescents can provide responses about their personality characteristics, with a structure comparable to adults. However, many questionnaires highlighted some problems with the Openness factor (i.e., the BFQ-C, the PPTQ-C, the BFPTSQ, and the Scholte et al.'s set). Such result is in line with other evidence suggesting that this dimension is the most controversial in this age group (Caspi et al., 2005; Lamb et al., 2002; Mervielde et al., 1995; Mervielde & De Fruyt, 2000). More research is needed to disentangle the appropriateness and the nature of this factor for children and adolescents.

Internal consistency was tested at least once for each questionnaire, with the only exception of the THE WAY I AM (Ruisel, 1998). The less reliable questionnaire is the PPTQ-C (Maćkiewicz & Ciecuch, 2016), probably due to the low number of items for each dimension. Other relevant reliability problems were found for the NEO-PI-3 (Costa et al., 2008; McCrae et al., 2005) and the JS NEO (Ortet et al., 2012) at the facet level. The internal consistency of the other questionnaires was high, except for some values below the threshold for the Spanish modified and short versions of the BFQ-C (Cupani et al., 2020; Robles-Haydar et al., 2022) and the Scholte et al.'s (1997) set. Even though Soto et al. (2008) documented an increasing internal consistency with age, such findings suggest that reliable data about the Big Five can also be gathered in children and adolescents through self-reports.

In conclusion, the findings emerging from this systematic review can guide researchers and practitioners in selecting the most adequate questionnaires, taking into account aspects such as participants' ages, time constraints, and the specificity level of the assessment. On the one hand, when the targets are children, the most valid and reliable questionnaires are the BFQ-C – with the advantage of being available in many different validated languages – and the SENNA1.0. However, given the length of these two instruments, when the time is limited, a good alternative could be the PPTQ-C, shorter and characterized by a more child-friendly format – despite having some internal consistency problems. On the other hand, when involving adolescents, other valid and reliable questionnaires – besides the BFQ-C and the SENNA1.0 – are the APSI, the BFPTSQ, and the FFM-APQ. Among them, the APSI is particularly useful when time is reduced, due to its shortness. The other instruments – i.e., the PPTQ-C, the NEO-PI-3, the JS NEO, the THE WAY I AM, and the Scholte et al.'s set – demonstrated doubtful structural validity and/or internal consistency and would benefit from further research. However, notwithstanding these limitations, questionnaires such

as the NEO-PI-3 and the JS NEO could be particularly useful for those researchers or practitioners interested in a deeper understanding of adolescents' personality, as they permit to extract information about the single facets of each factor.

2.5.1 Limitations

This systematic review has a series of limitations. First, the initial search strategy included only English peer-reviewed research articles indexed in three of the most used databases. However, additional questionnaires could have been retrieved considering other types of resources (e.g., non-peer-reviewed articles, books, chapters, presentations at conferences, dissertations), extending the languages, and/or consulting other databases. Second, by focusing solely on self-report questionnaires specifically designed or adapted for children and/or adolescents, we excluded both other types of self-report measures (e.g., interviews) and also instruments belonging to the other two approaches, i.e., self-report scales designed only for adults and other-report scales. We did not include self-report questionnaires originally developed for adults considering the importance of relying on age-appropriate instruments for taking into account young people's peculiarities (Kaplan, 2013; Simon et al., 2023). However, we acknowledge that some adult-based measures – such as the International Personality Item Pool (IPIP; Goldberg, 1999) – contain simple and short item formulations that could be easily used with young people (Mlačić et al., 2006). Moreover, we decided to exclude other-report questionnaires considering the benefits and large use of self-reports in psychological assessment (Dodorico McDonald, 2008; Pekrun, 2020). Nevertheless, we recognize the advantages of other-report instruments in some contexts (e.g., for assessing Big Five in very young children). Third, we searched for questionnaires based on the BFM, excluding other personality (e.g., HEXACO; Ashton & Lee, 2007) or temperament models (e.g., Rothbart & Bates, 2006). Fourth, we did not separate questionnaires for assessing Big Five personality traits in children and in adolescents due to the paucity of the selected instruments. However, given the peculiarities of each developmental stage, it is fundamental to take into consideration age differences.

2.5.2 Future Research

Future reviews could compensate for some of the limitations of this study. First, they could include instruments belonging to the two approaches excluded in our work – self-report scales designed only for adults and other-report scales – to broaden the list of useful Big Five questionnaires when assessing young people. Second, they could also investigate which self-report questionnaires for children and/or adolescents were

developed and/or validated following other personality frameworks.

In addition, the questionnaires described in this systematic review were developed or validated mostly with participants from Western, educated, industrialized, rich, and democratic (WEIRD) countries. However, previous research raised doubts about the possibility of confirming the Big Five structure of personality in developing countries characterized by a different socioeconomic background (Laajaj et al., 2019). For such a reason, it is paramount that future studies further explore the validity and reliability of instruments (also using advanced analyses, such as the Rasch model; Burro et al., 2025) devoted to measuring Big Five personality traits involving underrepresented cultural contexts, languages, and samples (including also young children).

Finally, an open issue in the study of personality in young people is the stability of the traits. Among the 24 articles retrieved in this review, only one (Ortet et al., 2012) tested it by re-administering the questionnaire after a month and calculating test-retest reliability. Future research should take into account this aspect to shed light on the dynamics of personality development.

2.6 Conclusion

This systematic review described 10 self-report questionnaires for measuring Big Five traits in children and adolescents. The questionnaires differ in many characteristics, i.e., target age, language, facet-level assessment, length, type of items, and response scale. In addition, for some questionnaires, there is stronger evidence of structural validity and internal consistency compared to others. The description provided in this review could help researchers or practitioners interested in assessing youths' personalities to select the most appropriate questionnaire for each sample and/or context.

Chapter 3. Achievement Emotions in Primary and Middle School: The Interplay of Sex, Age, Personality, and Emotion Regulation

3.1 Abstract

Achievement emotions are influenced by a series of antecedents. While the role of some of them has been widely documented, the interplay among others has been understudied, particularly in primary and middle school students. Using the Control-Value Theory as the main theoretical framework, we examined the contribution of demographic variables (sex and age), personality traits, and four behavioral/cognitive emotion regulation strategies in relation to 10 achievement emotions. We involved 330 fourth, sixth, and seventh-graders in a cross-sectional study. We assessed their Big Five personality traits, two behavioral (Actively Approaching and Withdrawal) and two cognitive (Positive Refocusing and Catastrophizing) emotion regulation strategies they could use to deal with stressful situations, and five positive (enjoyment, pride, hope, relief, and relaxation) and five negative (anxiety, anger, shame, hopelessness, and boredom) school-related emotions. Conducting 10 hierarchical multiple regressions, we found that females reported higher anxiety and lower boredom than males, and older students less positive and more negative emotions than younger ones. About personality, Extraversion, Conscientiousness, and Openness were found to be protective factors, while Neuroticism a risk factor (despite a positive link to relief). Actively Approaching and Positive Refocusing displayed adaptive patterns of relations, contrary to Withdrawal and Catastrophizing. Notwithstanding limitations (e.g., sample size and cross-sectional design), our findings shed light on the importance of both stable individual characteristics (sex, age, and personality) and more malleable factors (emotion regulation strategies) in relation to school-related emotions. At a practical level, they can guide the design of evidence-based interventions for training students' emotion regulation abilities.

Keywords: achievement emotions, school, demographic variables, Big Five traits, emotion regulation strategies

3.2 Introduction

Emotions are a fundamental component of educational settings. Students spend a significant amount of their time in school, and their emotional experiences in this context have garnered considerable attention from researchers over the past 25 years (Pekrun, 2024). The Control-Value Theory of achievement emotions (CVT; Pekrun, 2006, 2024) has given a strong boost to research in this field by providing a theoretical framework for understanding their antecedents and outcomes. However, while the role of some correlates of achievement emotions, such as control-value beliefs and performance, has been amply documented (Camacho-Morles et al., 2021; Luo et al., 2016; Peixoto et al., 2017; Putwain et al., 2021), others have received much less attention. Accordingly, in this study, we investigated the interplay among demographic variables (sex and age), Big Five personality traits, and behavioral and cognitive emotion regulation (ER) strategies in shaping primary and middle school students' emotions toward school.

3.2.1 The Control-Value Theory of Achievement Emotions

According to the CVT (Pekrun, 2006, 2024), achievement emotions are defined as those emotions that students feel in relation to achievement activities (e.g., attending classes, studying, doing homework, or doing written or oral tests) or outcomes (e.g., expecting or receiving a good or bad grade). Beyond their object focus (activity vs. outcome), achievement emotions can also be categorized by valence (positive/pleasant vs. negative/unpleasant) and arousal (activating vs. deactivating). The CVT assumes that achievement emotions impact a range of learning outcomes and, in turn, are influenced by a variety of antecedents. Regarding their outcomes, a meta-analysis corroborated the assumptions that positive activity-related emotions, like enjoyment, are linked positively to academic performance, while negative emotions, such as anger and boredom, are linked negatively (Camacho-Morles et al., 2021). Concerning their antecedents, control-value appraisals are considered the most proximal, leading to direct changes in emotional experiences. Research confirmed that students perceiving themselves as competent and attributing a positive value to learning tasks generally experience more positive than negative emotions (Luo et al., 2016; Peixoto et al., 2017; Putwain et al., 2021). Distal antecedents are assumed to impact achievement emotions both directly and through the mediation of control-value beliefs. Among them, there are both mostly stable individual characteristics, such as sex (or gender, when defined as a social rather than a biological construct; American Psychological Association,

2024) and personality traits (Pekrun, 2006, 2024; Pekrun et al., 2023), as well as more malleable individual dispositions, such as the use of different ER strategies (Harley et al., 2019; Wright et al., 2025). However, the interrelations among these factors in shaping achievement emotions have been rarely studied (Sorić et al., 2013), especially in primary and middle school students.

3.2.1.1 Sex and Age Differences in Achievement Emotions

In the CVT (Pekrun, 2006, 2024), the functional associations between achievement emotions and their antecedents and outcomes are considered universal, as characterizing all human beings, for example, without sex distinctions. However, even though the structure of these relations is assumed to be equivalent across males and females, differences in the mean levels of achievement emotions are expected as a function of differences in their antecedents (primarily, control-value appraisals; Frenzel et al., 2007; Pekrun, 2006) and stereotypes (Bieg et al., 2015). Previous research has amply documented sex differences in subject-related emotions. Involving primary to high school students, many studies found that girls usually report lower positive and higher negative emotions than boys in mathematics, physics, and physical education (Fierro-Suero et al., 2023; Frenzel et al., 2007; Lichtenfeld et al., 2012, 2023; Limprecht et al., 2013; Luo et al., 2016; Pekrun et al., 2017; Stipek & Gralinski, 1991; Symes et al., 2025), and vice versa in native or foreign language and chemistry (Raccanello et al., 2019; Sorić et al., 2013; Wang et al., 2024). Notwithstanding the assumptions of the CVT about the domain-specificity of achievement emotions and the utility of investigating emotions separately by school subjects (Goetz et al., 2006; Raccanello et al., 2013), in some cases, it is still relevant to examine students' emotions related to the general school domain. For example, this can be the case when interested in studying trait-level instead of state-level emotions (Pekrun et al., 2011) or in keeping the examined constructs at the same level of granularity to maximize the size of the relations (Obermeier et al., 2022). All this considered, scarce attention has been paid to sex differences related to emotions felt toward the general school context. Some studies showed different levels of positive emotions between males and females. Involving third-to-eighth-graders, Gentry et al. (2002) documented lower enjoyment in the classroom for boys than girls. Coherently, Raccanello et al. (2025c) found that, in the seventh grade, mother-reported positive emotions were lower for males than females, while no differences emerged among fourth-graders. Results regarding negative emotions are inconsistent. On the one hand, the aforementioned study by Raccanello et

al. (2025c) did not find sex differences in a composite measure of school-related negative emotions, neither in fourth nor in seventh-graders. On the other hand, other works about test anxiety usually document higher levels in females than males, both in primary school (Aydin, 2019) and older students (Hoferichter & Raufelder, 2015; Putwain, 2007; Putwain & Daly, 2014). However, given the paucity of works investigating sex differences among primary and middle school students in relation to the emotions linked to school in general, more research is needed to provide further support to these findings.

Beyond sex differences, research also explored changes in achievement emotions across diverse ages or school grades. The CVT does not define a direction in developmental transformations (Pekrun, 2024). However, studies involving primary, middle, and high school students usually have found a maladaptive trend, with higher negative and lower positive emotions at increasing age or grade, both in mathematics and native language (Lichtenfeld et al., 2023; Raccanello et al., 2013, 2019; Sakaki et al., 2024). Similar findings also emerged in works focusing on achievement emotions associated with the more general school domain. Gentry et al. (2002), in a cross-sectional study involving third-to-eighth-graders, documented a lower frequency of enjoyment from grades 6 to 8, compared to grades 3 to 5. Similar results emerged in Vierhaus et al.'s (2016) longitudinal work based on two cohorts of students from grades 2 to 5 and from grades 4 to 7. They found that enjoyment in school lessons was stable in the first group, while constantly decreasing in the second group, and that boredom continued to increase in both groups. Meyer and Schlesier (2022), conducting a longitudinal study with fifth and sixth-graders, documented a decrease in enjoyment and pride, and an increase in anxiety, hopelessness, and boredom. On the whole, these results suggest a detrimental developmental trajectory in students' emotional experiences, which is in line with the trend observed for other affective or motivational constructs (Bouffard et al., 2001; Hascher et al., 2022; Lepper et al., 2005).

3.2.1.2 Personality and Achievement Emotions

Personality can be described as the relatively stable pattern of thoughts, feelings, and behaviors characterizing each individual across different situations and times (Carver & Scheier, 2012; Damian et al., 2019; Shiner et al., 2021). According to one of the most widespread frameworks, the Big Five Model (Goldberg, 1993), personality can be defined by five broad traits, namely Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. These traits were originally used to

depict adults' characteristics, but increasing research has shown the appropriateness of this model also for younger people (Vicentini et al., 2025b).

Psychological literature has amply provided evidence of the relation between Big Five traits and well-being, also in children and adolescents. More extraverted, agreeable, conscientious, and open-minded, and less neurotic people usually experience higher psychological and subjective well-being, not only in their everyday life (Garcia, 2011; Goswami, 2014; Suldo et al., 2015), but also at school (Evans et al., 2018; Weber & Huebner, 2015). In the context of the CVT (Pekrun, 2006, 2024), personality or temperament – a construct referring to emerging personality characteristics in early childhood (McAdams, 2019) – is considered a direct and indirect (through control-value appraisals) antecedent of achievement emotions. However, these relations have been rarely studied, both in samples of adults (for exceptions see Chamorro-Premuzic et al., 2008; de la Fuente et al., 2020, 2024; Pekrun et al., 2023; Sander & de la Fuente, 2022; Thomas & Cassidy, 2019; Xu et al., 2024) and in younger students. In one of the few works focusing on both primary and middle school (Raccanello et al., 2025c), a composite measure of positive emotions was associated positively with Extraversion, Conscientiousness, and Openness, and negatively with Neuroticism, while a general measure of negative emotions showed negative links with Agreeableness and Openness, and positive links with Neuroticism. Other works involving samples of middle and high school students took into account the associations between the Big Five factors and some school-related emotions, in some cases focusing only on single traits. Sorić et al. (2013), exploring a variety of antecedents of negative achievement emotions in high school, documented positive relations between Neuroticism and unhappiness, anger, anxiety, and humiliation, and negative associations of Agreeableness and Conscientiousness with unhappiness and anger. However, interestingly, when controlling for other predictors (control-value appraisals and ER strategies), only the relation between Neuroticism and all the negative emotions remained statistically significant. Hoferichter and Raufelder (2015) and Hoferichter et al. (2014), considering only Neuroticism, showed a positive relation with test anxiety in seventh and eighth-graders. Cheng et al. (2023), measuring only two facets of Conscientiousness in 10th-to-16th-graders during the COVID-19 pandemic, found positive associations with class-related enjoyment and negative associations with anger, anxiety, hopelessness, and boredom.

These preliminary findings offer insights into how personality traits affect

emotional experiences at school, but more research is needed to fully understand the relation between different traits and various emotions.

3.2.1.3 Emotion Regulation Strategies and Achievement Emotions

ER refers to all the conscious and unconscious processes through which individuals manage which emotions to feel, and when and how to experience or express them (Gross, 1998). People adopt a variety of strategies to self-regulate their own emotions, which can be categorized into behavioral – involving the process of “taking actions” – or cognitive – pertaining to the process of “thinking” (Garnefski et al., 2001). The effectiveness of a strategy cannot be completely established a priori as it depends on the characteristics of both the individual and the context (Aldao & Nolen-Hoeksema, 2012; Vaughan-Johnston et al., 2020). Research indicates that while the prolonged use of certain strategies is typically associated with positive outcomes, others may lead to negative consequences, such as the development of psychopathological symptoms (Garnefski et al., 2007; Garnefski & Kraaij, 2018). As a result, according to some authors (Garnefski et al., 2007; Putwain et al., 2025; Vierhaus et al., 2016), it is possible to differentiate between strategies usually “adaptive” and others generally “maladaptive”.

In educational contexts, ER strategies can be implemented in different stages of the emotion-generative process, as underlined by the ER in Achievement Situations (ERAS) model proposed by Harley et al. (2019). This framework integrates Pekrun’s (2006, 2024) CVT and Gross’s (1998) Process Model of ER and posits that students can regulate their achievement emotions in different phases. Before specific emotions arise, individuals can act on their antecedents by employing strategies directed to select (stage 1; situation selection) or modify (stage 2; situation modification) the academic achievement situation, to redirect attention (stage 3; attentional deployment), or to reassess key appraisals (stage 4; cognitive change). Once emotions have been generated, they can use strategies for managing their expression (stage 5; response modulation).

While scholarly attention has often centered on two ER strategies, namely reappraisal and suppression (Frenzel et al., 2024; Sorić et al., 2013), it is essential to recognize that students can implement a diverse array of strategies to modulate their emotions in academic settings. Therefore, this study will focus on two behavioral (Actively Approaching and Withdrawal; Kraaij & Garnefski, 2019) and two cognitive strategies (Positive Refocusing and Catastrophizing; Garnefski et al., 2007), that

correspond to different stages of the emotion-generative process outlined in the ERAS model (Harley et al., 2019).

On the one hand, Actively Approaching and Withdrawal are measured by the *Behavioral ER Questionnaire* (BERQ; Kraaij & Garnefski, 2019). The former can be conceptualized as a strategy applicable in the second stage (situation modification) as it refers to the behaviors used by people to actively face a stressful event. The latter can be used in the first stage (situation selection) as it describes individuals' withdrawal from stressful situations and avoidance of social contact. General evidence from adult samples indicates that Actively Approaching is generally adaptive, while Withdrawal maladaptive (Kraaij & Garnefski, 2019; Şevki Keskiner et al., 2025). To our knowledge, the only study focusing on these strategies in academic contexts involved university students (Mudło-Głagolska & Larionow, 2023). It indicated that Actively Approaching was related positively to the harmonious passion for study and general positive reactivity (a composite measure of activation, intensity, and duration of positive emotions), and negatively to general negative reactivity (a combined measure of the activation, intensity, and duration of negative emotions), while Withdrawal, beyond showing inverse relations with these constructs, was also positively linked to the obsessive passion for study.

On the other hand, Positive Refocusing and Catastrophizing are assessed by the *Cognitive ER Questionnaire* (CERQ; Garnefski et al., 2007). In line with Putwain et al. (2025), Positive Refocusing can be considered an example of strategy applicable in the third stage (attentional deployment) of the emotion-generative process, as it redirects thoughts on positive and pleasant – although potentially distracting – issues, while Catastrophizing can be conceptualized as part of the fourth stage (cognitive change), as it leads people to emphasize the negativity of what they experienced. Garnefski et al. (2001, 2007, 2017), using the CERQ with children and adolescents, documented that psychopathological symptoms were associated negatively with Positive Refocusing, and positively with Catastrophizing, supporting the view of the former as adaptive and the latter as maladaptive. However, the role of these strategies in educational settings has been explored only rarely. A study with university students during the COVID-19 pandemic found a positive link between Catastrophizing and symptoms of post-traumatic stress (Yang et al., 2022). Putwain et al. (2025), exploring the relations between a range of ER strategies and test anxiety in high school, found a negative correlation with Positive Refocusing, and a positive one with Catastrophizing.

Due to the lack of studies examining the relations between behavioral and cognitive ER strategies and various achievement emotions, particularly in primary and middle school, further research is necessary. Given the malleable nature of such strategies and the possibility to train students in their use (Wright et al., 2025), understanding which strategies are usually more or less adaptive in achievement contexts represents the basis for designing school interventions.

3.2.2 The Concurrent Influence of Demographic Characteristics, Personality Traits, and Emotion Regulation on Achievement Emotions

Few works have examined how demographic variables (such as sex and age), personality traits, and ER strategies concurrently interact to influence achievement emotions. Hoferichter and Raufelder (2015), in a sample of eighth-graders, found that test anxiety was related positively to Neuroticism and negatively to the relationships with peers (a measure that could be considered a proxy for the strategy of social support), also exploring gender differences in all the constructs. Sorić et al. (2013), involving high school students, ran hierarchical regressions to examine the unique contribution of personal variables (gender and age), personality traits, control-value appraisals, and two ER strategies (reappraisal and suppression) in influencing four negative achievement emotions (unhappiness, anger, anxiety, and humiliation) in the context of chemistry learning. In the final model, their findings indicated that males and older students experienced more negative emotions; Neuroticism was positively correlated with all emotions, while control-value appraisals were negatively correlated with them; and, surprisingly, both reappraisal and suppression were found to be positively associated with some negative emotions, with the exception of anger.

Other authors focused on the interplay of personality and ER in relation to achievement emotions or aspects of school well-being, without considering demographic variables in middle and high school students. Hoferichter et al. (2014) observed that, in seventh and eighth-graders, test anxiety was higher in students high in Neuroticism and with poor relationships with peers. Involving high school students, Evans et al. (2018) found that academic productive coping (a strategy similar to problem solving) partially mediated the relation between Conscientiousness and school satisfaction and totally mediated the relation between Extraversion and school satisfaction.

These preliminary results highlight the importance of further exploring these relations in academic settings. Therefore, we examined how both stable factors, such

as demographic characteristics and personality traits, and more malleable ones, such as four underexplored ER strategies, related to a range of achievement emotions. Additionally, we chose to involve primary and middle school students, as these groups have often been disregarded by previous research on this topic.

3.2.3 The Current Study

This study addresses two significant gaps in the literature: (a) there is a lack of research examining the simultaneous influence of demographic variables, personality traits, and ER strategies on various school-related achievement emotions, particularly among primary and middle school students; and (b) while the importance of ER in educational settings has been widely acknowledged (Harley et al., 2019), most research has predominantly focused on a limited range of strategies (e.g., reappraisal and suppression; Sorić et al., 2013), neglecting other behavioral and cognitive ones. To address these issues and building on the assumptions of the CVT (Pekrun, 2006, 2024), the current study explores the relation among demographic characteristics, the Big Five personality traits, and the use of two behavioral and two cognitive ER strategies in relation to 10 school-related emotions, using a sample of primary and middle school students in Italy. Specifically, we concentrated on achievement emotions linked to a general domain to maintain a consistent level of granularity in relation to the other measures. We had three aims, with corresponding hypotheses.

First, we studied how sex (i.e., defined as the binary categorization assigned at birth; American Psychological Association, 2024) and age were related to school-related achievement emotions. In line with previous findings (Gentry et al., 2002; Raccanello et al., 2025c), we hypothesized that females had higher levels of positive emotions (Hypothesis 1). Given the paucity of works about sex differences in school-related negative emotions (except a few studies using composite measures or focusing specifically on test anxiety; Aydin, 2019; Hoferichter & Raufelder, 2015; Putwain, 2007; Putwain & Daly, 2014; Raccanello et al., 2025c), we did not formulate any hypotheses about them. As regards age, based on the maladaptive developmental trend usually documented in the literature (Gentry et al., 2002; Lichtenfeld et al., 2023; Meyer & Schlesier, 2022; Raccanello et al., 2013, 2025c; Sakaki et al., 2024; Vierhaus et al., 2016), we expected that younger students had higher levels of positive emotions (Hypothesis 2a) and lower levels of negative emotions (Hypothesis 2b) than older students.

Second, we examined the relation between Big Five personality traits and

school-related achievement emotions. Following prior works (Cheng et al., 2023; Hoferichter & Raufelder, 2015; Hoferichter et al., 2014; Raccanello et al., 2025c; Sorić et al., 2013), we hypothesized positive emotions to be related positively to Extraversion, Agreeableness, Conscientiousness, and Openness, and negatively to Neuroticism (Hypothesis 3a), and vice versa for negative emotions (Hypothesis 3b).

Third, we investigated how two behavioral and two cognitive ER strategies were linked to school-related achievement emotions. Consistent with previous literature (Mudło-Głagolska & Larionow, 2023; Putwain et al., 2025; Yang et al., 2022), we expected that positive emotions were associated positively with more adaptive strategies (Actively Approaching and Positive Refocusing), and negatively with more maladaptive ones (Withdrawal and Catastrophizing; Hypothesis 4a), and vice versa for negative emotions (Hypothesis 4b).

3.3 Method

3.3.1 Participants and Procedure

The sample included 330 primary and middle school students attending the fourth ($n = 156$; $M_{age} = 9.69$, $SD = 0.31$, range: 8.97–10.67; 50% females), sixth ($n = 100$; $M_{age} = 11.71$, $SD = 0.45$, range: 11.01–13.45; 52% females), and seventh grade ($n = 74$; $M_{age} = 12.63$, $SD = 0.37$, range: 12.05–14.01; 58% females) in Italy. The study was approved by the Ethical Committee of the Department of Human Sciences, University of Verona (protocol numbers 161865 dated 17/04/2023, and 15396 dated 08/01/2025). After obtaining the approval of the heads of the schools, we requested parents or legal guardians to sign the written informed consent form for students' participation. Data collection took place through paper-and-pencil questionnaires administered during normal school classes.

3.3.2 Measures

3.3.2.1 Big Five Traits

We used the *Five-Factor Model – Adolescent Personality Questionnaire* (FFM-APQ; Rogers & Glendon, 2018) to assess the Big Five personality traits, i.e., Extraversion (e.g., “Is very sociable”), Agreeableness (e.g., “Gives things to others”), Conscientiousness (e.g., “Organizes themselves well”), Neuroticism (e.g., “Is easily annoyed”), and Openness (e.g., “Has lots of ideas”). It comprises 25 items – five for each trait – to be assessed on a 5-point scale (1 = *Not at all*, 5 = *Very much*).

The FFM-APQ was originally developed in English, so we used back-translation to derive the Italian version (see Table B.1 in Appendix B). Internal

consistency, measured through Cronbach's (1951) alpha (α) and McDonald's (1999) omega (ω), was good ($\geq .70$) for all the traits, with the only exception of Agreeableness, slightly below the threshold (Table B.2). The five-factor structure of FFM-APQ was confirmed in this sample (see Appendix B).

3.3.2.2 Emotion Regulation Strategies

We assessed four ER strategies. We used 8 items of the BERQ (Kraaij & Garnefski, 2019) to measure Actively Approaching (e.g., "I try to do something about it") and Withdrawal (e.g., "I avoid other people"), and 8 items of the CERQ (Garnefski et al., 2007) to assess Positive Refocusing (e.g., "I think of nicer things than what I have experienced") and Catastrophizing (e.g., "I keep thinking about how terrible it is what I have experienced"). Each item was rated on a 5-point scale (1 = *Not at all*, 5 = *Extremely*). For the BERQ, we translated the items in Italian through back-translation (Table B.1). For the CERQ, we used the validated Italian version (Cerolini et al., 2022; Presaghi & Ercolani, 2005). The internal consistency of both scales was good (Table B.2) and their factorial structure was confirmed (see Appendix B).

3.3.2.3 Achievement Emotions

We measured school-related achievement emotions by using the *Drawing Set for the Achievement Emotions Adjective List* (DS-AEAL; Raccanello & Burro, 2024). It consisted of 10 single items measuring three positive activating (i.e., "Happy", "Hopeful", "Proud"), two positive deactivating (i.e., "Relieved", "Calm"), three negative activating (i.e., "Anxious", "Angry", "Ashamed"), and two negative deactivating emotions (i.e., "Sad", "Bored"). Each item comprised a written label describing verbally the emotion and a drawing of the associated facial expression. The sex of the children represented in the images was matched with the participants' sex to favor identification. Despite being aware of the limitations associated with single-item compared to multi-item measures, we used this approach, in line with previous studies (Goetz et al., 2010; Nett et al., 2011), in order to keep the questionnaire brief (also considering the reduced attention span of younger children; Simon et al., 2023). In addition, when assessing emotional states, single-item scales could reduce the risk of recall bias that could affect longer measures requiring participants more time for reflection (Goetz et al., 2010).

3.3.3 Data Analysis

We used SPSS (version 29.0.1.0; IBM, 2023) to conduct 10 hierarchical multiple regressions, one for each emotion, included in the model as the outcome

variable. Separate groups of predictors were gradually introduced based on theoretical reasons (CVT; Pekrun, 2006, 2024), previous research (Sorić et al., 2013), and a stability/malleability criterion (from the most stable to the most malleable antecedents). For each model, we included demographic variables (sex and age – as sex was categorical, it was coded as a dummy variable: 0 = *males* and 1 = *females*) in step 1; Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness) in step 2; and the behavioral (Actively Approaching and Withdrawal) and cognitive (Positive Refocusing and Catastrophizing) ER strategies in step 3. Following Keith (2019), the size of the relations was considered small with $.05 < \beta \leq .10$, medium with $.10 < \beta \leq .25$, and large with $\beta > .25$. In Appendix B, we described all the preliminary checks conducted on the data.

3.4 Results

3.4.1 Hierarchical Multiple Regressions

Pearson's intercorrelations and descriptive statistics are reported in Table B.2. Statistics and standardized coefficients (β) of the 10 hierarchical multiple regressions are reported in Tables 3.1 and 3.2, respectively. Unstandardized coefficients (B) and associated standard error (SE) are reported in Table B.3.

3.4.1.1 Positive Emotions

Demographic variables (step 1) alone explained a significant proportion of variance only for enjoyment (6.7%), pride (4.8%), and relaxation (4.8%), but not for hope and relief (Table 3.1). The inclusion of personality (step 2) led to a significant increase in the explained variance in all the positive emotions: 16.2% for enjoyment, 12.9% for pride, 6.4% for hope, 7.2% for relief, and 10.2% for relaxation. Adding ER strategies (step 3) resulted in an incremental amount of explained variance for enjoyment (22.2%), pride (15.6%), hope (9.5%), and relaxation (14.1%), but not for relief.

Considering step 3 (in which all the models were significant, $p < .05$; Tables 3.1 and 3.2), among the demographic variables, no significant finding emerged for sex, not supporting Hypothesis 1, while age showed a medium negative association with enjoyment ($\beta = -.20, p < .001$), in line with Hypothesis 2a. As for personality, we found medium positive relations between: Extraversion and enjoyment ($\beta = .16, p = .016$) and hope ($\beta = .14, p = .041$); Conscientiousness and pride ($\beta = .24, p < .001$) and relief ($\beta = .15, p = .028$); Neuroticism and relief ($\beta = .13, p = .037$); and Openness and pride ($\beta = .15, p = .031$), partially confirming Hypothesis 3a. Regarding ER strategies,

Withdrawal showed a medium negative link with enjoyment ($\beta = -.15, p = .013$), while Positive Refocusing medium positive links with pride ($\beta = .17, p = .003$), hope ($\beta = .16, p = .005$), and relaxation ($\beta = .18, p = .001$), corroborating Hypothesis 4a.

Table 3.1

Hierarchical Multiple Regression Results, Explained Variance (R^2), and Change in Explained Variance (ΔR^2)

		<i>F</i> (<i>df</i>)	<i>p</i>	R^2	ΔR^2		
					Δ	<i>F</i> (<i>df</i>)	<i>p</i>
Enjoyment	Step 1	11.73(2, 327)	< .001	.067	-	11.73(2, 327)	< .001
	Step 2	8.93(7, 322)	< .001	.163	.096	7.35(5, 322)	< .001
	Step 3	8.26(11, 318)	< .001	.222	.060	6.09(4, 318)	< .001
Pride	Step 1	3.06(2, 327)	.048	.018	-	3.06(2, 327)	.048
	Step 2	6.79(7, 322)	< .001	.129	.110	8.15(5, 322)	< .001
	Step 3	5.36(11, 318)	< .001	.156	.028	2.63(4, 318)	.034
Hope	Step 1	0.02(2, 327)	ns	.001	-	0.02(2, 327)	ns
	Step 2	3.15(7, 322)	.003	.064	.064	4.40(5, 322)	< .001
	Step 3	3.02(11, 318)	< .001	.095	.031	2.69(4, 318)	.031
Relief	Step 1	1.42(2, 326)	ns	.009	-	1.42(2, 326)	ns
	Step 2	3.58(7, 321)	< .001	.072	.060	4.42(5, 321)	< .001
	Step 3	2.70(11, 317)	.002	.086	.010	1.15(4, 317)	ns
Relaxation	Step 1	8.16(2, 327)	< .001	.048	-	8.16(2, 327)	< .001
	Step 2	5.20(7, 322)	< .001	.102	.054	3.88(5, 322)	.002
	Step 3	4.76(11, 318)	< .001	.141	.040	3.69(4, 318)	.006
Anxiety	Step 1	13.56(2, 327)	< .001	.077	-	13.56(2, 327)	< .001
	Step 2	8.11(7, 322)	< .001	.150	.073	5.55(5, 322)	< .001
	Step 3	6.79(11, 318)	< .001	.190	.040	3.95(4, 318)	.004
Anger	Step 1	2.12(2, 326)	ns	.013	-	2.12(2, 326)	ns
	Step 2	5.76(7, 321)	< .001	.112	.100	7.13(5, 321)	< .001
	Step 3	4.09(11, 317)	< .001	.124	.010	1.14(4, 317)	ns
Shame	Step 1	3.36(2, 327)	.036	.020	-	3.36(2, 327)	.036
	Step 2	5.50(7, 322)	< .001	.107	.087	6.24(5, 322)	< .001
	Step 3	3.90(11, 318)	< .001	.119	.012	1.10(4, 318)	ns
Hopelessness	Step 1	2.96(2, 327)	ns	.018	-	2.96(2, 327)	ns
	Step 2	4.30(7, 322)	< .001	.085	.068	4.76(5, 322)	< .001
	Step 3	6.06(11, 318)	< .001	.173	.088	8.45(4, 318)	< .001
Boredom	Step 1	9.51(2, 327)	< .001	.055	-	9.51(2, 327)	< .001
	Step 2	9.53(7, 322)	< .001	.172	.117	9.07(5, 322)	< .001
	Step 3	6.55(11, 318)	< .001	.185	.030	1.27(4, 318)	ns

Note. ns = not significant.

3.4.1.2 Negative Emotions

Demographic variables (step 1) accounted for a significant portion of the variance for anxiety (7.7%), shame (2.0%), and boredom (5.5%), but not for anger and

hopelessness (Table 3.1). Adding personality (step 2) significantly increased the explained variance for all negative emotions: 15.0% for anxiety, 11.2% for anger, 10.7% for shame, 8.5% for hopelessness, and 17.2% for boredom. When also ER strategies were added (step 3), changes in explained variance were significant for anxiety (12.4%) and hopelessness (17.3%), but not for anger, shame, and boredom.

Focusing on step 3 (in which models resulted significant for all the emotions, $p < .05$; Tables 3.1 and 3.2), among the demographic variables, sex showed a medium positive relation with anxiety ($\beta = .11, p = .040$) and a medium negative relation with boredom ($\beta = -.19, p < .001$) – indicating higher anxiety and lower boredom for females – but not with the other emotions; and age exhibited medium positive relations with anxiety ($\beta = .21, p < .001$) and boredom ($\beta = .15, p = .008$), supporting Hypothesis 2b. Concerning personality, Extraversion showed a medium negative link with boredom ($\beta = -.14, p = .030$), and Neuroticism medium/high positive links with anxiety ($\beta = .22, p < .001$), anger ($\beta = .26, p < .001$), shame ($\beta = .26, p < .001$), and boredom ($\beta = .24, p < .001$), corroborating Hypothesis 3b. As for ER strategies, we found positive associations between Withdrawal and hopelessness ($\beta = .22, p < .001$), and between Catastrophizing and anxiety ($\beta = .16, p = .003$) and hopelessness ($\beta = .17, p = .002$). In addition, despite the non-significant variation in the explained variance when considering ER strategies, Actively Approaching resulted moderately and negatively related to boredom ($\beta = -.12, p = .038$), in line with Hypothesis 4b.

3.5 Discussion

This study aimed to investigate the interplay among demographic, personality, and ER factors with respect to school-related achievement emotions, in a sample of fourth, sixth, and seventh-graders, attending primary and middle schools in Italy. Using the CVT (Pekrun, 2006, 2024) as the main theoretical framework, we examined how sex, age, Big Five traits, and two behavioral (Actively Approaching and Withdrawal) and two cognitive (Positive Refocusing and Catastrophizing) ER strategies were associated with five positive (enjoyment, pride, hope, relief, and relaxation) and five negative (anxiety, anger, shame, hopelessness, and boredom) emotions that students could feel toward school in general. To achieve this goal, we ran 10 hierarchical regressions, adding in three steps the three groups of factors. The final step had a significant result for all 10 emotions, while leading to a significant increase in the explained variance in only six of them (i.e., enjoyment, pride, hope, relaxation, anxiety,

Table 3.2
Standardized Beta (β) Coefficients

	Enjoyment	Pride	Hope	Relief	Relaxation	Anxiety	Anger	Shame	Hopelessness	Boredom
Step 1										
Sex ^a	.07	-.03	.01	.02	-.11*	.12*	-.05	.13*	.10	-.14*
Age	-.25***	-.13*	.01	-.09	-.18***	.24***	.11	-.05	.08	.19***
Step 2										
Sex ^a	.09	-.01	.02	.04	-.10	.10	-.08	.10	.07	-.16**
Age	-.20***	-.07	.03	-.06	-.13*	.20***	.06	-.11*	.07	.15**
Extraversion	.22***	.01	.18**	.06	.01	-.03	-.08	.01	-.16*	-.16*
Agreeableness	.03	-.08	-.04	-.08	.02	.01	-.01	.09	.05	-.09
Conscientiousness	.07	.26***	.06	.18**	.14*	.03	.03	.02	.07	-.07
Neuroticism	-.08	.03	.11	.12*	-.08	.28***	.31***	.29***	.22***	.25***
Openness	.03	.15*	.05	.07	.10	-.01	.03	-.11	.09	.06
Step 3										
Sex ^a	.09	-.03	.01	.04	-.10	.11*	-.08	.10	.08	-.19***
Age	-.20***	-.05	.05	-.05	-.11	.21***	.08	-.11	.11	.15**
Extraversion	.16*	-.04	.14*	.03	-.04	.01	-.06	.03	-.10	-.14*
Agreeableness	.05	-.06	-.03	-.08	.03	-.01	-.02	.08	.02	-.07
Conscientiousness	.03	.24***	.03	.15*	.10	.05	.03	.03	.08	-.04
Neuroticism	-.02	.05	.11	.13*	-.07	.22***	.26***	.26***	.10	.24***
Openness	.04	.15*	.04	.07	.09	-.03	.02	-.10	.07	.05
Actively Approaching	.05	-.01	.02	.06	.05	.01	.01	.01	.02	-.12*
Withdrawal	-.15**	-.05	-.04	-.01	-.05	.05	.10	.10	.22***	.02
Positive Refocusing	.17	.17**	.16**	.10	.18**	-.09	-.01	-.06	-.07	.03
Catastrophizing	-.03	.02	.08	-.01	.06	.16**	.05	-.02	.17**	.02

Note. ^aSex was coded using 0 for males and 1 for females. * $p < .05$. ** $p < .01$. *** $p < .001$.

and hopelessness).

Our first aim was to study the contribution of sex and age to students' emotional experience at school. In the final step of our analyses, we found no significant relation between sex and positive emotions. Therefore, our findings did not support Hypothesis 1 and previous research documenting a higher level of pleasant school-related emotions in females compared to males (Gentry et al., 2002; Raccanello et al., 2025c). As for negative emotions, we underlined a lack of previous research on sex differences in the general school domain. In our study, females showed higher anxiety and lower boredom than males. The former result is in line with prior research about test anxiety (Aydin, 2019; Hoferichter & Raufelder, 2015; Putwain, 2007; Putwain & Daly, 2014). This could reflect a general tendency for females to be more prone to anxiety than males, due to both biological and environmental (e.g., socialization processes) factors (McLean & Anderson, 2009). The result about boredom is in line with some evidence about a higher propensity for males to experience this emotion due to the higher need for external stimulation (Vodanovich & Kass, 1990; Vodanovich et al., 2011). As for age, we found a significant relation with enjoyment, anxiety, and boredom. In line with Hypotheses 2a and 2b, older students enjoyed school less, felt more anxious, and experienced increased boredom, compared to younger ones. This confirms previous literature indicating a decline in positive achievement emotions and an increase in negative ones at progressing ages or grades, when considering both specific subjects (Lichtenfeld et al., 2023; Raccanello et al., 2013, 2019; Sakaki et al., 2024) and school in general (Gentry et al., 2002; Meyer & Schlesier, 2022; Vierhaus et al., 2016). In addition, such findings give further support to the literature highlighting a maladaptive developmental trend in students' affective and motivational experience (Bouffard et al., 2001; Hascher et al., 2022; Lepper et al., 2005).

The second aim was to investigate the relation between the Big Five personality traits and school-related emotions. Based on the results from the final step of the analyses, we found that positive emotions had positive relations with certain personality traits: enjoyment with Extraversion, pride with Conscientiousness and Openness, and relief with Conscientiousness – supporting Hypothesis 3a and previous findings (Raccanello et al., 2025c). Unexpectedly, we found a positive association between relief and Neuroticism, which is however in line with previous studies involving university students (de la Fuente et al., 2020; Pekrun et al., 2023). As argued by Pekrun et al. (2023), it is plausible that more neurotic people, who usually report heightened levels

of negative feelings, are more inclined to feel a sense of relief, as it is the positive emotion that follows the experience of a stressful situation. On the other side, we found that all negative emotions (except hopelessness) were positively associated with Neuroticism, and that boredom was negatively related also to Extraversion, in line with Hypothesis 3b and previous studies (Hoferichter & Raufelder, 2015; Hoferichter et al., 2014; Raccanello et al., 2025c; Sorić et al., 2013). On the whole, these results help shed light on how primary and middle school students' personality traits can influence their emotions at school. Not surprisingly, the most influential were Extraversion and Neuroticism: indeed, among the Big Five, they are considered those with the strongest affective component (Verduyn & Brans, 2012). However, Conscientiousness and Openness also had a significant role in influencing positive emotions at school, confirming their relevance in achievement settings, which are usually among the best predictors of academic performance (Dumfart & Neubauer, 2016; Gatzka, 2021).

As the last aim, we examined how students' general tendency to use some ER strategies in their lives affects their emotions at school. We focused on two behavioral and two cognitive strategies, mostly understudied in educational research, that can be utilized in the four stages preceding the generation of an emotion according to the ERAS model (Harley et al., 2019). After controlling for demographic and personality characteristics, our results corroborated Hypotheses 4a and 4b. Students who used Withdrawal to cope with negative events reported less enjoyment and more hopelessness at school; those who utilized Positive Refocusing felt more proud, hopeful, and relaxed; and those who employed Catastrophizing reported more anxiety and hopelessness. Moreover, Actively Approaching showed a negative relation to boredom, even though, for this emotion, the addition of ER strategies among the predictors did not result in a statistically significant additional proportion of variance explained. These results support the view of Actively Approaching and Positive Refocusing as adaptive, and of Withdrawal and Catastrophizing as maladaptive, considering not only the emergence of psychopathological symptoms (Garnefski et al., 2001, 2007, 2017; Kraaij & Garnefski, 2019; Şevki Keskiner et al., 2025), but also students' emotional experience in academic contexts (Mudło-Głagolska & Larionow, 2023).

From a theoretical perspective, this study advances knowledge on the concurrent contribution of some underexamined factors in affecting achievement emotions, especially when referring to the general school domain and to primary and

middle school students. It corroborated the assumption of the CVT (Pekrun, 2006, 2024) by showing how some stable characteristics – such as sex, age, and personality traits – along with more malleable factors – like ER strategies – relate to 10 emotions, varying in their valence and arousal. From an applied view, this work extends knowledge about which are the risk and protective factors for primary and middle school students' emotional well-being. Based on our results, teachers and other practitioners working in school contexts (e.g., school psychologists) should be aware of how more stable demographic and personality characteristics can have an impact on students' emotions. Specifically, they should pay particular attention, on the one hand, to older students, and on the other hand, to less extraverted, conscientious, open-minded, and more neurotic ones, as they could experience more negative than positive emotions than their counterparts. As regards sex, they should take into account the higher propensity for females to experience anxiety and for males to feel bored. Moreover, our findings showed that those who reported a tendency to use Actively Approaching and Positive Refocusing in their everyday life reported a better emotional experience at school compared to those who declared a higher use of strategies such as Withdrawal and Catastrophizing. Given the malleable nature of ER strategies (Wright et al., 2025), these results could help practitioners to design evidence-based interventions (Flay et al., 2005) aimed at promoting the more adaptive strategies and contrasting the use of those more maladaptive. In addition, knowing the personality profile of students could also assist in understanding who is more in need of such training. Based on the CVT (Pekrun, 2006, 2024), taking actions to improve students' emotional experience at school could help in ameliorating both their well-being and their learning.

3.5.1 Limitations and Future Research

This study suffers from a number of limitations that can be addressed in future research. First, despite a cross-sectional design, we hypothesized a particular direction in the relations based on theory (e.g., CVT; Pekrun, 2006, 2024) and the level of generality of the assessed constructs – personality and ER strategies (assessed at a general level), in turn affecting achievement emotions (related to a particular context, i.e., school). For such a reason, our findings can be considered only correlational and need further confirmation through longitudinal designs. Second, we assessed achievement emotions generally associated with school, without distinguishing among different domains (e.g., mathematics or native language), in line with previous studies

(Meyer & Schlesier, 2022; Moè et al., 2009; Obermeier et al., 2022; Raccanello et al., 2025c; Vierhaus et al., 2016). We chose to do this to maintain a similar level of generality in comparison to the other measures, i.e., personality and ER strategies. However, considering the importance of domain specificity of achievement emotions within the framework of CVT (Goetz et al., 2006; Raccanello et al., 2013), future research should investigate how individual differences and strategies for managing emotions impact students' emotional experiences in various evaluative and non-evaluative situations across different school subjects. Third, ER was measured by asking students how much they use a certain strategy for coping with stressful situations in their everyday life. However, recent research demonstrated that, in achievement contexts, ER strategies are domain-specific as well, despite showing moderate to large correlations with their general counterparts (Stockinger et al., 2025). Future studies could replicate our work by leading students to think about school-related situations before responding (e.g., Schlesier et al., 2025) or by using instruments developed specifically for achievement settings (e.g., *Academic ER Questionnaire*, AERQ; Burić et al., 2016). Fourth, our sample was limited to students from a Western, educated, industrialized, rich, and democratic (WEIRD) country. This impedes the generalization of our results to other contexts. Even though the CVT (Pekrun, 2006, 2024) sustains the universality of the relations between the constructs independently of the culture or the country, there is a need for further research to confirm the validity of this assumption (Pekrun, 2024).

3.6 Conclusion

This study examined the interplay among demographic characteristics, personality, and ER strategies in relation to 10 achievement emotions that primary and middle school students could experience at school. Our findings were in line with the assumptions of the CVT (Pekrun, 2006, 2024) in underlining the role of sex, age, Big Five traits, and two behavioral and two cognitive ER strategies as relevant risk or protective factors for emotional well-being in educational contexts. Such results can serve as guidance for teachers and other practitioners, not only to better understand which relatively stable characteristics can impact students' well-being, but also for designing evidence-based interventions for training their ER abilities.

Chapter 4. Emotion Regulation Strategies as Mediators in the Relation Between Big Five Personality Traits and Achievement Emotions: Cross-Cultural Evidence From University Students

4.1 Abstract

Personality traits and emotion regulation (ER) are key antecedents of emotions in learning contexts. Nevertheless, little is known about the possible mediating role of ER in the relation between the Big Five (BF) traits and achievement emotions. Considering the Control-Value Theory as the main framework, we examined the mediation of behavioral (Actively Approaching and Withdrawal) and cognitive (Refocus on Planning and Catastrophizing) ER strategies in the relation between the BF traits and 10 study-related achievement emotions. We involved 754 university students from Italy and the United Kingdom. Using path analyses (PAs), we found that Actively Approaching mediated the relation of Extraversion, Agreeableness, Negative Emotionality, and Open-Mindedness with pride and relaxation. Withdrawal mediated the relation of Extraversion and Negative Emotionality with boredom. Catastrophizing mediated the relation between Negative Emotionality and hope, anxiety, anger, and hopelessness. Through multi-group PAs, we observed some country differences in the relation of the BF traits with, respectively, Actively Approaching and Catastrophizing, and three negative emotions. These findings can serve as the basis for developing evidence-based interventions that take into account personality differences and/or influence ER strategies to improve students' achievement emotions.

Keywords: Big Five, personality, emotion regulation strategies, achievement emotions, Control-Value Theory, mediation, university students

4.2 Introduction

Personality, emotion regulation (ER), and achievement emotions are well-established constructs in psychological research, yet their interrelations have rarely been examined within learning contexts. We addressed four gaps in existing research, characterized by a lack of knowledge (a) on the mediational role of ER strategies in the relation between Big Five (BF) traits and achievement emotions, (b) by examining relatively disregarded ER strategies, (c) by focusing on a range of positive and negative achievement emotions, and (d) investigating the universality of such relations across individual (gender) and contextual (country) factors. Therefore, we investigated how BF traits relate to study-related achievement emotions, considering the mediation of behavioral and cognitive ER strategies, involving university students from Italy and the United Kingdom (UK).

4.2.1 Big Five Personality Traits

Personality traits are enduring patterns of thoughts, feelings, and behaviors that characterize an individual and distinguish one person from another over time and situations (Carver & Scheier, 2012). According to one of the most used framework, the BF model (Goldberg, 1993), there are five major traits that together capture the fundamental structure of human personality: Extraversion (describing individuals typically sociable and assertive), Agreeableness (relating to those who show compassion and respect toward others), Conscientiousness (referred to people usually organized), Negative Emotionality (or Neuroticism; regarding emotionally unstable individuals who tend to feel negative emotions), and Open-Mindedness (referred to creative and sensitive to beauty people; Soto & John, 2017b). For the sake of clarity, we adopt these five labels, acknowledging that alternative terms also exist.

The impact of BF traits on affect has long been recognized, as indicated by classical meta-analyses reporting that personality predicts subjective well-being (in terms of affect, happiness, life satisfaction, and quality of life), with an undesirable impact for Negative Emotionality and the opposite for the other traits (e.g., Steel et al., 2008). Additionally, the relevance of BF traits for academic settings has been well-documented. A meta-analysis about university students found positive correlations between Agreeableness, Conscientiousness, and Open-Mindedness and academic achievement; for Extraversion, correlations were negative in individualistic contexts and positive for education majors; and for Negative Emotionality, they were positive for freshmen and sophomores (Chen et al., 2025).

4.2.2 Emotion Regulation Strategies

ER encompasses conscious and unconscious efforts to modulate which emotions are experienced, when they occur, and how they are internally processed or externally expressed (Gross, 2015), through behavioral or cognitive strategies (Garnefski & Kraaij, 2007; Kraaij & Garnefski, 2019). Gross's (1998, 2015) Process Model of Emotion Regulation (PMER) describes a five-phase process of emotion origin, including situation selection, situation modification, attentional deployment, cognitive change, and response modulation. The PMER, also in its applications to the academic context (see the Emotion Regulation in Achievement Situations model, ERAS; Harley et al., 2019), fostered research on two ER strategies, reappraisal and suppression, adaptively associated with positive well-being and mental health, the former, and with the opposite pattern, the latter. Recently, an expanding body of literature has examined the role of a larger range of ER strategies for learning. A recent meta-analysis also revealed significant associations between ER and achievement, with positive effects for strategies such as problem solving and negative effects for others, including avoidance (Romo et al., 2025).

Beyond the intrinsic relevance of ER for learning, the growing body of research on this topic is also related to the diffusion of models such as the ERAS and to the availability of instruments assessing a relatively large variety of strategies pertaining to different PMER phases, such as the *Behavioral Emotion Regulation Questionnaire* (BERQ; Kraaij & Garnefski, 2019) and the *Cognitive Emotion Regulation Questionnaire* (CERQ; Garnefski & Kraaij, 2007). On the one hand, students can implement specific behaviors related to problem solving to actively face a stressful event, for example, during the situation modification phase. Rather, they could withdraw from situations and people during the situation selection or even the response modulation phase. These two strategies – labeled Actively Approaching and Withdrawal in the BERQ – resulted in adaptive or maladaptive outcomes, respectively, in terms of passion for studying and emotional reactivity among university students (Mudło-Głagolska & Larionow, 2023). On the other hand, students could react by thinking about steps for handling the stressful event or by highlighting the extreme negativity of their experiences, for example, during the attentional deployment or the cognitive change phase. For university students, these two strategies – labeled Refocus on Planning and Catastrophizing in the CERQ – were distinguished as respectively adaptive or maladaptive, relating them to test anxiety and post-traumatic stress

symptoms (Kamel, 2018; Yang et al., 2022). It is worth noting that even if some strategies are generally considered beneficial, while others as detrimental, adaptive ER is increasingly understood not merely as the use of specific strategies, but resulting from a flexible match between the characteristics of individuals, contexts, and situational goals (Wright et al., 2025).

4.2.3 Achievement Emotions

Achievement emotions are multi-faceted affective processes occurring “in response to events and actions that are judged according to competence-based standards” (Pekrun et al., 2023, p. 146). In the last two decades, research in this field has been prompted by the Control-Value Theory (CVT; Pekrun, 2006, 2024; Pekrun et al., 2023), which provides three dimensions to define achievement emotions: valence (positive or pleasant vs. negative or unpleasant), physiological arousal (activating vs. deactivating), and object focus (activity vs. outcome). The CVT also targets achievement emotions’ network of factors, comprising proximal and distal antecedents as well as academic outcomes.

Proximal antecedents include control and value beliefs, influenced by more distal antecedents that can also directly impact achievement emotions. Among them are both personality traits (Pekrun, 2006, 2024; Pekrun et al., 2023) and ER strategies (Harley et al., 2019; Wright et al., 2025) – which can also play the role of proximal antecedents. Achievement emotions influence academic outcomes, generally positively for pleasant emotions and negatively for unpleasant emotions (Pekrun, 2006, 2024; Pekrun et al., 2023; for a meta-analysis see Camacho-Morles et al., 2021). CVT core assumptions pertain to the context-specificity of achievement emotions, reciprocal causation among key constructs, and the universality of functional relations between these constructs across individual factors, such as gender, and contextual factors, including country (Pekrun, 2006, 2024; Pekrun et al., 2023).

4.2.4 The Mediating Role of Emotion Regulation Strategies in the Relation Between Big Five Personality Traits and Achievement Emotions

Notwithstanding the relevance for learning of the interrelations between BF traits, ER, and emotions, attention has only recently been paid to the mediating role of ER strategies, primarily in non-academic contexts and focusing on reappraisal and suppression (Berkovich & Eyal, 2021; Kobylńska et al., 2022), and only rarely in academic settings (de la Fuente et al., 2024; Xu et al., 2024). From a study involving 17-to-25-year-olds, we know that participants with higher Negative Emotionality

experienced stronger test anxiety, an effect that was, however, mitigated by cognitive reappraisal (Xu et al., 2024). De la Fuente et al. (2024) assessed study-related self-regulation (including goal-setting planning) and coping, as well as nine achievement emotions (resulting in composite positive and negative scores), in university students. They found that Extraversion and Conscientiousness were positively related to self-regulation and problem-focused coping; they were also associated positively with positive achievement emotions and negatively with negative achievement emotions. Agreeableness and Negative Emotionality were linked negatively to self-regulation and positively to emotion-focused coping, and also positively to negative achievement emotions. In turn, self-regulation was linked positively to positive achievement emotions and negatively to negative achievement emotions. However, the authors did not elaborate further about the mediation of self-regulation. Therefore, the nature of the mediating role of a relatively large number of ER strategies in the relation between personality and a range of achievement emotions remains an underexplored issue.

Nevertheless, we can base on previous research about the direct relations between these three constructs. Beyond the cited findings on the relation between personality and well-being (Steel et al., 2008), a 30-year meta-analysis revealed that test anxiety has its strongest positive relation with Negative Emotionality and a small negative relation with Conscientiousness (von der Embse et al., 2018). Pekrun et al. (2023) indicated that university students high in Extraversion, Agreeableness, Conscientiousness, and Open-Mindedness generally experienced more positive achievement emotions and fewer negative achievement emotions, and vice versa for Negative Emotionality. However, they also found exceptions to this pattern: anxiety, shame, and disappointment were positively associated with Extraversion, and Negative Emotionality showed a positive link to relief. Meta-analytical findings about the relation between personality and ER revealed that higher Extraversion, Agreeableness, Conscientiousness, and Open-Mindedness, and lower Negative Emotionality are linked positively to adaptive strategies, such as problem solving, and negatively to maladaptive ones, like avoidance (Barańczuk, 2019). Generally, this could be related to the combined effects that individuals' personality traits have on the efficacy of different socialization practices, and on their triggering (Eisenberg et al., 1998). In addition, people who are more assertive, organized, and creative, and less neurotic, are probably prone to design and implement plans to solve problems. Moreover, being social, compassionate and respectful of others, and having a relatively stable mood

could be a resource for not withdrawing from social stimuli in the face of difficult events. Finally, while the proposal of models such as the ERAS has stimulated research on ER and achievement emotions, knowledge about a wide range of both strategies and emotions remains lacking. With university students, Stockinger et al. (2025) found that several learning-related ER strategies were linked to their emotions, well-being, health, and academic achievement. Students who resorted more to situation selection – operationalized in part by items about withdrawal from social interactions – experienced higher anxiety and boredom, while those using competence development – including some items pertaining to making and implementing plans – felt more enjoyment and less anxiety and boredom.

4.2.5 The Current Study

We studied the mediation of ER strategies in the relation between BF traits and study-related achievement emotions in university students. We assessed four relatively underexplored ER strategies: Actively Approaching, Withdrawal, Refocus on Planning, and Catastrophizing, balancing domain (behavioral and cognitive), reference to different phases in the PMER and ERAS models, and adaptiveness (adaptive and maladaptive). In line with the context-specific nature of achievement emotions (Pekrun, 2006, 2024; Pekrun et al., 2023), we measured them in the study setting, traditionally less investigated (von der Embse et al., 2018).

4.2.5.1 Aim 1

Based on the CVT, we tested two models examining the relation between BF traits and achievement emotions (separately for valence), while also investigating the mediation of ER strategies.

Hypothesis 1a. We hypothesized that BF traits were related to ER strategies. We expected that students with higher scores for Extraversion, Agreeableness, Conscientiousness, and Open-Mindedness would use adaptive strategies (Actively Approaching and Refocus on Planning) more frequently to deal with negative events, rather than maladaptive strategies (Withdrawal and Catastrophizing), and vice versa for Negative Emotionality.

Hypothesis 1b. We hypothesized that ER strategies were associated with achievement emotions. We expected that students who tend to use adaptive strategies experience more intense positive emotions (enjoyment, pride, hope, relief, and relaxation) and less intense negative emotions (anxiety, anger, shame, hopelessness, and boredom), and vice versa for maladaptive strategies.

Hypothesis 1c. We hypothesized that BF traits impacted achievement emotions. We expected that students with higher scores for Extraversion, Agreeableness, Conscientiousness, and Open-Mindedness would feel more intense positive emotions and less intense negative emotions, and vice versa for Negative Emotionality. We examined whether BF traits influence achievement emotions directly or indirectly via ER strategies.

4.2.5.2 Aim 2

We investigated the models' structural invariance across gender (as a social construct and identity; American Psychological Association, 2024) and country to test CVT assumptions about the universality of the relations between achievement emotions and their antecedents.

Hypothesis 2. We expected the tested models to be invariant across gender (males and females) and country (Italy and the UK), i.e., that the relations between the variables remained unchanged.

4.3 Method

4.3.1 Participants and Procedure

We involved 754 university students attending university in Italy ($n = 501$; $M_{age} = 22.62$, $SD = 4.89$, range: 19–59; 86.03% females) or in the UK ($n = 253$; $M_{age} = 21.15$, $SD = 4.57$, range: 18–54; 76.68% females). Six hundred and thirty-two (83.82%) students were enrolled in a Bachelor's degree course, 112 (14.85%) in a Master's degree course, and 10 (1.33%) did not specify their study level. Most of them ($n = 427$, 56.63%) were attending a course in the field of Psychology.

The research was approved by the Ethics Committee of the Department of Human Sciences at the University of Verona (protocol number 404224, dated 10/10/2023). After giving informed consent, students completed an online survey in Italian (Italy) or English (UK). They were recruited during on-site classes or meetings and asked to share the link with peers.

4.3.2 Measures

4.3.2.1 Big Five Personality Traits

We assessed students' personality using the *Big Five Inventory-2* (BFI-2; Soto & John, 2017b; Burro et al., 2025), which comprises 60 items on a 5-point scale (1 = *Strongly disagree*, 5 = *Strongly agree*). The BFI-2 measures five traits: Extraversion (e.g., "Is outgoing, sociable"), Agreeableness (e.g., "Is polite, courteous to others"), Conscientiousness (e.g., "Keeps things neat and tidy"), Negative Emotionality (e.g.,

“Often feels sad”), and Open-Mindedness (e.g., “Values art and beauty”). In this study, we used a 15-item adaptation of this scale: details about its factorial structure and internal consistency are reported in Appendix C.

4.3.2.2 Emotion Regulation Strategies

The students were asked how much various ER strategies described them when they have to deal with a negative or unpleasant event. Items were rated on a 7-point scale (1 = *Not at all*, 5 = *Extremely*). We used 8 items from the BERQ (Kraaij & Garnefski, 2019) to measure two behavioral strategies, Actively Approaching (e.g., “I get to work on it”) and Withdrawal (e.g., “I avoid other people”). We obtained the Italian version through back-translation. We utilized 8 items from the CERQ (Garnefski & Kraaij, 2007; Italian version of Cerolini et al., 2022; Presaghi & Ercolani, 2005) to assess two cognitive strategies, Refocus on Planning (e.g., “I think about a plan of what I can do best”) and Catastrophizing (e.g., “I keep thinking about how terrible it is what I have experienced”). Appendix C provides information about factorial structure and internal consistency of the two measures.

4.3.2.3 Achievement Emotions

We used a brief version of the *Achievement Emotions Adjective List* (AEAL; Raccanello et al., 2022a, 2022b) to assess the extent to which students experienced 10 achievement emotions while studying. It comprises 10 adjectives about five positive emotions, i.e., enjoyment (“Happy”), pride (“Proud”), hope (“Hopeful”), relief (“Relieved”), and relaxation (“Calm”), and five negative emotions, i.e., anxiety (“Anxious”), anger (“Angry”), shame (“Ashamed”), hopelessness (“Sad”), and boredom (“Bored”), rated on a 7-point scale (1 = *Not at all*, 7 = *Extremely*).

4.3.3 Data Analysis

We used the R software (R Core Team, 2025; version 4.5.0; lavaan package; Rosseel, 2012). Details about the factorial structure of the measures, descriptive statistics, and intercorrelations are available in Appendix C.

For aim 1, we conducted two path analyses (PAs; Maximum Likelihood estimator, ML) to examine the relations between BF traits and emotions – separately for positive and negative emotions – investigating the mediation of ER. We included all variable links and covariances between adaptive and maladaptive strategies. We considered $\beta s \leq .05$ as small and not meaningful, $.05 < \beta s \leq .10$ as small, $.10 < \beta s \leq .25$ as moderate, and $\beta s > .25$ as large (Keith, 2019). We examined the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of

approximation (RMSEA), and the square root mean residual (SRMR) as model-fit indexes. Models were acceptable when CFI and TLI $> .90$ and preferably close to $.95$, and RMSEA and SRMR $< .10$ and preferably close to $.06$ (Hu & Bentler, 1999). Our sample size was appropriate (Kline, 2016), with a ratio of observations to parameters of 9:1 (754 participants for 86 estimated parameters).

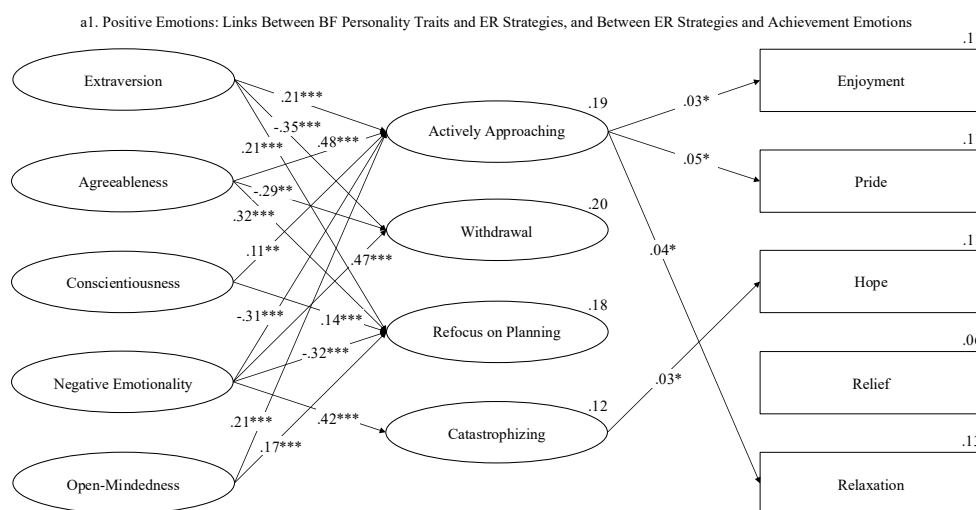
For aim 2, we ran four multi-group PAs to study structural invariance across gender and country. We compared an unconstrained model (with path coefficients estimated freely in each group) to a constrained model (with path coefficients forced to be equal across groups), calculating the chi-square. We excluded from the models across gender 6 and 5 students, respectively, who indicated “Other” and “I prefer not to answer”.

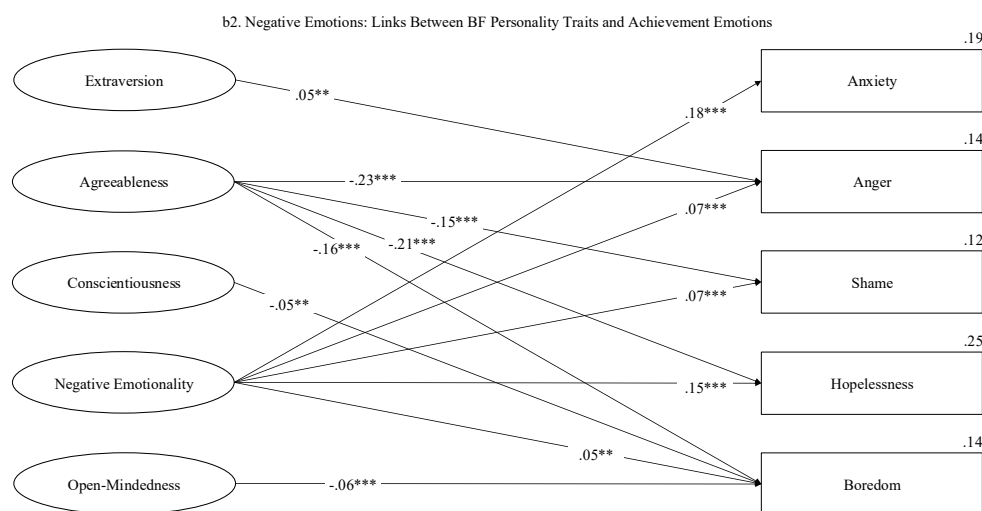
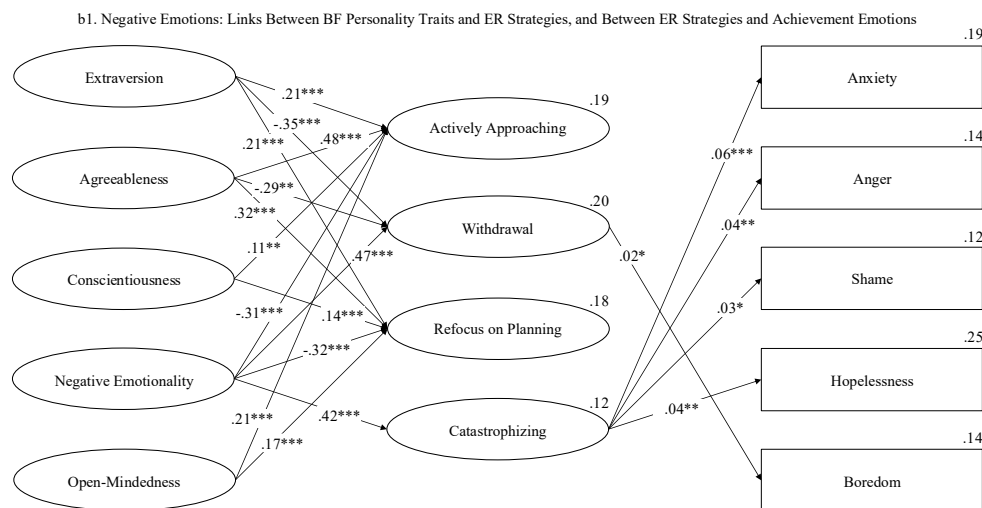
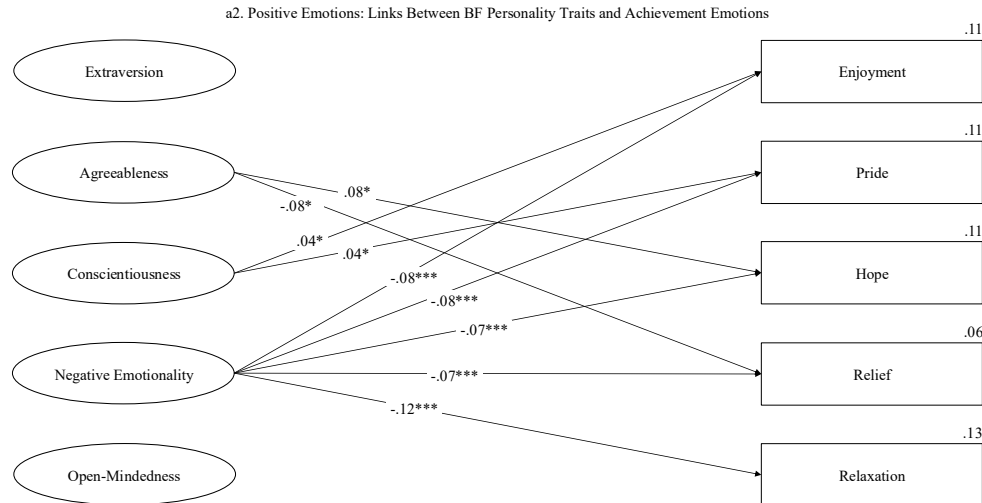
4.4 Results

PAs had a good fit (positive/negative emotions: CFI = $.997/.997$, TLI = $.944/.945$, RMSEA = $.042/.042$, SRMR = $.012/.012$). We reported the paths in Figure 4.1.

Figure 4.1

Two Path Models Representing the Associations Between Big Five Personality Traits, Emotion Regulation Strategies, and Achievement Emotions, for Positive (a) and Negative Emotions (b). To Avoid Visual Overcrowding, Links Between Big Five Personality Traits and Emotion Regulation Strategies, and Between Emotion Regulation Strategies and Achievement Emotions (a1, b1), and Links Between Big Five Personality Traits and Achievement Emotions (a2, b2), Are Reported Separately





Note. For the sake of brevity, only significant paths are represented. * $p < .05$. ** $p < .01$. *** $p < .001$.

First, Extraversion, Agreeableness, Conscientiousness, and Open-Mindedness were related positively, and Negative Emotionality negatively, to Actively Approaching and Refocus on Planning. Extraversion and Agreeableness were negatively linked to Withdrawal. Negative Emotionality was positively associated with Withdrawal and Catastrophizing. Second, there were positive associations of Actively Approaching with enjoyment, pride, and relaxation; of Withdrawal with boredom; and of Catastrophizing with hope, anxiety, anger, shame, and hopelessness. Third, Extraversion was positively related to anger. Agreeableness was related positively to hope and negatively to relief, anger, shame, hopelessness, and boredom. Conscientiousness was related positively to enjoyment and pride, and negatively to boredom. Negative Emotionality was related negatively to positive emotions and positively to negative emotions. And Open-Mindedness was negatively related to boredom.

The links between BF traits and strategies were moderate or large, while those between strategies and emotions were small. The links between BF traits and emotions were generally small, except for those between Agreeableness and the four negative emotions, and between Negative Emotionality and relaxation, anxiety, and hopelessness, which were moderate.

Considering indirect effects (Table 4.1), Actively Approaching mediated the relation of four BF traits (except Conscientiousness) with pride and relaxation (with negative estimates only for Negative Emotionality). Withdrawal mediated the relation of Extraversion and Negative Emotionality with boredom (with a negative estimate for Extraversion). Catastrophizing mediated the relation of Negative Emotionality with hope, anxiety, anger, and hopelessness (with positive estimates). All the mediations were total except those involving Negative Emotionality, which were partial.

The multi-group PAs confirmed structural invariance across gender for all the emotions and across countries for positive emotions; however, for the PA on negative emotions across countries, the chi-square of the multi-group comparison was significant (Table 4.2). Comparing fully and partially constrained models (Table 4.3), we found that the positive links of Extraversion with Actively Approaching and Catastrophizing, and of Negative Emotionality with shame and hopelessness, were stronger for the UK than for Italy. Finally, the link between Conscientiousness and shame was positive for Italy and negative for the UK, and vice versa for the link between Conscientiousness and anger.

Table 4.1

Selected Standardized Indirect Effects Between Big Five Personality Traits and Achievement Emotions

Model	Selected Specific Indirect Effect	β	p	SE	BCA 95% CI
Positive emotions	Extraversion → Actively Approaching → Enjoyment	.02	.068	.01	[.00, .02]
	Extraversion → Actively Approaching → Pride	.02	.030	.01	[.01, .02]
	Extraversion → Actively Approaching → Relaxation	.02	.025	.01	[.01, .02]
	Agreeableness → Actively Approaching → Enjoyment	.02	.064	.01	[.00, .02]
	Agreeableness → Actively Approaching → Pride	.02	.026	.01	[.01, .04]
	Agreeableness → Actively Approaching → Relaxation	.02	.022	.01	[.01, .04]
	Conscientiousness → Actively Approaching → Enjoyment	.01	.113	.01	[.00, .01]
	Conscientiousness → Actively Approaching → Pride	.01	.071	.01	[.00, .01]
	Conscientiousness → Actively Approaching → Relaxation	.01	.066	.01	[.00, .01]
	Negative Emotionality → Actively Approaching → Enjoyment	-.02	.058	.01	[-.02, .00]
	Negative Emotionality → Actively Approaching → Pride	-.03	.021	.01	[-.03, -.01]
	Negative Emotionality → Actively Approaching → Relaxation	-.03	.017	.01	[-.02, -.01]
	Negative Emotionality → Catastrophizing → Hope	.03	.026	.01	[.01, .03]
	Negative Emotionality → Catastrophizing → Relaxation	.03	.026	.01	[.01, .03]
	Open-Mindedness → Actively Approaching → Enjoyment	.01	.072	.01	[.00, .02]
	Open-Mindedness → Actively Approaching → Pride	.02	.033	.01	[.01, .02]
	Open-Mindedness → Actively Approaching → Relaxation	.02	.028	.01	[.01, .02]
	Extraversion → Withdrawal → Boredom	-.02	.031	.01	[-.02, -.01]
	Agreeableness → Withdrawal → Boredom	-.01	.078	.01	[-.02, .00]
Negative emotions	Negative Emotionality → Withdrawal → Boredom	.03	.028	.01	[.01, .02]
	Negative Emotionality → Catastrophizing → Anxiety	.05	< .001	.01	[.01, .04]
	Negative Emotionality → Catastrophizing → Anger	.04	.003	.01	[.01, .03]
	Negative Emotionality → Catastrophizing → Shame	.03	.073	.01	[-.01, .03]
	Negative Emotionality → Catastrophizing → Hopelessness	.04	.002	.01	[.01, .03]

Note. We reported the specific indirect effects only for cases in which the path analyses revealed a significant path between one of the Big Five traits and one of the emotion regulation strategies, together with a significant path between the latter strategy and one of the achievement emotions. Indirect effects were estimated using nonparametric bootstrapping with 5000 resamples and bias-corrected and accelerated 95% confidence intervals (Hayes, 2018). The exam of the indirect effects, considering the p -value and the confidence interval, was analogous, with 14 out of the 23 selected cases indicating mediation (in bold). SE = standard error; BCA 95% CI = bias-corrected and accelerated 95% confidence interval.

Table 4.2

Fit Indexes of the Constrained or Unconstrained Models Across Gender and Country, Separately for Path Analyses on Positive and Negative Emotions, and Chi-Square of the Multi-Group Comparisons

Model	Multi-Group Comparison		CFI	TLI	RMSEA	SRMR	$\chi^2(df)$	<i>p</i>
Positive emotions	Gender	Constrained model	.997	.992	.016	.023	67.83(65)	.381
	Country	Constrained model	.985	.967	.033	.031	83.75(65)	.059
Negative emotions	Gender	Constrained model	.998	.960	.036	.012	58.48(65)	.703
	Country	Unconstrained model	.994	.883	.061	.014	101.35(65)	.003

Note. We reported the fit indexes of the constrained model when the multi-group comparison was not significant, and of the unconstrained model when it was significant. CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; TLI = Tucker-Lewis index.

Table 4.3

Standardized Coefficients of the Significantly Different Effects Across Country (Italy, United Kingdom) and Chi-Square Comparisons

Effects	Country	β	<i>p</i>	$\Delta\chi^2$	<i>p</i>
Extraversion → Actively Approaching	Italy	.15	< .001	3.92	.049
	United Kingdom	.20	< .001		
Extraversion → Catastrophizing	Italy	.01	.830	3.89	.049
	United Kingdom	.14	.024		
Conscientiousness → Anger	Italy	-.07	.091	4.32	.038
	United Kingdom	.08	.156		
Conscientiousness → Shame	Italy	.04	.322	5.49	.019
	United Kingdom	-.12	.038		
Negative Emotionality → Shame	Italy	.13	.008	5.92	.015
	United Kingdom	.26	< .001		
Negative Emotionality → Hopelessness	Italy	.30	< .001	11.02	< .001
	United Kingdom	.40	< .001		

Note. Regarding the multi-group path analysis across countries, we reported the difference between the chi-square ($\Delta\chi^2$) of the constrained model (in which all the relations are constrained to be equal) and the partially constrained model (in which all the relations are constrained to be equal, except the one described in the first column).

4.5 Discussion

We examined how four ER strategies that university students can resort to during different phases of the PMER (Gross, 1998, 2015; ERAS model, Harley et al., 2019) can mediate the relation between BF personality traits (Soto & John, 2017b) and 10 study-related achievement emotions (Pekrun, 2006, 2024; Pekrun et al., 2023; Raccanello et al., 2022a, 2022b). Our findings confirm the general adaptive role of four out of five BF traits and the general maladaptive role of Negative Emotionality, as

typically documented for a range of outcomes unrelated to ER or achievement emotions (Chen et al., 2025; Steel et al., 2008; von der Embse et al., 2018). The added value of this work lies in extending such knowledge to emotional processes triggered by the study setting, which is crucial for both students' achievement and well-being.

In line with a meta-analysis about BF traits and ER (Barańczuk, 2019), we found that more neurotic students were less likely to use problem solving strategies, in turn preferred by students high in the other traits; moreover, less extraverted and agreeable students, and more neurotic ones, favored Withdrawal, with the latter students more likely to engage also in Catastrophizing (confirming Hypothesis 1a). This evidence highlights the strongly maladaptive role of Negative Emotionality, alongside the social aspect of three of the five traits, which were associated with the most socially-oriented strategy, Withdrawal.

Coherently with the sparse evidence on ER and emotions with university students (Kamel, 2018; Mudło-Głagolska & Larionow, 2023; Stockinger et al., 2025; Yang et al., 2022), our analyses showed that Actively Approaching (behavioral) was positively associated with enjoyment, pride, and relaxation, whereas Withdrawal (behavioral) and Catastrophizing (cognitive) were positively linked to boredom the former, and to hope, anxiety, anger, shame and hopelessness the latter (partially confirming Hypothesis 1b). These findings suggest that the cognitive ER strategies we considered may exert null or unpleasant consequences on emotions, while the two behavioral strategies appear to have a similar relevance, with opposite cascading effects in terms of emotional pleasantness. Moreover, the pattern of outcome-focused emotions associated with Catastrophizing suggests that dwelling on negative thoughts may be related to both the past (anger and shame can be considered retrospective emotions) and the future (hope, anxiety, and hopelessness can be considered prospective emotions).

Always broadly consistent with the rare previous literature on BF traits and achievement emotions (Pekrun et al., 2023; von der Embse et al., 2018), Hypothesis 1c was partially confirmed, with direct significant links in the expected direction, except for more extraverted students who were more prone to feeling angry and more agreeable ones to feeling less relieved. Both results could be due to the fact that the study is typically conducted individually, which may lead to frustration for a socially poor environment or dissatisfaction with prolonged solitary activities, even if learning goals – which could provide relief – are achieved. Only for more neurotic students, the links with all the emotions were significant, again indicating the pervasive negative effects

of Negative Emotionality.

Finally, our findings help fill a gap in the literature, which has rarely examined the mediation of ER (for exceptions, see de la Fuente et al., 2024; Xu et al., 2024). Actively Approaching mediated the relation between Extraversion, Agreeableness, Negative Emotionality, and Open-Mindedness, and two positive emotions, pride and relaxation. Refocus on Planning did not mediate any relation, suggesting that planning is beneficial when studying whether plans are implemented, not just designed. As for the maladaptive strategies, Withdrawal mediated the relation of Extraversion and Negative Emotionality with boredom, while Catastrophizing mediated the relation of Negative Emotionality with hope, anxiety, anger, and hopelessness. Overall, these findings highlight the differential mediational role of the four strategies, with different applied implications. Moreover, only the mediations involving Negative Emotionality were partial, supporting the pervasive and marked influence of negative mood and lability on achievement emotions through multiple mechanisms.

Concerning aim 2, the multi-group PA revealed that while the relations between the three constructs can be generalized universally to students of different genders, as assumed by the CVT (Pekrun, 2006, 2024; Pekrun et al., 2023), this could not always be the case, considering different cultural contexts. The relations of Extraversion with Actively Approaching and Catastrophizing, and of Negative Emotionality with shame and hopelessness, were stronger in the UK compared to Italy, and more conscientious students tended to be less ashamed and angrier in the UK (and vice versa in Italy). This may reflect cultural differences in emotional intensity, expressiveness, and application of emotion exhibition rules between Northern European and Mediterranean contexts, possibly rooted in cultural differences in emotion development and socialization practices (Bozicevic et al., 2021). Nevertheless, all these links included the BF traits, whose relations with other constructs varied across cultures also in previous meta-analyses (Chen et al., 2025).

4.5.1 Practical Implications

These findings have the potential to inform professionals in developing effective strategies to promote students' learning and well-being. The beneficial or detrimental impacts of personality on achievement emotions, directly or through ER, speak in favor of the urgency of identifying, on the one hand, students who are at risk, to develop individualized strategies to protect their vulnerabilities, and, on the other hand, to intervene to influence changes in personality traits towards more adaptive

patterns (Wright et al., 2025). Moreover, our results extend previous research indicating the need for supporting students' ER, with cascading effects on their well-being, in particular in terms of achievement emotions, and also learning (Stockinger et al., 2025). This could also contribute to alleviating the pervasive mental health challenges currently faced by university students.

4.5.2 Limitations and Future Research

This study suffers from several limitations. First, our BF measure did not encompass all facets of each BF trait (Soto & John, 2017b); further studies should investigate whether single facets are differentially associated with ER and achievement emotions. Second, we selected four ER strategies; future investigations could examine a larger range, as assessed, for example, through the whole BERQ and CERQ, such as seeking distraction, ignoring, acceptance, or self-blame. Third, in line with previous research (Raccanello et al., 2022a), we assessed achievement emotions using single items, which limits reliability estimates and may reduce construct validity; nevertheless, this helped to shorten the questionnaire, thereby diminishing the risk of recall biases. Fourth, we employed a cross-sectional design and did not investigate the reciprocal relations between constructs; in line with CVT's assumptions about reciprocal causation (Pekrun, 2006, 2024; Pekrun et al., 2023), longitudinal studies should examine these relations. Fifth, we only considered students who identified as male or female when assessing the structural invariance; future research should explore whether relations remain stable for non-binary students as well. Sixth, even if we involved students from two countries, we limited to Western, educated, industrialized, rich, and democratic (WEIRD) countries; future research should study cross-cultural differences including participants from a variety of countries. Seventh, we used self-report instruments, prone to memory and desirability biases: while further physiological or observational measures are needed to triangulate our findings, self-reports still remain among the key ways to access people's inner world (Pekrun, 2020).

4.6 Conclusion

We advanced knowledge about the mediating role of ER strategies in the relation between BF traits and achievement emotions. At an applied level, such knowledge can support interventions tailored to enhancing the well-being and learning of university students, focusing on their individual differences.

Chapter 5. A Brief Self-Report Scale to Assess Personality in Children and Adolescents: The 15-Item Dichotomous Big Five Inventory-2 (BFI-2-15D)

5.1 Abstract

Given the paucity of brief self-report instruments to assess youth's personality, this study aimed to develop the *15-item Dichotomous Big Five Inventory-2* (BFI-2-15D). It consists of a 15-item adaptation for children and adolescents of the BFI-2, which considers the breadth of the five traits and has to be rated on a dichotomous scale. Involving 970 7-to-12-year-olds, we confirmed its factorial structure, invariant across sex and age level. Despite expected drawbacks in internal consistency, corrected item-total correlations were adequate for all the dimensions. Moreover, the BFI-2-15D has good discriminant and concurrent validity. Notwithstanding limitations, this brief questionnaire represents a valuable alternative to longer questionnaires in research contexts characterized by time constraints and to prevent respondents' fatigue and excessive cognitive load.

Keywords: Big Five, children and adolescents, brief scale, self-report, dichotomous response

5.2 Introduction

The Big Five Model (BFM) is one of the most used frameworks to study personality (Goldberg, 1993). Research evidence showed that this model can reliably and validly describe the characteristics of people in different developmental stages (Caspi et al., 2005; Soto & Tackett, 2015). However, while various instruments are available for measuring the Big Five traits in adults, only a few questionnaires were specifically designed for young people, and most of them are very long (Vicentini et al., 2025b). Despite adult-based measures are often used without any adaptation with samples of children and/or adolescents (e.g., De Fruyt et al., 2000; Serrano et al., 2021), from a developmental perspective, it is paramount to rely on age-appropriate instruments. Particularly, among the questionnaires specifically designed for youngsters, there is a paucity of instruments validated with samples of children – while for adolescents there is a larger number – which are brief, and that define the broad Big Five traits encompassing different facets, i.e., sub-dimensions that contribute to each factor (Vicentini et al., 2025b). In addition, to our knowledge, there is no questionnaire using a dichotomous scale – a response format that is quicker and easier to understand than Likert scales, especially for young children (Coombes et al., 2021).

Accordingly, in this study, we developed and tested the psychometric properties of a 15-item dichotomous self-report questionnaire for measuring children's and adolescents' Big Five traits, i.e., the Italian version of the *15-item Dichotomous Big Five Inventory-2* (BFI-2-15D). To do this, we adapted the *Big Five Inventory-2* (BFI-2; Soto & John, 2017b; Italian adaptation with Rasch analysis, *Big Five Inventory-2 Rasch Analysis*, BFI-2-R; Burro et al., 2025), a self-report instrument originally designed for adults. Differently from the 60-item BFI-2, the BFI-2-15D consisted of 15 items, as our aim was to develop a brief, understandable, and easy-to-administer instrument that permits researchers and/or practitioners to reduce the cognitive load associated with long surveys and assess children's and/or adolescents' personality in a time-efficient way. Coherently with previous short measures (e.g., Gosling et al., 2003; Soto & John, 2017a), we decided to privilege content validity over internal consistency, which is usually affected by the number of items, item content, and response scale. Notwithstanding this possible limitation, the BFI-2-15D is a valid alternative to longer instruments for assessing children's and/or adolescents' personality traits. Particularly, it could be used to prevent respondents' fatigue in data collections that require rating several scales and in research or applied settings characterized by time constraints (e.g.,

schools, online surveys, e-commerce).

5.2.1 Big Five Traits in Children and Adolescents

Personality regards individuals' tendencies to think, feel, and behave in specific ways, consistently in different situations and times (Shiner et al., 2021). According to the BFM, it can be described by taking into account five “big” factors, i.e., Extraversion, Agreeableness, Conscientiousness, Negative Emotionality (also called Neuroticism or, using a positive formulation, Emotional Stability), and Open-Mindedness (also called Openness to Experience, Intellect, Imagination, or Culture; Soto & John, 2017b). Even though other frameworks propose different conceptualizations, this taxonomy obtained a wide consensus, particularly for representing adults' personality characteristics (Goldberg, 1993). However, the BFM offers a comprehensive understanding also of youths' individuality (Shiner, 2010).

Traditionally, childhood personality has been studied by referring to the concept of temperament (Caspi et al., 2005). Temperament regards differences in behaviors, emotions, and emotion regulation that can be observed in early childhood (McAdams, 2019). The three major dimensions distinguished in one of the most famous conceptualizations of temperament, i.e., Surgency, Effortful Control, and Negative Affectivity, share many similarities with the Big Five traits of Extraversion, Conscientiousness, and Neuroticism, respectively (De Pauw et al., 2009; Morizot, 2014; Rothbart & Bates, 2006; Rothbart et al., 2000; Shiner, 2010). This led some authors to consider temperament and Big Five personality traits as basically the same set – the former more limited in scope and characterizing prevalently the earliest stages of life, and the latter broader in scope and pertaining to later developmental phases (Shiner, 2015). In line with that, many studies tested the Big Five personality structure in samples of children and adolescents, with different findings. On the one hand, by studying parent-reported personality traits of young people, Soto and John (Soto, 2016; Soto & John, 2014) found a different number of factors. They proposed an alternative model for describing youth personality, i.e., the Little Six. In this taxonomy, they included the additional trait of Activity, a dimension already outlined in some temperament models (e.g., Thomas & Chess, 1977) that merges aspects pertaining to both Extraversion and Conscientiousness. On the other hand, other authors successfully applied the BFM to school-age children and adolescents using both other and self-report instruments (Shiner, 2010).

Without entering into details in the discussion about the possibility of

identifying a Big Five personality structure for children and adolescents comparable to adults, which is not the focus of this work, it is important to underline that the characteristics of each factor are peculiar in each developmental stage. For such a reason, some authors prefer to use different labels for some traits in youths, for example, Benevolence instead of Agreeableness (Mervielde & De Fruyt, 1999) and Imagination or Intellect instead of Open-Mindedness (Barbaranelli et al., 2003; Mervielde & De Fruyt, 1999; Scholte et al., 1997).

5.2.2 Relevance of Age-Appropriate Instruments

The Big Five personality traits in children and adolescents are usually measured by both other and self-report instruments. The former rely on significant informants (e.g., parents, teachers), while the latter permit the direct involvement of the target participants. On the one hand, other-report questionnaires are particularly useful for gathering information on the personality characteristics of very young children who lack the cognitive or insight abilities needed for answering written questions (Shiner et al., 2021; Zupančič et al., 2003). On the other hand, self-report scales enable young people to assess aspects of their personality that other people could struggle to detect from the outside (Dodorico McDonald, 2008). Self-report instruments are the most widespread in the field of personality measurement (Dodorico McDonald, 2008) and are very practical from an applied perspective (Pekrun, 2020).

Previous studies utilized two approaches in assessing self-reported Big Five in children and adolescents. In the first approach, young people's personality traits are evaluated through self-report instruments designed for adults, without adapting them (e.g., De Fruyt et al., 2000; Serrano et al., 2021). In the second approach, the authors rely on self-report instruments specifically developed and/or validated for children and/or adolescents, including both adult questionnaires properly adapted for younger ages (e.g., McCrae et al., 2005) and new questionnaires purposely designed for measuring the Big Five in childhood and/or adolescence (e.g., Rogers & Glendon, 2018). While the former approach is particularly useful in longitudinal or cross-sectional studies comparing participants in the entire life span (De Fruyt et al., 2000), it does not take into account the peculiarities of young people. In fact, the use of questionnaires whose content regards a specific age with participants of another developmental period can lead to a loss of meaning (Shiner et al., 2021). As such, it follows that using age-appropriate instruments is more suitable for more than one reasons. First, it permits to include situations familiar to children and adolescents and

to exclude those more specific to adult life (Barbaranelli et al., 2003). Second, it allows to consider participants' level of cognitive development, text comprehension, and reading skills (Allik et al., 2004; Kaplan, 2013), e.g., by using a more understandable lexicon, short statements, and brief measures.

A recent systematic review of self-report questionnaires for assessing Big Five personality traits in children and adolescents identified only 10 questionnaires reflecting this last approach, characterized by different lengths (Vicentini et al., 2025b). On the one hand, the longest instruments were the NEO-PI-3 (Costa et al., 2008; McCrae et al., 2005) and the JS NEO (Ortet et al., 2012), both including 240 items. They are the English and Spanish adaptations for adolescents of a well-consolidated adult measure, i.e., the *Revised NEO Personality Inventory* (NEO-PI-R; Costa & McCrae, 1992). The authors of the two adapted versions, as a first step, identified some problematic items in the original scale and substituted them with more preferable alternatives. They took into account the readability and comprehensibility of the items and the characteristics of the target age group. The main advantage of such questionnaires consists in the possibility of assessing not only the five broad factors defined by the BFM, but also six facets for each of them (30 in total). However, due to their length, they are not always suitable for research settings characterized by time constraints. On the other hand, among the questionnaires described in that review (Vicentini et al., 2025b), only a few have less than 30 items. The shortest measure was the *Pictorial Personality Traits Questionnaire for Children* (PPTQ-C; Maćkiewicz & Cieciuch, 2016), a Polish instrument specifically designed to be used with children and adolescents. It comprises 15 bipolar written statements associated with pictures to be rated on a 3 or 5-point scale. Despite problems in the internal consistency due to the low number of items (i.e., three) for each dimension (alpha, α , range: .44–.69; Maćkiewicz & Cieciuch, 2016), its brevity allows gathering data even with young children without an excessive cognitive load.

In line with these examples, we decided to adapt for children and adolescents a strongly valid and reliable adult-based Big Five measure, i.e., the BFI-2 (Soto & John, 2017b). In doing this, we paid attention to what young people experience in their everyday lives and rephrased some items to make them more understandable to school-aged participants. In addition, given the paucity of brief measures deputed to assess Big Five factors in childhood and/or adolescence, we decided to select only 15 items.

5.2.3 The Big Five Inventory-2 and Its Shorter Versions

The BFI-2 (Soto & John, 2017b) is the major revision of the *Big Five Inventory* (BFI; John et al., 1991, 2008), one of the most used questionnaires for assessing the Big Five personality traits in adults. The original version of the BFI-2 is in English, but it has been validated in many different languages (e.g., Chinese, Croatian, French, German, Japanese, Polish, Russian, and Spanish) and its psychometric properties were confirmed in a variety of samples and cultural contexts (Hausding & Horstmann, 2023; Husain et al., 2025; Rammstedt et al., 2024; Shchebetenko et al., 2020; Zhang et al., 2022). Recently, it was made available also in Italian, and its structure proved to be strongly valid, also thanks to the use of Rasch analysis (BFI-2-R; Burro et al., 2025).

The BFI-2 consists of 60 items to be rated on a 5-point scale, organized in a hierarchical structure, with five factors (i.e., Extraversion, Agreeableness, Conscientiousness, Negative Emotionality, and Open-Mindedness) and 15 facets. Given the lack of a consensus about which are the most relevant aspects within each domain (Shiner et al., 2021), Soto and John (2017b) selected three facets for each broad trait after identifying those considered more prominent in previous literature (DeYoung et al., 2007; Goldberg, 1999; Hofstee et al., 1992; McCrae & Costa, 2010; Saucier & Ostendorf, 1999): Sociability, Assertiveness, and Energy Level for Extraversion; Compassion, Respectfulness, and Trust for Agreeableness; Organization, Productiveness, and Responsibility for Conscientiousness; Anxiety, Depression, and Emotional Volatility for Negative Emotionality; and Aesthetic Sensitivity, Intellectual Curiosity, and Creative Imagination for Open-Mindedness. This hierarchical organization allows for a compromise between broadly and narrowly defined traits, known as the bandwidth-fidelity tradeoff (Soto & John, 2017b). On the one side, the broad definition enables to benefit from the high bandwidth, as the factors provide general information on behaviors and can predict various relevant criteria. On the other side, the narrow definition has the advantage of high fidelity, as the facets describe better specific behaviors and have a more accurate predictive power.

Moreover, the items of the BFI-2 – in line with those of the BFI – are focused, clear, and efficient (Soto & John, 2017b). Their formulation was based on a precise selection process of the trait-descriptive adjectives (focus), was studied to prevent ambiguousness or multiple meanings (clarity), and was brief to not heavily impact time and respondents' fatigue (efficiency). These characteristics facilitated the use of the BFI-2 also with samples of adolescents (Jovanović & Šakan, 2024; Ringwald et al.,

2024; van Dijk et al., 2021; Wartberg et al., 2023). However, to our knowledge, no revised version has been developed and validated specifically for young people.

Despite its advantages, the full version of the BFI-2 could be difficult to administer in some research contexts, such as in large-scale surveys, within-subjects designs, or laboratory studies (Gosling et al., 2003; Soto & John, 2017a) due to its length. For such a reason Soto and John (2017a) validated a short and an extra-short form consisting respectively of 30 (BFI-2-S) and 15 items (BFI-2-XS). They used a bottom-up approach with the aim to maintain the clear five-factor structure of the full BFI-2, while, at the same time, adequately representing the bandwidth of each trait. In the first step, they selected an item for each facet to develop the 15-item version, and, in the second step, they added an additional item for each facet to obtain the 30-item form. This method led to some expected drawbacks in the internal reliability of the dimensions – especially in the BFI-2-XS (α range: .49–.73; Soto & John, 2017a). This was due not only to the low number of items for each factor – research evidence showed that both Cronbach’s α and McDonald’s omega (ω) can be negatively affected by the brevity of scales (Orçan, 2023), as emerged for the PPTQ-C (Maćkiewicz & Cieciuch, 2016) – but also by the authors’ choice to equally represent each facet purposely privileging content validity over internal consistency (that, conversely, could have been maximized by selecting items with similar content), in line with previous literature (Gosling et al., 2003; John & Soto, 2007; Smith et al., 2000; Stanton et al., 2002).

Similarly, we used an analogous approach to develop the BFI-2-15D, by selecting the 15 items representing better the various nuances of the five traits. In doing so, we prioritized the breadth of the content to the internal consistency of the final dimensions.

5.2.4 Response Format

When designing a new questionnaire, the selection of the most adequate response format is a fundamental aspect (Hilbert et al., 2016). A recent systematic review of self-report questionnaires for assessing Big Five traits in children and adolescents found that Likert scales were the most used format, ranging from three to seven options (Vicentini et al., 2025b). In particular, the 3-point scale was preferred when targets were younger children (Barbaranelli et al., 2003; Maćkiewicz & Cieciuch, 2016). Likert scales with three or more options have some recognized advantages. Some studies documented an increase in internal consistency and convergent validity

with the addition of response alternatives (Preston & Colman, 2000; Weng, 2004). However, they are only one of the possible response formats in self-report questionnaires.

Another option is represented by dichotomous scales, characterized by only two response alternatives (e.g., *Yes/No*, *True/False*), without middle anchors. Despite being rare in psychological assessment (Hilbert et al., 2016), this format has often been used for medical screening purposes (Capik & Gozum, 2015; Lemmens et al., 2015). Capik and Gozum (2014), involving old adults, confirmed the validity and reliability of an instrument for screening prostate cancer with both a dichotomous and a Likert response format. Similarly, Lemmens et al. (2015) tested with both adolescents and adults the psychometric properties of dichotomous and Likert versions of an instrument about Internet gaming disorder, obtaining valid and reliable measures in both cases.

In the field of personality assessment, the results are still indeterminate (Hilbert et al., 2016; Rakhshani et al., 2024; Simms et al., 2019). For example, two works examined the impact of the response scale on the psychometric properties of the BFI (Simms et al., 2019) and the BFI-2 (Rakhshani et al., 2024). Involving samples of adults, both concluded that low-number scales negatively affected the score distribution or the psychometric precision of the instruments, but not their convergent and criterion validity. Another study measured the “dutifulness” facet of Conscientiousness in a sample of adults, comparing the results of three types of response formats, i.e., 5-point Likert, dichotomous, and visual analogue scales – the last one consisting of a horizontal line with labels on its extremities on which participants have to draw a vertical dash corresponding to their response (Hilbert et al., 2016). The authors obtained similar internal consistency and convergent and criterion validity using all three formats, concluding that the psychometric quality of a personality measure does not improve when using a more differentiated scale.

Coombes et al. (2021), in their systematic review, took into account the psychometric properties of a variety of self-reported health outcome measures for children and adolescents, also investigating the ability to use different response formats. They concluded that children up to 7 years of age need a dichotomous scale, while older children can reliably use 3-point Likert scales. However, they also acknowledge that there is a great variability in their cognitive development, not always matching their chronological age.

Despite some inconsistent evidence about psychometric properties, we decided

to adopt a dichotomous response format in the BFI-2-15D. This permitted not only to differentiate it from already existing questionnaires (Vicentini et al., 2025b), but also to make the assessment quicker and easier to understand for children and adolescents with various levels of cognitive development (Coombes et al., 2021).

5.2.5 The Current Study

This study aimed at developing and testing the psychometric properties of the BFI-2-15D, i.e., a brief and dichotomous validation of the BFI-2 (Soto & John, 2017b) for assessing self-reported Big Five traits in children and adolescents. Our aim was to develop a short, understandable, and easy-to-administer instrument to quickly assess young people's personality – also taking into account the breadth of each trait. Given its brevity, the use of a dichotomous scale, and the choice to represent various facets of the five traits, we recognize that this questionnaire may have low internal consistency in some domains, in line with previous literature (e.g., Soto & John, 2017a), and low discriminative capacity. However, notwithstanding these possible drawbacks, the BFI-2-15D could be a useful questionnaire for researchers and/or practitioners interested in screening the Big Five traits in contexts characterized by long data collections or time constraints (e.g., school, survey online, e-commerce). All this considered, we had three aims.

The first aim was to select 15 items for developing a brief BFI-2-15D. To do so, we adapted the original item formulation of the BFI-2 (Soto & John, 2017b; Italian version by Burro et al., 2025). Then, we expected to confirm its five-factor structure (Hypothesis 1a). In addition, we explored internal consistency and corrected item-total correlations (CITCs) of each factor. Given the characteristics of the scale and in line with previous research (Gosling et al., 2003; Soto & John, 2017a), we expected to find low internal consistency in terms of ordinal Cronbach's (1951) α and ordinal McDonald's (1999) ω , but good CITC (Streiner et al., 2015; Hypothesis 1b). The second aim was to test the measurement invariance of the BFI-2-15D for sex (i.e., binary categorization assigned at birth) and age level of the participants. We expected the factorial structure to be invariant across males and females (Hypothesis 2a) and across children and adolescents (Hypothesis 2b). The third aim was to study the discriminant and concurrent validity of the BFI-2-15D. As for discriminant validity, we expected its factors to be independent (Hypothesis 3a). As for concurrent validity, we expected the five factors of the BFI-2-15D to be positively correlated to the five factors of the *Five-Factor Model – Adolescent Personality Questionnaire* (FFM-APQ; Rogers

& Glendon, 2018), i.e., a valid and reliable self-report scale for assessing Big Five traits in adolescence (Hypothesis 3b).

5.3 Method

5.3.1 Participants and Procedure

We involved a convenience sample of 970 7-year-olds ($n = 98$; $M_{age} = 7.47$, $SD = 0.30$, range: 6.91–7.96; 45% females), 9-year-olds ($n = 376$; $M_{age} = 9.63$, $SD = 0.38$, range: 7.79–10.56; 45% females), 11-year-olds ($n = 206$; $M_{age} = 11.82$, $SD = 0.40$, range: 10.94–13.45; 48% females), and 12-year-olds ($n = 290$; $M_{age} = 12.79$, $SD = 0.40$, range: 10.47–14.31; 53% females), attending respectively the second and fourth grade (primary school), and the sixth and seventh grade (lower secondary school) in Italy. In this paper, we labeled 7-to-9-year-olds as children and 11-to-12-year-olds as adolescents. The data collection took place at school, during regular class hours, through paper-and-pencil questionnaires. All the questions were read out loud to facilitate participants with still low reading skills. After obtaining the approval of the school headteacher, the participants' parents had to sign an informed consent form. The project was performed in compliance with relevant laws and institutional guidelines, and approved by the Ethical Committee of the Department of Human Sciences, University of Verona (protocol numbers 8209 dated 13/01/2023, 161865 dated 17/04/2023, and 15396 dated 08/01/2025).

We administered the BFI-2-15D to the whole sample. A subsample of children (i.e., 9-year-olds; $n = 116$; $M_{age} = 9.67$, $SD = 0.30$, range: 8.97–10.38; 52% females) and adolescents (i.e., 11 and 12-year-olds; $n = 125$; $M_{age} = 12.12$, $SD = 0.61$, range: 11.01–14.01; 55% females) also completed the FFM-APQ (Rogers & Glendon, 2018) for testing the convergent validity.

5.3.2 Measures

5.3.2.1 The 15-Item Dichotomous Big Five Inventory-2

The BFI-2-15D is the Italian adaptation for children and adolescents derived from the BFI-2 (Soto & John, 2017b). Starting from the Italian translation for adults provided by Burro et al. (2025), we took a number of steps to make the items easier to understand for younger children. First, while the items of the original adult version have a third-person singular formulation (e.g., “Is relaxed, handles stress well”), we decided to change all of them to the first-person singular to favor young participants' identification (e.g., “I am relaxed”). Second, we avoided using two different verbs or concepts in the same item to diminish the cognitive load when the two terms had a

similar meaning (e.g., we changed “Is respectful, treats others with respect” into “I respect others”) and when we considered one of them too difficult for younger children (e.g., we changed “Is systematic, likes to keep things in order” into “I am tidy”). Third, we carefully chose the lexicon in order to insert words easy to comprehend also by 7-year-olds (e.g., we changed “Is outgoing, sociable” into “I like staying with others”). Fourth, we adapted the content of some items by selecting descriptions of more familiar situations to children and adolescents (e.g., we changed “Has few artistic interests” into “I do not like drawing very much”). Finally, in line with the adult version, we used the present simple tense consistently in all the items.

Like the original BFI-2 (Soto & John, 2017b) and the BFI-2-R (Burro et al., 2025), our final item pool consisted of 60 items (see Table D.2 in Appendix D). They were equally distributed to describe the five traits (12 items each – Extraversion, Agreeableness, Conscientiousness, Negative Emotionality, and Open-Mindedness) and the 15 facets (four items each – see the list reported in the Introduction). Half of the items at both trait and facet levels were reversed. We chose to use a dichotomous scale (*True, False*) to simplify the task for younger children.

5.3.2.2 Five-Factor Model – Adolescent Personality Questionnaire

The FFM-APQ (Rogers & Glendon, 2018) consisted of 25 items, to be rated on a 5-point Likert-type scale (1 = *Not at all*, 5 = *Very much*). It allows to assess the Big Five traits in adolescence, namely Extraversion (e.g., “Is very sociable”), Agreeableness (e.g., “Gives things to others”), Conscientiousness (e.g., “Organizes themselves well”), Neuroticism (e.g., “Is easily annoyed”), and Openness (e.g., “Has lots of ideas”). A previous study confirmed the five-factor structure of the questionnaire and the internal consistency of its dimensions with a sample of adolescents (Cronbach’s alpha, $\alpha = .73-.81$; Rogers & Glendon, 2018). However, given the brevity of the scale and the easiness of its items, we decided to administer it also to a subsample of 9-year-olds. Since the original FFM-APQ is in English, we derived the Italian version through back-translation. The factorial structure of the scale was replicated through confirmatory factor analysis (CFA; see Appendix D). The dimensions demonstrated a good internal consistency in most of the cases (ordinal α range: $.74-.81$; ordinal ω range: $.74-.82$).

5.3.3 Data Analysis

We used the R software (version 4.5.0; R Core Team, 2025) for all the analyses. For the first aim, we conducted a first CFA to select, among the 60 initial pool of items,

15 items representing the five traits and their facets, and, then, a second CFA to test the structural validity of the final scale. In both cases, we used the diagonally weighted least squares (DWLS) estimator for ordinal data. We did not have any missing data. Preliminarily, we checked whether the data were suitable for factor analyses by running Bartlett's test of sphericity and the Kaiser-Meyer-Olkin test of sampling adequacy (KMO). The former checks if the correlation matrix is significantly different from the identity matrix (a significant test reveals that the observed matrix is adequate for factor analysis; Beavers et al., 2013). The latter checks the strength of the partial correlations among the items: KMO values $< .50$ indicate that the degree of common variance is insufficient, between $.50$ and $.59$ miserable, between $.60$ and $.69$ middling, between $.70$ and $.79$ meritorious, and between $.80$ and 1.00 marvelous (Beavers et al., 2013). For the CFAs, we evaluated the goodness of fit by taking into account the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root-mean-square error of approximation (RMSEA), and the standardized root mean residual (SRMR). The model was considered appropriate with CFI and TLI $> .90$ and preferably close to $.95$, and RMSEA and SRMR $< .10$ and preferably close to $.06$ (Hu & Bentler, 1999). Following Kline (2016), for running a CFA the minimum ratio between observations and parameters should be at least 1:5, or preferably 10:1. As we had 970 participants and 140 estimated parameters in the first CFA (corresponding to a ratio of nearly 7:1) and 39 estimated parameters in the second CFA (corresponding to a ratio of nearly 25:1), our sample size was adequate. Then, we assessed the internal consistency and the CITC of each factor. The former refers to the extent to which items of the same dimension measure the same concept, while the latter describes the extent to which individuals' differences in responses to each item align with the scale total omitting that item. Internal consistency was evaluated by ordinal Cronbach's (1951) α and ordinal McDonald's (1999) ω : in both cases, values $\geq .70$ are good. For CITC, we considered values between $.20$ and $.80$ as adequate (Streiner et al., 2015).

For the second aim, we tested the measurement invariance of the BFI-2-15D across sex and age level by running multigroup CFAs, comparing the selected model respectively in males and females, and in children (7 and 9-year-olds) and adolescents (11 and 12-year-olds). Measurement invariance confirms that an instrument works in the same way when utilized with different groups (Chen, 2007). Configural invariance examines whether the same factorial structure is consistent in different groups; metric invariance checks whether the factor loadings are the same in different groups; and

scalar invariance tests whether the intercepts are equal in different groups. We considered the following thresholds for supporting different types of invariance: ΔCFI and $\Delta\text{TLI} \leq .010$, and $\Delta\text{RMSEA} \leq .015$ for configural, metric, and scalar invariance; $\Delta\text{SRMR} \leq .030$ for metric invariance; and $\Delta\text{SRMR} \leq .010$ for scalar invariance (Chen, 2007).

For the third aim, we tested the discriminant and convergent validity of the BFI-2-15D. For discriminant validity, we followed Rönkkö and Cho's (2020) approach. The discriminant validity of an instrument can be confirmed when its dimensions are proved to be distinct from the others. Rönkkö and Cho's (2020) approach uses the heterotrait-monotrait ratio, i.e., the correlation of a dimension with the others (heterotrait) is compared with the correlations of that dimension with itself (monotrait). Values < 0.80 of the upper limit of the confidence intervals (CIs) associated with these correlations denote discriminant validity. In addition, we calculated the chi-square likelihood ratio test to further compare heterotrait and monotrait correlations: significant results ($p < .05$) permit to reject the null hypothesis of a substantial identity between the two of them, indicating that the dimensions refer to different constructs.

For convergent validity, we calculated bivariate correlations – using Pearson's r – between the factors of the BFI-2-15D and the corresponding factors of the FFM-APQ. Following Cohen (1988), values between .10 and .30 were considered small, between .30 and .50 moderate, and higher than .50 large. The level of significance was $p < .05$.

5.4 Results

5.4.1 Development of the BFI-2-15D

5.4.1.1 Selection of the Items

First, we selected the items to insert in the final version of the BFI-2-15D (Table 5.1). Preliminarily, Bartlett's test of sphericity, $\chi^2(1770) = 9965.26, p < .001$, and KMO test of sampling adequacy, $\text{KMO} = .83$, indicated that the data were appropriate for factor analysis. Then, we compared two hierarchical CFA models on the pool of 60 items. The first model included 15 first-order factors (i.e., three facets for each trait) and five second-order factors (i.e., the Big Five traits). The second model included also an additional general third-order factor (i.e., personality), as the Big Five traits, while being distinct constructs, usually show correlation patterns: an additional third-order factor offers a parsimonious explanation of such covariances, hypothesizing that they are due to the influence of a more general factor (Musek, 2017). In both cases, the fit

Table 5.1

Items of the English and the Italian Versions of the 15-Item Dichotomous Big Five Inventory-2 (BFI-2-15D), and Corresponding Second-Order Traits and First-Order Facets. Instructions for Administering the BFI-2-15D: "Below Are Some Sentences That Can Describe You. For Each Sentence, Indicate Whether it is TRUE or FALSE for You. Answer Thinking About Yourself." (Italian Version: "Di Seguito Sono Riportate Alcune Frasi che Ti Possono Descrivere. Per Ogni Frase, Indica se è VERA o FALSA per Te. Rispondi Pensando a Te.")

Item order	BFI-2-15D (English version)	BFI-2-15D (Italian version)	Second-order trait	First-order facet
1	I like spending time with others	Mi piace stare con gli altri	Extraversion	Sociability
2	I like helping others	Aiuto volentieri gli altri	Agreeableness	Compassion
3R	Sometimes I am a slacker	A volte sono uno/a scansafatiche	Conscientiousness	Responsibility
4R	I do not get angry easily	Non mi arrabbio facilmente	Negative Emotionality	Emotional Volatility
5	I am curious	Sono curioso/a	Open-Mindedness	Intellectual Curiosity
6	Others listen to me	Gli altri mi ascoltano	Extraversion	Assertiveness
7	I think well of people	Penso bene delle persone	Agreeableness	Trust
8	If I begin something, then I finish it	Se inizio una cosa, poi la finisco	Conscientiousness	Productiveness
9	I often feel sad	Spesso mi sento triste	Negative Emotionality	Depression
10R	I am little creative	Sono poco creativo/a	Open-Mindedness	Creative Imagination
11	I show a lot of enthusiasm	Mostro molto entusiasmo	Extraversion	Energy Level
12	I respect others	Rispetto gli altri	Agreeableness	Respectfulness
13R	I do not tidy up things	Non rimetto in ordine le cose	Conscientiousness	Organization
14R	I am calm	Sono tranquillo/a	Negative Emotionality	Anxiety
15	I like art, music, books	Mi piacciono l'arte, la musica, i libri	Open-Mindedness	Aesthetic Sensitivity

Note. R = reversed item. The English version items of the BFI-2-15D were obtained by back-translating the Italian version.

indexes were not completely satisfying (first: CFI = .446, TLI = .421, RMSEA = .089, and SRMR = .159; second: CFI = .835, TLI = .827, RMSEA = .048, and SRMR = .096). However, the second model was better than the first one, and we considered its results for choosing 15 items.

For the process of item selection, we took into account three recursive criteria: (a) for each trait, we chose the item of each facet with the highest factor loading ($\lambda > .40$); (b) among the selected items, we excluded those which had a relatively high positive correlation ($r > .30$) with items pertaining to other traits; and (c) we observed the explained variance for each trait and, when R^2 was lower than .20, we substituted the poor item with another one from the same facet with a high λ value. More details about the scoring key and discriminative capacity of the BFI-2-15D can be found in Appendix D.

5.4.1.2 Structural Validity

We examined the structural validity, internal consistency, and item-total correlations of the final scale. Preliminarily, Bartlett's test of sphericity, $\chi^2(1770) = 989.97$, $p < .001$, and KMO test of sampling adequacy, KMO = .74, indicated that the data were appropriate for factor analysis. Then, we ran two CFAs on the 15 items. The first CFA included five factors (i.e., the Big Five traits). The second hierarchical CFA included, beyond five first-order factors, an additional general second-order factor (i.e., personality). The fit of the first model was inadequate, CFI = .687, TLI = .617, RMSEA = .073, and SRMR = .148. However, the second model was good, CFI = .950, TLI = .935, RMSEA = .030, and SRMR = .076, and, thus, it was selected. Factor loadings ranged from .57 to .86 for the general second-order factor and from .46 to .85 for the first-order traits (Figure 5.1). These results corroborated Hypothesis 1a.

5.4.1.3 Internal Consistency and Corrected Item-Total Correlations

We calculated the internal consistency and CITCs of the five factors. As expected, in most of the cases, both ordinal α and ordinal ω values were low, ranging from .50 to .73 and from .52 to .73, respectively, while CITCs were adequate, ranging from .24 to .56. These results were in line with Hypothesis 1b.

5.4.2 Measurement Invariance of the BFI-2-15D

We conducted a series of gradually more restricted analyses to test measurement invariance across sex and age level (Table 5.2). The results confirmed that the factorial structure of the BFI-2-15D was invariant at the configural, metric, and scalar levels in both cases, confirming Hypotheses 2a and 2b.

Table 5.2

Results of Invariance Analyses Across Sex (Males, Females) and Age Level (Children, Adolescents)

Groups	Model	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ TLI	Δ RMSEA	Δ SRMR
Sex	Configural invariance	.973	.966	.022	.088	-	-	-	-
	Metric invariance	.969	.963	.023	.093	-.004	-.003	.001	.005
	Scalar invariance	.973	.967	.022	.089	.004	.004	-.001	-.004
Age level	Configural invariance	.959	.947	.027	.093	-	-	-	-
	Metric invariance	.949	.937	.030	.098	-.010	-.010	.003	.005
	Scalar invariance	.957	.947	.027	.095	.008	.010	-.003	-.003

Note. CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual; Δ CFI/TLI/RMSEA/SRMR = change in CFI/TLI/RMSEA/SRMR.

5.4.3 Validity of the BFI-2-15D

5.4.3.1 Discriminant Validity

Discriminant validity was examined by considering latent correlations based on the results of the CFA and their CIs to take into account the measurement error. In line with Rönkkö and Cho's (2020) approach, in all the cases, the upper limits of the CIs were below 0.80, ranging from -0.02 to 0.59. The chi-square likelihood ratio test resulted significant for all the comparisons, $p < .05$. These findings confirmed the discriminant validity of the five dimensions of the BFI-2-15D, corroborating Hypothesis 3a.

5.4.3.2 Convergent Validity

For testing convergent validity, we calculated bivariate correlations between the five factors of the BFI-2-15D and the corresponding five factors of the FFM-APQ (Table 5.3). First, as the FFM-APQ has been validated only for adolescents, we calculated the correlations only for a subsample of 11-to-12-year-olds. Second, we tested the correlations between the two instruments also including a subsample of children. The correlations between the same factors were positive and significant in both cases. They were moderate to large in the subsample including only adolescents, $r = .33-.51$, and moderate in the subsample including both children and adolescents, $r = .34-.44$. These results supported Hypothesis 3b.

5.5 Discussion

Given the paucity of brief questionnaires to assess Big Five personality traits in children and adolescents (Vicentini et al., 2025b), the main aim of this study was to

Table 5.3

Intercorrelations and Descriptive Statistics (Means, M; Standard Deviations, SD; 95% Confidence Intervals, CI) for the Five Factors of the Big Five Inventory-2-Children and Adolescents (BFI-2-15D) and the Five Factors of the Five-Factor Model – Adolescent Personality Questionnaire (FFM-APQ). For the BFI-2-15D, the Descriptive Statistics Before the Slash Regard the Whole Sample (n = 970) and After the Slash the Subsample for Which Concurrent Validity Was Tested (n = 241)

Variable	1	2	3	4	5	6	7	8	9	10
1. BFI-2-15D - Extraversion	-									
2. BFI-2-15D - Agreeableness	.32***	-								
3. BFI-2-15D - Conscientiousness	.13*	.16**	-							
4. BFI-2-15D - Negative Emotionality	-.23***	-.22***	-.17**	-						
5. BFI-2-15D - Open-Mindedness	.13*	.07	.04	-.05	-					
6. FFM-APQ - Extraversion	.34***	.15*	.16**	-.14*	.15**	-				
7. FFM-APQ - Agreeableness	.22***	.36***	.14*	-.01	.10	.37***	-			
8. FFM-APQ - Conscientiousness	.21***	.13*	.44***	-.25***	.17**	.42***	.32***	-		
9. FFM-APQ - Neuroticism	-.15**	-.15**	-.25***	.44***	.04	-.01	.05	-.18**	-	
10. FFM-APQ - Openness	.29***	.08	.18**	-.10	.42***	.53***	.32***	.49***	.04	-
M	2.47/2.44	2.66/2.66	1.76/1.71	1.19/1.22	2.36/2.42	17.04	17.42	16.51	13.56	17.90
SD	0.71/0.71	0.65/0.63	0.99/0.97	0.98/0.94	0.77/0.74	4.15	3.79	4.10	4.81	4.16
95% CI	[2.42, 2.51]/ [2.35, 2.53]	[2.62, 2.70]/ [2.58, 2.74]	[1.70, 1.83]/ [1.59, 1.83]	[1.13, 1.25]/ [1.10, 1.34]	[2.31, 2.41]/ [2.33, 2.52]	[16.52, 17.57]	[16.93, 17.90]	[15.99, 17.03]	[12.95, 14.17]	[17.37, 18.43]

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

develop a 15-item self-report measure to be rated through dichotomous response alternatives, i.e., the BFI-2-15D. Our goals were to develop a scale that is: (a) age-appropriate, with easy-to-understand items and response options suitable also for younger children (i.e., 7-year-olds; Coombes et al., 2021); (b) brief, in order to allow a quick assessment of personality also in research contexts with time constraints (Soto & John, 2017a); (c) broad in the description of the five factors, with item representing three different facets for each trait (Soto & John, 2017a); and (d) psychometrically sound, despite being aware of internal reliability issues related to brief instruments (Gosling et al., 2003; Maćkiewicz & Cieciuch, 2016; Soto & John, 2017a).

Firstly, we adapted the 60 items of the BFI-2 (Soto & John, 2017b), by considering the specificity of the target age groups. Then, through factor analysis and taking into account different recursive criteria, we selected 15 items, one for each of the three facets of the five traits. The hierarchical factorial structure of the final BFI-2-15D – with five specific factors and one general personality factor – was confirmed, corroborating Hypothesis 1a. However, as expected, we found problems in the internal consistency of the scale, with most values of ordinal α and ordinal ω below the thresholds. This is attributable to at least three reasons: first, the low number of items for each dimension; second, the dichotomous response format; and third, the specific choice to select items representing different facets for each factor, instead of the same content. Similar findings emerged in previous works about the development of brief personality measures, both for young people (Maćkiewicz & Cieciuch, 2016) and adults (Gosling et al., 2003; Soto & John, 2017a). However, the items demonstrated a good CITC within their dimension. Despite low internal consistency indexes, this indicates an acceptable level of coherence among the items of each factor. These findings were in line with Hypothesis 1b.

Secondly, we verified whether the factorial structure of the BFI-2-15D was invariant across sex (considered as the biological binary distinction between males and females) and age level (we considered 7-to-9-year-olds as children and 11-to-12-year-olds as adolescents). Previous studies investigated and confirmed the measurement invariance of instruments to measure the Big Five traits in children and/or adolescents, across gender (Maćkiewicz & Cieciuch, 2016; Morizot, 2014) or different ages (Maćkiewicz & Cieciuch, 2016; Primi et al., 2016). Proving the measurement invariance of a scale is a fundamental step to make valid comparisons, as it demonstrates that the instrument works in the same way for different groups of people.

Our results corroborated Hypotheses 2a and 2b, confirming the measurement invariance of the scale at the configural, metric, and scalar levels, for sex and age level. This enables researchers and/or practitioners to validly use the BFI-2-15D with samples of both males and females, and both children and adolescents, also obtaining reliable results when making inferences about the differences in the two groups.

Thirdly, we tested the discriminant and concurrent validity of the BFI-2-15D. As regards discriminant validity, the five dimensions resulted independent, supporting Hypothesis 3a. Concerning concurrent validity, we examined the correlations between the scores of the five factors of the BFI-2-15D and those of the FFM-APQ (Rogers & Glendon, 2018) in a subsample of children and adolescents. The FFM-APQ is a valid and reliable measure for assessing Big Five in adolescence. However, given the simplicity of its items, we administered it also to 9-year-olds: the factorial structure and the internal consistency of the scale were confirmed also for our sample. All the correlations between the five factors of the BFI-2-15D and the corresponding factors of the FFM-APQ were positive, significant, and moderate-to-large, both when considering solely the subsample of adolescents and when including also 9-year-olds. These results supported Hypothesis 3b.

5.5.1 Limitations and Future Research

This study suffers from a series of limitations that can guide future research. First, our sample came from a specific Western, educated, industrialized, rich, and democratic (WEIRD) country and, thus, our findings could not be necessarily generalized to other contexts. Future research could investigate the suitability and the psychometric properties of the BFI-2-15D also involving children and adolescents of other countries, prioritizing those under-represented in psychological research. Second, in line with other brief measures (Gosling et al., 2003; Maćkiewicz & Cieciuch, 2016; Soto & John, 2017a), the BFI-2-15D showed a low internal consistency. Researchers and/or practitioners who want to use this scale should be aware of this drawback and, when the context permits it, use longer measures to obtain more reliable results. Third, we did not measure the test-retest reliability of the BFI-2-15D. As in the context of hierarchical personality assessment test-retest reliability could be more appropriate than internal consistency (McCrae, 2015), further research is needed to explore the consistency of results obtained by this brief scale over a short time period. Fourth, while the use of a dichotomous scale could have facilitated the task for younger children, it probably contributed to negatively impacting the internal consistency of the five

dimensions. In future studies, other response formats (e.g., Likert scales with three or more alternative options) could be tested and compared. Fifth, despite taking into account various facets in selecting the items, the BFI-2-15D does not provide scores for assessing them. When interested in the assessment of the more narrowed nuances of each trait, longer instruments specifically devoted to young people should be used (e.g., NEO-PI-R; Costa et al., 2008; McCrae et al., 2005).

5.6 Conclusion

The BFI-2-15D is a 15-item dichotomous self-report questionnaire to assess Big Five personality traits in children and/or adolescents. It derived from an adaptation of the BFI-2 (Soto & John, 2017b), a strongly valid and reliable 60-item instrument designed specifically for adults. The five-factor structure of the BFI-2-15D was confirmed and invariant across sex and age level. In line with expectations, its internal consistency was low, while there was a good internal coherence among the items of each dimension. Moreover, its discriminant and concurrent validity were proven. In light of this evidence, the BFI-2-15D can be considered a good alternative to longer scales for evaluating the Big Five in youth, especially in contexts characterized by time constraints or when it is pivotal to take into account respondents' fatigue and cognitive load.

Chapter 6. A Training Program for Increasing Emotional Competence in Adolescence: Efficacy and Role of Personality Traits

6.1 Abstract

Emotional competence is a crucial resource for coping with everyday challenges. Although it develops progressively through socialization, it can also be enhanced through targeted educational programs. This study examined the efficacy of a brief, evidence-based intervention designed to improve adolescents' emotional competence, while also investigating how personality traits influence learning outcomes. A total of 236 Italian middle school students were assigned to either an experimental or a control group. The intervention consisted of a four-unit school-based program combining onsite and online activities. Participants completed pretest and posttest questionnaires that assessed their knowledge of facial expressions of emotions, emotional lexicon, and emotion regulation strategies, and the Big Five personality traits. Generalized mixed models revealed that, compared to the control group, students in the experimental group demonstrated significant gains in all targeted domains. Through a linear model, we found that high levels of Agreeableness and Conscientiousness predicted greater improvements in emotional vocabulary, whereas high Negative Emotionality was associated with greater learning of emotion regulation strategies. Despite some limitations, the findings support the efficacy of brief interventions in promoting emotional competence during adolescence. They also highlight the role of personality traits in shaping learning processes, suggesting that short training programs may be particularly beneficial for individuals who experience greater emotional challenges.

Keywords: training program, emotional competence, adolescents, personality, Big Five

6.2 Introduction

This study examined the efficacy of a brief, evidence-based (Flay et al., 2005) training program designed to enhance emotional competence in adolescence, while also investigating the role of personality traits in influencing learning. Emotional competence is considered beneficial for various domains of life, including well-being and academic achievement (Lau & Wu, 2012; Parker et al., 2004). Emotionally competent people are not immune to experiencing difficulties, but they are well-equipped to face adverse situations (Buckley et al., 2003). For these reasons, it is crucial to promote training programs that enhance adolescents' emotional competence, as a key resource for coping with the challenging transition to adulthood.

The psychological literature has widely documented the efficacy of school-based programs that focus on social and emotional learning (SEL), also involving adolescents (Durlak et al., 2022). However, notwithstanding the availability of studies on this topic, there are some knowledge gaps in the literature. First, interventions on emotional competence only rarely benefited from the advantages of both onsite and online methodologies. Second, little is known about individual differences in personality that could uniquely impact responses to interventions about emotional competence.

Accordingly, the present study examined the efficacy of a school-based intervention on emotional competence adapted from previous training programs (Raccanello et al., 2023, 2024). This intervention involved onsite and online activities to foster everyday-life emotional competence in a sample of middle school students in Italy, divided into an experimental and a control group. Additionally, we examined how personality traits impact learning in this specific educational setting.

6.2.1 Adolescents' Emotional Competence

Following Denham (1998; Root & Denham, 2010), emotional competence can be conceptualized as the ability to express, understand, and regulate one's own and others' emotions. Although many changes in these components occur during infancy and childhood, improvements could also take place during adolescence and adulthood (Kotsou et al., 2011).

Emotional expression has been classically associated with the individual's capacity to adequately use and recognize facial expressions of emotions (Ekman, 1993). However, emotions can also be communicated through and inferred from other nonverbal (e.g., vocal bursts, body movements, and posture; Brooks et al., 2023; Reed

et al., 2020) and verbal cues (e.g., emotional lexicon; Hunter, 2014). Even at a very young age, infants demonstrate some capacity to recognize emotions based on facial expressions and vocal information (Herba & Phillips, 2004). However, despite a paucity of studies examining how these abilities are refined during the transition to adolescence, some evidence suggests that the ability to recognize different facial expressions of emotions increases with age. Improvements in such ability have been found involving different samples of children, adolescents, and adults, and using both labelling (in which participants had to freely associate a label to a list of facial expressions; Rodger et al., 2015) and matching tasks (in which participants had to select from a list the label that correctly matched the facial expression; Lawrence et al., 2015). Research evidence indicates that the understanding of the emotional lexicon also grows from childhood to adolescence. For example, Nook et al. (2020) found that the ability to provide a definition of words pertaining to the emotional vocabulary increased until the age of 11, but that the abstractness of such definitions (including the use of diverse synonyms to describe emotion-related words) continued to improve until the beginning of adulthood.

According to Pons et al. (2004), emotion comprehension refers to the knowledge that an individual has acquired about nine components related to the nature of emotions, their antecedents, and the possibility of regulating them. Typically, these pieces of knowledge are acquired gradually between the ages of 3 and 11. For example, most children develop the ability to identify the external causes of emotions by the age of 5 years; however, they only later become capable of understanding the role of internal factors (namely, desires, beliefs, and morality) in influencing emotions.

Emotion regulation refers to the ability to manage aspects such as the duration, intensity, and latency of both positive and negative emotions through various strategies (Gross, 1998; Thompson, 1990; Zimmer-Gembeck & Skinner, 2011). Some reviews and meta-analyses suggest that adolescents experience highly intense positive and negative emotions more frequently than children and adults, and are characterized by a higher emotional intensity compared to them (Bailen et al., 2019; Reitsema et al., 2022). However, the higher intensity of the emotional experiences in adolescence seems to be associated with an inadequate ability to regulate them. From a biological perspective, this could be partially explained by the relative immaturity of the prefrontal cortex, the brain region responsible for executive functions, which plays a crucial role in regulating processes (Fombouchet et al., 2023). The biological maturation of the brain, combined

with the continuous acquisition of new strategies to cope with adverse events (Zimmer-Gembeck & Skinner, 2011), contributes to explaining the increasingly refined abilities to regulate the intensity of emotions with age. These strategies can be distinguished based on their underlying processes (behavioral or cognitive strategies; Garnefski et al., 2001) or the type of resources they require (interpersonal or intrapersonal strategies; Phillips & Power, 2007). Young children tend to regulate their emotions primarily by relying on external resources (e.g., parents) and enacting behavioral strategies (e.g., physically escaping from unpleasant situations; Zimmer-Gembeck & Skinner, 2011). However, during development, their repertoire of strategies gradually expands, encompassing also intrapersonal (e.g., relying on their own intrinsic resources) and cognitive strategies (e.g., mentally escaping from unpleasant situations; Zimmer-Gembeck & Skinner, 2011).

6.2.2 Interventions on Emotional Competence in Adolescence

Many socialization processes contribute to the development of emotional competence (Denham et al., 2014; Root & Denham, 2010). People progressively refine their emotion-related knowledge and skills by observing how others express affective states and respond to their own emotional displays. However, they can also ameliorate their emotional competence by being explicitly educated about emotions and their functioning.

Training programs designed to enhance emotional skills have been successfully implemented within the school context (Buckley et al., 2003). Universal school-based interventions, which are provided to all students without taking their specific needs into account, have certain advantages over targeted interventions that focus solely on individuals deemed at “high risk” for mental health issues. They can engage larger numbers of participants, help reduce high dropout rates, and make support accessible to students from disadvantaged backgrounds who may have fewer social and emotional resources (Lakes et al., 2019; Sousa et al., 2023). A review of meta-analyses showed that school-based SEL interventions for children and adolescents have consistent positive impacts on their socio-emotional competencies, attitudes, prosocial behaviors, and academic achievement, and contribute to diminishing conduct problems and emotional distress (Durlak et al., 2022). When involving secondary school students, these programs have been proven to be more efficacious in enhancing self and social awareness than other action-focused competencies (van de Sande et al., 2019).

Despite utilizing diverse theoretical backgrounds (e.g., emotional intelligence,

SEL; Mayer & Salovey, 1997; CASEL, n.d.), many studies describe training programs aimed at enhancing adolescents' skills related to the three components of emotional competence as described by Denham (1998). These programs typically address emotional expression by discussing physical and facial configurations of emotions, as well as verbal communication; understanding of emotions by talking about their significance, functions, and utility and by making people reflect on their causes and consequences; and emotion regulation by targeting strategies to manage emotions in different contexts and situations (Allara et al., 2019; Lakes et al., 2019; McLeod & Boyes, 2021; Postigo-Zegarra et al., 2019; Raccanello & Hall, 2021; Ruiz-Aranda et al., 2012a, 2012b; Schoeps et al., 2018).

Most of the aforementioned studies included only onsite traditional activities, such as journal writing, brainstorming, discussions, dialogues, role playing, crossword puzzles, and the utilization of photos, poems, or stories (Allara et al., 2019; Lakes et al., 2019; Postigo-Zegarra et al., 2019; Ruiz-Aranda et al., 2012a). Kuosmanen et al. (2019), after reviewing studies that document evidence-based programs aimed at promoting mental health and well-being in adolescents, concluded that there is a paucity of digital interventions. Meta-analytic findings have suggested that these interventions can be efficacious on emotion regulation – particularly those based on digital games – and are typically well-received by youth (Reynard et al., 2022). A growing body of work has highlighted the potential of game-based and immersive environments to foster both emotional understanding and regulation skills. For instance, video game interventions have been employed in therapeutic contexts with individuals aged 10 to 17, yielding improvements in both emotion recognition and regulation (David et al., 2018; Ducharme et al., 2021). Similarly, virtual-reality-based training has been shown to outperform traditional role-play conditions in terms of feasibility, acceptability, and effectiveness in reducing risky behaviors among middle school students (Hadley et al., 2019). Beyond immersive approaches, tablet-based applications have also been tested as accessible tools for school settings. Web-based programs implemented on tablets have successfully enhanced students' expressive and regulatory emotional skills (Houck et al., 2022), while tailored digital platforms have been designed to address context-specific challenges such as managing emotions during pandemics, with evidence of gains in knowledge and metacognitive awareness about facial expressions of emotions, emotional lexicon, and strategies for regulating emotions (Raccanello et al., 2024). Taken together, these studies illustrate both the diversity of digital formats

being explored and their promising role in supporting adolescents' emotional development across different contexts.

Despite the advantages of onsite and online interventions, research documenting the effectiveness of combined approaches to enhance emotional competence in adolescents remains limited. In response to this gap, the training program described in this study leveraged the benefits of both digital methodologies – through the use of a tablet-based web application – and traditional teaching methods to promote middle school students' understanding of facial expressions of emotion, expand their emotional lexicon, and improve their knowledge of emotion regulation strategies. We adapted the materials and structure from two previous interventions focused on emotional prevention towards disasters, engaging primary school students in online and onsite activities on earthquakes, and primary and middle school students in solely online activities on pandemics (Raccanello et al., 2023, 2024).

6.2.3 Personality and Emotional Competence

Personality refers to relatively stable individual differences in thinking, feeling, and behaving across various situations and over time (Carver & Scheier, 2012; Damian et al., 2019; Shiner et al., 2021). Among the various frameworks for describing personality, the Big Five Model (BFM; Goldberg, 1993) identifies five broad traits, namely Extraversion, Agreeableness, Conscientiousness, Negative Emotionality, and Open-Mindedness. These traits have been successfully used to describe personality not only in adults, but also in younger people (Caspi et al., 2005; Shiner, 2010; Soto & Tackett, 2015; Vicentini et al., 2025b).

In the last decade, many scholars have proposed using the BFM as a comprehensive framework to systematize the classification of social, emotional, and behavioral skills (Belfi & Borghans, 2024; Chernyshenko et al., 2018; John & De Fruyt, 2015; Primi et al., 2016, 2019; Soto et al., 2021, 2022; Walton et al., 2023). Despite recognizing their theoretical relation, Soto et al. (2021, 2022) underline the importance of distinguishing between traits and skills: the former denote individuals' generally stable tendencies, while the latter refer to more situational capacities that people demonstrate in specific contexts. Acknowledging this distinction, this integrative model suggests a connection between personality traits and certain relevant emotional skills (Soto et al., 2021, 2022). Some abilities connected to the components of emotional competence described by Denham (1998) are thought to be related to specific Big Five traits (Soto et al., 2021, 2022). The capacity to communicate to others one's own

thoughts and feelings (expressive skill) is connected to the trait of Extraversion. The capacity to understand others' thoughts and feelings (perspective-taking skill) is associated with the domain of Agreeableness. The capacity to understand one's own thoughts and feelings (self-reflection skill) is mainly related to the trait of Open-Mindedness, but is also thought to be compounded with other dimensions. Finally, the capacity to regulate stress, anxiety, fear, anger, and irritation (stress regulation and anger management) is linked to Emotional Stability (or low Negative Emotionality). These hypothesized associations were mostly confirmed by correlational results (Soto et al., 2022).

These recent studies have provided valuable insights into the relations between individuals' personality traits and their social, emotional, and behavioral skills. However, there is still limited understanding of how these traits influence people's potential to learn in interventions designed to enhance emotional competence.

6.2.4 The Current Study

In this study, we tested the efficacy of a training program on emotional competence involving a sample of sixth and seventh-graders and following the standards of evidence-based research (Flay et al., 2005). Additionally, we examined the role of personality traits in influencing learning during this intervention. We had two aims.

6.2.4.1 Aim 1

Based on previous literature (Raccanello et al., 2023, 2024), we verified whether participants in the experimental group, after participating in the training program, increased their knowledge about facial expressions of emotions (Hypothesis 1a), emotional lexicon (Hypothesis 1b), and emotion regulation strategies (Hypothesis 1c), compared to participants in the control group (who did not take part in the training program).

6.2.4.2 Aim 2

We investigated whether the Big Five personality traits (i.e., Extraversion, Agreeableness, Conscientiousness, Negative Emotionality, and Open-Mindedness) of participants in the experimental group affected their learning during the training program. Given the exploratory nature of this aim, we did not formulate any specific hypothesis.

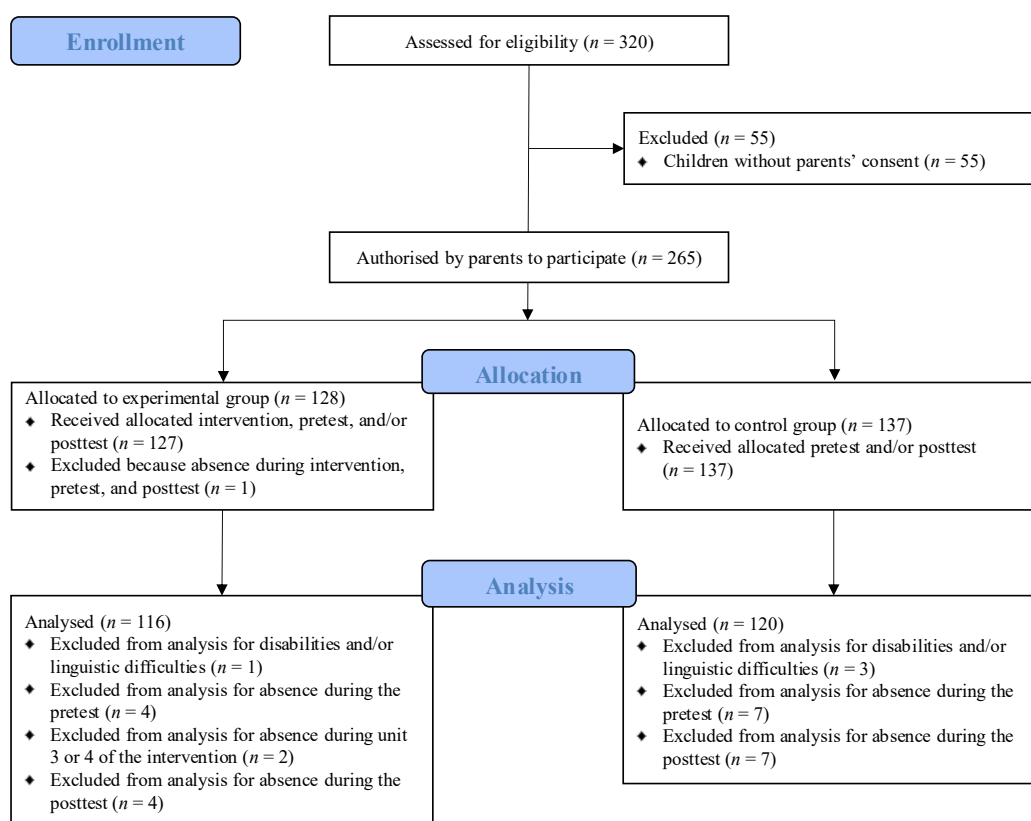
6.3 Method

6.3.1 Participants

We involved a convenience sample of 236 middle school students attending the sixth ($n = 131$) and seventh grade ($n = 105$) in Italy. We divided them into an experimental ($n = 116$, $M_{age} = 12.33$, $SD = 0.57$, range: 11.21–13.70, 46% females; 6 classes) and a control group ($n = 120$, $M_{age} = 12.05$, $SD = 0.56$, range: 10.47–13.81, 41% females; 10 classes). Participants in the two groups were characterized by various socio-economic and family characteristics.

Figure 6.1

CONSORT Flow Diagram



6.3.2 Procedure

The project was approved by the Ethics Committee of the Department of Human Sciences of the University of Verona (protocol number 161865 dated 17/04/2023). We collected the data between March 2023 and February 2024, after obtaining the informed consent form signed by the students' parents or legal guardians. During school time, participants in the experimental group completed paper-and-pencil questionnaires

about one week before (pretest) and after (posttest) the training program. The control group completed the same questionnaires at a distance of approximately four weeks, without participating in the training program. The pretest and posttest assessed their knowledge of facial expressions of emotions, emotional lexicon, and emotion regulation strategies. In the pretest, we also measured participants' personality traits.

6.3.2.1 Recruitment and Attrition Information

We considered a total of 320 students eligible. We excluded 55 students because their parents did not sign the informed consent form for participation. We allocated 128 participants to the experimental group and 137 to the control group. In the experimental group, 1 student was absent during all the phases (i.e., pretest, intervention, posttest), so only 127 students participated in at least one phase of the project. Finally, we analyzed data of 116 participants for the experimental group and 120 for the control group (respectively for each group, 11 and 17 students were excluded because of disabilities and/or linguistic difficulties, or because they had been absent during at least one phase of the project). The CONSORT diagram, detailing recruitment and attrition, is presented in Figure 6.1.

6.3.3 Training Program

The name of the training program was *A compass for emotions* (in Italian, *Una bussola per le emozioni*). It consisted of four units, each lasting approximately an hour, and was administered once a week during school time. The intervention was adapted from previous evidence-based interventions (Raccanello et al., 2023, 2024). In the first (i.e., “How to recognize facial expressions of emotions?”) and second (i.e., “Can we use different words to describe emotions?”) units, we focused on, respectively, nonverbal and verbal expression of emotions (Ekman, 1993; Hunter, 2014); in the third unit (i.e., “How does the intensity of emotions vary?”), we discussed the different intensities and causes of emotions (Gross, 1998; Pons et al., 2004; Thompson, 1990); and, in the fourth unit (i.e., “How to feel better?”), we talked about emotion regulation by explaining the efficacy of several types of strategies, distinguishing between behavioral or cognitive, and intrapersonal or interpersonal strategies (Garnefski et al., 2001; Gross, 1998; Phillips & Power, 2007; Thompson, 1990; Zimmer-Gembeck & Skinner, 2011). At the end of the training program, participants received a certificate of attendance and took home a portfolio containing the paper sheets of the completed activities.

The training program comprised online and onsite activities (Table 6.1). In the

first part of each unit, students were required to individually complete a level of an app (adapted from HEMOT, 2022; Raccanello et al., 2023, 2024; Vicentini et al., 2020) using tablets and headphones. Each level consisted of a brief lesson describing the main contents of the unit, followed by a list of written items (e.g., “Is he happy?”) – usually associated with an image (e.g., the face of a boy expressing joy) – to be answered on a dichotomous scale (e.g., *Yes* or *No*). After responding, the app revealed the right answer to enhance learning. Each written information was read aloud by a software voice to facilitate students with reading difficulties. In the second part of each unit, we conducted at least two onsite activities using a variety of methodologies (e.g., paper sheets, mimic gestural activities, posters), also taking advantage of cooperative learning (Johnson & Johnson, 2009; Slavin, 1991).

Table 6.1

Online and Onsite Activities of the Four Units of the Training (Adapted From Raccanello et al., 2023, 2024)

Units Activities and descriptions	
1	Unit 1 – How to recognize facial expressions of emotions? 1.1 Online activity: Level 1 After a brief explanation about nonverbal expression of emotions, the level consisted of 36 written items associated with images. The participants had to indicate whether the verbal description of the emotion matched the drawn facial expression (e.g., “Is he happy?”); possible answers were <i>Yes</i> or <i>No</i>. 1.2 Onsite activity: Emotional telephone game A small group of participants was lined up in front of the class. The conductor showed only the participant at the beginning of the line a card on which an emotion was written. Then, the first participant, without talking, had to mime the emotion to the second participant. The second participant had to reproduce the mimed emotion, without talking, to the third participant, and so on. The last participant in the line had to guess the emotion that was being conveyed. We repeated the game six times, once for each of six emotions (joy, surprise, calm, fear, sadness, and anger). 1.3 Onsite activity: Striped faces Individually, the participants had to reassemble the images of six facial expressions, corresponding to six emotions (joy, surprise, calm, fear, sadness, and anger). 1.4 Interactive lesson The conductor explained to the participants different nonverbal channels through which emotions can be communicated (e.g., facial expressions, posture, tone of voice, images).
2	Unit 2 – Can we use different words to describe emotions? 2.1 Online activity: Level 2 After a brief explanation about verbal expression of emotions, the level consisted of 36 written items. The participants had to indicate if two adjectives belonging to the psychological lexicon were (e.g., “Does to be AMAZED mean to be SURPRISED?”) or were not (e.g., “Does to be TERRIFIED mean to be SAD?”) synonyms; possible answers were <i>Yes</i> or <i>No</i>. 2.2 Onsite activity: Emotional synonyms In small groups, the participants completed a paper sheet listing a variety of synonyms to describe the emotions represented in six images (related to the facial expressions of joy, surprise, calm, fear, sadness, and anger).

3 Unit 3 – How does the intensity of emotions vary?

3.1 Online activity: Level 3

After a brief explanation about the intensity of emotions, the level consisted of 48 written items associated with images. The participants had to indicate if the two drawn faces represented in the image were expressing the emotion with the same intensity (e.g., “Are they SURPRISED in the same way?”); possible answers were *Yes* or *No*.

3.2 Onsite activity: Mime of emotions

The conductor chose six volunteers who had to mime – with their faces only – one of six emotions (joy, surprise, calm, fear, sadness, and anger), first at a very low intensity and then at a very high intensity. The class had to guess the mimed emotion.

3.3 Onsite activity: Thermometer of emotions

Individually, the participants answered digital questions using *Mentimeter* (n.d.). They had to indicate the intensity of six emotions (joy, surprise, calm, fear, sadness, and anger) that they would experience in six different situations (e.g., “I received a bad mark in mathematics”). Then, the conductor reflected with them on the causes of emotions and individual differences.

4 Unit 4 – How to feel better?

4.1 Online activity: Level 4

After a brief explanation of emotion regulation, the level consisted of 24 written items associated with images, describing possible strategies for feeling better. In the first part, participants had to indicate whether the strategy was behavioral (e.g., “Giving correct, clear, and understandable information about the problems”) or cognitive (e.g., “Trying to look also at the bright side”); possible answers were *Do* or *Think*. In the second part, participants had to indicate whether the strategy was intra (e.g., “Keeping calm”) or interpersonal (e.g., “Hugging close people”); possible answers were *Alone* or *With others*.

4.2 Onsite activity: Compass for emotions

The conductor showed the participants a poster representing the “compass for emotions”. It was a metaphor for the importance of emotion regulation strategies in promoting well-being (the compass was divided into four quadrants, originating from the intersection of two axes: *Do/Think* and *Alone/With others*; adapted from Whitehouse & Pudney, 1999). In pairs, the participants completed a paper sheet by writing a list of strategies useful to deal with negative emotions (fear, sadness, and anger).

4.3 Onsite activity: Sticky strategies

Each participant received a sticky card. Individually, they had to write an emotion regulation strategy on it. Then, they had to classify it based on the two dimensions represented in the compass (*Do/Think* and *Alone/With others*) and place their card on the corresponding part of the poster (adapted from Raccanello & Hall, 2021).

6.3.3.1 Implementation Fidelity

The training program was conducted by two experts in developmental and educational psychology, with the help of five assistants. The conductors followed a protocol defined a priori to make the training program the more comparable as possible between the classes. Since an assistant was present in all the units for all the involved classes, she assessed the implementation fidelity of each session using a checklist on five aspects (adapted from Berger et al., 2016; O'Donnell, 2008; Raccanello et al., 2024): (a) implementation of all the activities; (b) respect of timing; (c) compliance with the contents described in the protocol; (d) adequacy of the support provided by collaborators; and (e) the extent to which the participants were involved in the activities. Each aspect had to be rated on a 5-point scale (1 = *Not at all*, 5 = *Extremely*). The total mean score was 4.95, indicating a high implementation fidelity.

6.3.4 Measures

The pretest and posttest assessed the participants' knowledge of facial expressions of emotions, emotional lexicon, and emotion regulation strategies through open-ended questions. A first rater coded 100% of the open answers, and a second rater independently coded 30% of them for reliability. In addition, we evaluated the personality traits of all participants in the pretest: for this work, we considered only the answers of participants in the experimental group. Concerning reliability, we calculated and reported the Cohen's (1960) kappa (k) or the percentage of agreement for the open-ended questions as follows. For the closed questions about personality, we reported in Appendix E the ordinal Cronbach's (1951) alpha (α), the ordinal McDonald's (1999) omega (ω), and the corrected item-total correlations (CITCs; Streiner et al., 2015).

6.3.4.1 Knowledge of Facial Expressions of Emotions

We assessed participants' ability to recognize facial expressions of emotions by requesting them to label 12 images (adapted from Izard et al., 2003; Pons & Harris, 2000; Raccanello et al., 2023, 2024). The images represented faces expressing six emotions (joy, surprise, calm, sadness, fear, and anger) at two different intensities. The sex of the drawn faces was the same of the participant to facilitate identification. We coded the answers by summing the correct labels (from 0 to 12; $k = .87$).

6.3.4.2 Knowledge of Emotional Lexicon

We assessed participants' knowledge of emotional lexicon by requesting them to list as many synonyms as possible of six adjectives describing six emotional states (happy, surprised, calm, sad, scared, and angry; Raccanello et al., 2023, 2024). We coded the answers by summing the number of correct synonyms (e.g., for happy: "Content", "Joyous"; for surprised: "Astonished", "Amazed"; for calm: "Relaxed", "Tranquil"; for sad: "Depressed", "Unhappy"; for scared: "Frightened", "Terrified"; for angry: "Furious", "Enraged"; agreement: 96.53%).

6.3.4.3 Knowledge of Emotion Regulation Strategies

We assessed participants' knowledge of emotion regulation strategies by asking them to list as many strategies as possible for feeling better when experiencing negative emotions, such as sadness, fear, and anger (adapted from Raccanello et al., 2023, 2024). We coded the answers by summing the plausible adaptive strategies (e.g., "Talking with friends", "Keeping calm"; agreement: 96.67%), on the basis of psychological literature (Zimmer-Gembeck & Skinner, 2011).

6.3.4.4 Personality Traits

We measured participants' Big Five personality traits through an adaptation of the *15-item Dichotomous Big Five Inventory-2* (BFI-2-15D; Vicentini et al., 2025a). It comprised 15 items, three for each of the five dimensions, i.e., Extraversion (e.g., "I like spending time with others"), Agreeableness (e.g., "I like helping others"), Conscientiousness (e.g., "Sometimes I am a slacker", reversed), Negative Emotionality (e.g., "I often feel sad"), and Open-Mindedness (e.g., "I come up easily with new ideas"), to be answered on a dichotomous scale (0 = *False*, 1 = *True*). Further details regarding the factorial structure and internal consistency of the adapted instrument can be found in Appendix E.

6.3.5 Data Analysis

We ran the analyses using the R software (version 4.5.1; R Core Team, 2025). For the first aim, we conducted three generalized linear mixed models (GLMMs). We considered as fixed between-subject factor the group (experimental vs. control), as fixed within-subject factor the phase (pretest vs. posttest), and as dependent variables the knowledge about facial expressions of emotions (proportion variable), emotional lexicon (count variable), and emotion regulation strategies (count variable); participants nested into classes ($n = 16$) were considered as random effects. For the GLMM involving the proportion variable, we used the binomial family and logit link-function, while for the ones involving count variables, we used the Poisson family and log link-function. Mixed-model ANOVA tables were performed through likelihood ratio tests. Conditional R^2 was computed for each model, indicating its explained variance, related to both fixed and random effects (Johnson, 2014; Nakagawa et al., 2017; Nakagawa & Schielzeth, 2013). Following Cohen (2013), when $0.02 \leq R^2 < 0.13$ is small, when $0.13 \leq R^2 < 0.26$ is medium, and when $R^2 \geq 0.26$ is large. Based on the conditional R^2 index, we ran a post-hoc power analysis. The power corresponded to 0.999 with an alpha of 0.05, indicating the adequacy of our sample size. For significant effects and interactions, we performed key Bonferroni post-hoc tests. Cohen's (1992) d was used for calculating the effect size: $d \approx 0.01$ was considered very small, $d \approx 0.20$ small, $d \approx 0.50$ medium, $d \approx 0.80$ large, $d \approx 1.20$ very large, and $d \approx 2.00$ huge (Sawilowsky, 2009). For the second aim, we explored whether the five personality traits predicted participants' learning related to the facial expressions of emotions, emotional lexicon, and emotion regulation strategies. Learning was operationalized as the delta (Δ) obtained by calculating the difference between the posttest and the pretest values for

participants of the experimental group. For each learning outcome, we ran a linear model (LM), using the Big Five traits as predictors and each Δ as the dependent variable, for a total of three LM. For each trait, responses to the three items were summed (range 0–3); sum scores 0–1 were recoded as 0 (low level), and sum scores 2–3 were recoded as 1 (high level). An omnibus Type II ANOVA was performed to test the overall significance of each model – this global test evaluates whether at least one predictor is significantly associated with the outcome variable. Before calculating the models, we performed some preliminary checks, i.e., posterior predictive check, linearity, homogeneity of variance, influential observations, multicollinearity (variance inflation factor, VIF, < 5 ; Shrestha, 2020), and normality of residuals.

6.4 Results

6.4.1 Efficacy of the Training Program

6.4.1.1 Knowledge of Facial Expressions of Emotions

The GLMM on the recognition of facial expressions of emotions (conditional $R^2 = 0.24$) showed a significant group $\times$ phase interaction (Tables 6.2 and 6.3; Figure 6.2) – with the main effects of group and phase being not significant. The post-hoc test revealed a very large increase ($d = 1.78$) in scores from the pretest to the posttest for the experimental group, but not for the control group, in line with Hypothesis 1a. Moreover, there were no differences between the two groups in the pretest, and, in the posttest, the scores were higher for the experimental group compared to the control group, with a very large effect ($d = 1.63$).

6.4.1.2 Knowledge of Emotional Lexicon

The GLMM on the production of emotional lexicon (conditional $R^2 = 0.54$) showed a significant main effect of phase, moderated by a group $\times$ phase interaction (Tables 6.2 and 6.3; Figure 6.2) – the main effect of group was not significant. In general, participants of both groups reported a higher number of synonyms of emotions in the posttest ($M = 9.81$, $SD = 4.97$, 95% CI [9.17, 10.44]) compared to the pretest ($M = 6.92$, $SD = 3.10$, 95% CI [6.53, 7.32]). Moreover, the post-hoc test showed a significant increase in scores from the pretest to the posttest for both the experimental and the control groups. However, for the control group, the effect size was small ($d = 0.10$), but for the experimental group, it was medium ($d = 0.53$), partially supporting Hypothesis 1b. Additionally, although there were no significant differences between the two groups in the pretest, the posttest results revealed a significant and medium effect ($d = 0.55$), with the experimental group reporting a higher number of synonyms than the control group.

Table 6.2

Chi-Square (With Degrees of Freedom) and Level of Significance for Each Effect and Interaction, and Key Bonferroni Tests and Effect Sizes, for All the Dependent Variables

Variables	Effects or interactions	$\chi^2(df)$	<i>p</i>	Bonferroni post-hoc comparisons	<i>z</i>	<i>p</i>	<i>d</i>
Knowledge of facial expressions of emotions	Group	0.01(1)	ns	-	-	-	-
	Phase	1.78(1)	ns	-	-	-	-
	Group $\times$ Phase	58.61(1)	< .001	Experimental group: pretest vs. posttest Control group: pretest vs. posttest Pretest: experimental group vs. control group Posttest: experimental group vs. control group	9.80 1.34 0.02 7.13	< .001 ns ns < .001	1.78 0.15 0.01 1.63
Knowledge of emotional lexicon	Group	1.82(1)	ns	-	-	-	-
	Phase	4.03(1)	.045	Pretest vs. posttest	9.56	< .001	0.31
	Group $\times$ Phase	42.32(1)	< .001	Experimental group: pretest vs. posttest Control group: pretest vs. posttest Pretest: experimental group vs. control group Posttest: experimental group vs. control group	12.34 2.01 1.35 6.27	< .001 .045 ns < .001	0.53 0.10 0.12 0.55
Knowledge of emotion regulation strategies	Group	1.32(1)	ns	-	-	-	-
	Phase	0.63(1)	ns	-	-	-	-
	Group $\times$ Phase	36.84(1)	< .001	Experimental group: pretest vs. posttest Control group: pretest vs. posttest Pretest: experimental group vs. control group Posttest: experimental group vs. control group	10.27 0.79 1.15 5.82	< .001 ns ns < .001	0.52 0.05 0.12 0.60

Note. *z* = *z*-ratio; *d* = Cohen's *d*; ns = not significant. For *z* and *d*, the absolute value is reported.

Table 6.3

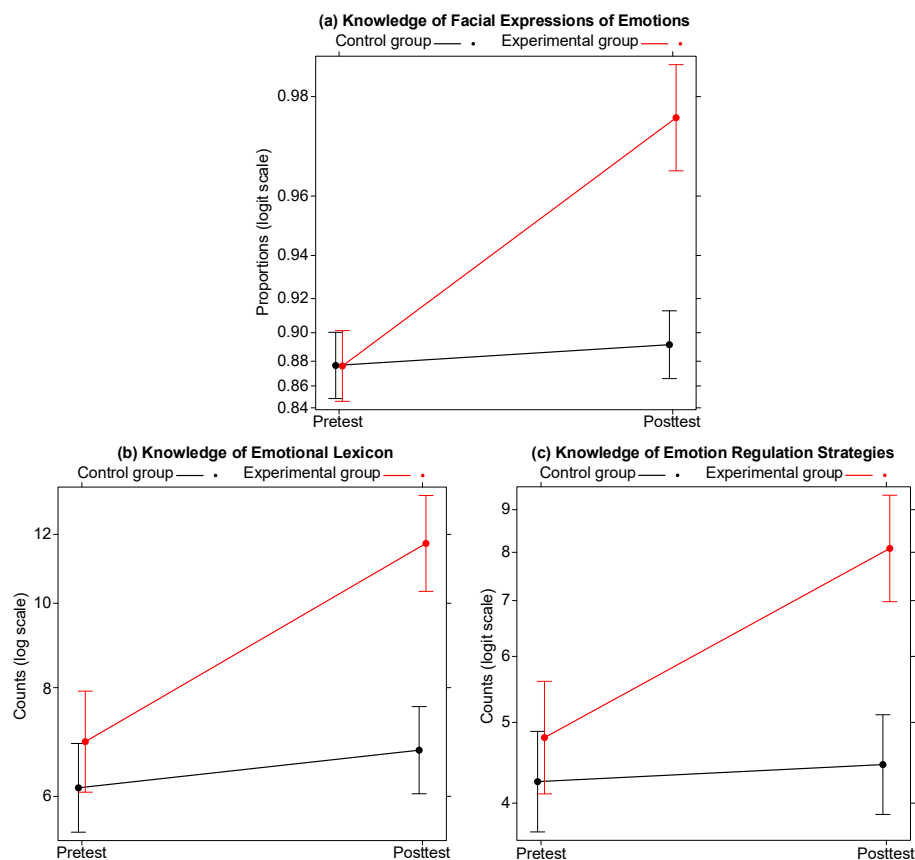
Mean, Standard Deviation, and 95% Confidence Interval for the Dependent Variables, for the Experimental and the Control Group, at the Pretest and Posttest

Variable and phase	Experimental group			Control group		
	<i>M</i>	<i>SD</i>	95% CI	<i>M</i>	<i>SD</i>	95% CI
Knowledge of facial expressions of emotions						
Pretest	0.86	0.12	[0.84, 0.88]	0.85	0.13	[0.83, 0.88]
Posttest	0.97	0.05	[0.96, 0.98]	0.87	0.12	[0.85, 0.89]
Knowledge of emotional lexicon						
Pretest	7.50	3.58	[6.84, 8.16]	6.37	2.43	[5.93, 6.81]
Posttest	12.67	5.15	[11.73, 13.62]	7.03	2.73	[6.54, 7.53]
Knowledge of emotion regulation strategies						
Pretest	5.20	2.91	[4.66, 5.73]	4.49	2.47	[4.05, 4.94]
Posttest	8.77	4.02	[8.03, 9.51]	4.71	3.04	[4.16, 5.26]

Note. 95% CI = 95% confidence interval.

Figure 6.2

Means and 95% Confidence Intervals Concerning the Interaction Between Group and Phase, for (a) Knowledge of Facial Expressions of Emotions, (b) Knowledge of Emotional Lexicon, and (c) Knowledge of Emotion Regulation Strategies



6.4.1.3 Knowledge of Emotion Regulation Strategies

The GLMM on the production of generally adaptive emotion regulation strategies (conditional $R^2 = 0.55$) indicated a significant group $\times$ phase interaction (Tables 6.2 and 6.3; Figure 6.2) – with the main effects of group and phase being not significant. The post-hoc test revealed that the experimental group (but not the control group) significantly increased the number of strategies from the pretest to the posttest, confirming Hypothesis 1c. The effect was medium ($d = 0.52$). Moreover, while the two groups did not differ in the pretest, the experimental group listed significantly more strategies in the posttest (medium effect size: $d = 0.60$).

6.4.1.4 Role of Personality Traits for Learning

The results of the first LM indicated that there were no significant effects of personality traits on learning related to facial expressions of emotions (Table 6.4). Regarding the learning of emotional lexicon, the effects of Agreeableness and Conscientiousness were significant. Highly agreeable and highly conscientious participants learnt more synonyms of emotions than those with low levels of these traits. In the case of Agreeableness, the effect size was large ($d = 0.82$); however, this should be interpreted cautiously, considering the unbalanced allocation of the participants in the two groups (Table 6.4). In the case of Conscientiousness, the effect size was medium ($d = 0.53$; Table 6.4). Finally, in the LM, we found a significant effect of Negative Emotionality on learning about emotion regulation strategies. Participants characterized by high levels of this trait learnt more strategies than those with low levels. The effect was medium ($d = 0.40$; Table 6.4).

6.5 Discussion

This study investigated the efficacy of a short school-based training program in enhancing emotional competence (Denham, 1998; Denham et al., 2014; Root & Denham, 2010) in a sample of middle school students in Italy, also exploring how personality differences impact learning in this setting. Building on previous experiences (Raccanello et al., 2023, 2024), we implemented a four-unit intervention that combined onsite and online activities to increase the knowledge of sixth and seventh-graders regarding facial expressions of emotions, emotional lexicon, and emotion regulation strategies.

Following the standard of evidence-based research (Flay et al., 2005), we compared the results of pretest and posttest measures in an experimental group that participated in the activities and a control group that participated only in the assessment sessions. Overall,

the present findings provide support for the efficacy of the implemented intervention. No differences emerged between the two groups in their knowledge during the pretest phase. However, following the intervention, participants in the experimental group exhibited a significant increase in their knowledge of facial expressions of emotions, emotional lexicon, and emotion regulation strategies. In contrast, participants in the control group showed no significant changes in their knowledge of facial expressions of emotions or emotion regulation strategies between the pretest and posttest phases, thereby fully supporting Hypotheses 1a and 1c. Nonetheless, a slight improvement was observed in their emotional vocabulary posttest. Although this increase was small in the control group, the corresponding effect in the experimental group was of medium magnitude, thus partially supporting Hypothesis 1b. These results align with previous studies documenting the efficacy of similar training programs (Raccanello et al., 2023, 2024), and with the large amount of research about the effectiveness of SEL interventions (Durlak et al., 2022; van de Sande et al., 2019). Although many emotional abilities and knowledge are acquired during infancy and childhood (Pons et al., 2004), our findings highlight the significance of even short interventions for refining them also in later developmental stages (Kotsou et al., 2011). Adolescence, in particular, is often considered a critical period characterized by intense emotions and still-maturing emotion regulation capacities (Bailen et al., 2019; Fombouchet et al., 2023; Reitsema et al., 2022). Taking actions to increase their emotional awareness and the wealth of strategies to manage their feelings is crucial for sustaining them on the challenging journey toward adulthood.

Moreover, we explored whether personality characteristics impacted learning in this training program. Focusing on the experimental group only, our results showed a significant influence of certain personality traits on learning about the emotional lexicon and emotion regulation strategies, but not on facial expressions of emotions. Participants with high levels of Agreeableness and Conscientiousness expanded their emotional vocabulary more than those with low levels of these traits. Although the result about Agreeableness should be interpreted with caution due to the unbalanced distribution of participants across the two groups (i.e., high vs. low trait level), it aligns with preliminary evidence on the relation between the Big Five personality traits and social, emotional, and behavioral skills. According to Soto et al. (2021, 2022), Agreeableness is associated with the perspective-taking skill – the capacity to understand others' thoughts and feelings –, in turn a key component of the theory of

Table 6.4

For All the Dependent Variables, F Test for Each Effect, Descriptive Statistics (Percentage, Mean, Standard Deviation, and 95% Confidence Interval) for Low and High Levels of the Traits, and Key Bonferroni Tests and Effect Sizes

Variables	Effect	F(df)	p	Low Trait Level				High Trait Level				t	p	d
				%	M	SD	95% CI	%	M	SD	95% CI			
Learning on facial expressions of emotions	Extraversion	0.01(1)	ns	9.48	1.46	2.12	[0.03, 2.88]	90.52	1.33	1.46	[1.05, 1.62]	-	-	-
	Agreeableness	0.36(1)	ns	7.76	1.22	1.39	[0.15, 2.29]	92.24	1.36	1.54	[1.06, 1.65]	-	-	-
	Conscientiousness	1.24(1)	ns	59.48	1.49	1.61	[1.11, 1.88]	40.52	1.13	1.36	[0.73, 1.53]	-	-	-
	Negative Emotionality	0.50(1)	ns	51.72	1.22	1.42	[0.85, 1.58]	48.28	1.48	1.63	[1.05, 1.92]	-	-	-
Learning on emotional lexicon	Open-Mindedness	0.02(1)	ns	41.38	1.35	1.67	[0.87, 1.84]	58.62	1.34	1.42	[0.99, 1.68]	-	-	-
	Extraversion	0.08(1)	ns	9.48	5.00	3.13	[2.90, 7.10]	90.52	5.19	3.54	[4.51, 5.88]	-	-	-
	Agreeableness	5.13(1)	.025	7.76	2.44	2.30	[0.68, 4.21]	92.24	5.40	3.48	[4.73, 6.07]	2.27	.025	0.82
	Conscientiousness	6.78(1)	.011	59.48	4.41	3.27	[3.62, 5.19]	40.52	6.30	3.53	[5.27, 7.33]	2.60	.011	0.53
Learning on emotion regulation strategies	Negative Emotionality	2.15(1)	ns	51.72	5.12	3.59	[4.19, 6.04]	48.28	5.23	3.41	[4.32, 6.15]	-	-	-
	Open-Mindedness	1.40(1)	ns	41.38	4.48	3.45	[3.48, 5.48]	58.62	5.66	3.46	[4.82, 6.50]	-	-	-
	Extraversion	0.01(1)	ns	9.48	4.00	3.63	[1.56, 6.44]	90.52	3.53	3.49	[2.86, 4.21]	-	-	-
	Agreeableness	0.28(1)	ns	7.76	3.33	3.57	[0.59, 6.08]	92.24	3.60	3.50	[2.93, 4.27]	-	-	-
	Conscientiousness	0.77(1)	ns	59.48	3.45	3.27	[2.66, 4.24]	40.52	3.77	3.82	[2.65, 4.89]	-	-	-
	Negative Emotionality	4.00(1)	.048	51.72	3.02	3.51	[2.11, 3.92]	48.28	4.18	3.41	[3.27, 5.09]	2.00	.048	0.40
	Open-Mindedness	0.04(1)	ns	41.38	3.44	2.89	[2.60, 4.28]	58.62	3.68	3.88	[2.74, 4.62]	-	-	-

Note. For *t* and *d*, the absolute value is reported. 95% CI = 95% confidence interval; *t* = *t*-ratio; *d* = Cohen's *d*; ns = not significant.

mind (Astington & Baird, 2005). Language plays a crucial role in theory of mind development, as individuals with well-developed perspective-taking skills tend to possess a richer psychological vocabulary for describing their own and others' affective states (de Villiers & de Villiers, 2014). In this light, our finding suggests that individuals high in Agreeableness may be particularly motivated to expand their emotional lexicon during interventions targeting emotional competence. Regarding Conscientiousness, our finding is not unexpected, as this trait is typically associated with learning and achievement (Chen et al., 2025). To our knowledge, no previous studies have examined the influence of the Big Five personality traits on SEL interventions; however, similar patterns have been observed in other contexts. For instance, Woods et al. (2016), in the context of a self-awareness workshop for medical practitioners, found that Conscientiousness was the only significant predictor of training outcomes among all the traits.

Finally, we found that students with high levels of Negative Emotionality learnt more emotion regulation strategies than their counterparts. This trait is typical of emotionally unstable people, who tend to feel very frequent negative emotions (Goldberg, 1993). Additionally, high Emotional Stability (i.e., the opposite pole of Negative Emotionality) has been linked to effective stress regulation and anger management skills (Soto et al., 2022). All this considered, our findings appear very interesting and promising, as they suggest that an intervention focusing also on emotion regulation strategies has a stronger impact on those who are more in need of them.

From an applied perspective, our findings can guide practitioners (e.g., teachers, psychologists, educators) in designing and implementing short training programs to enhance adolescents' emotional competence, leveraging the advantages of both onsite and online activities. Moreover, despite the need for further research to confirm our results, they shed light on how some personality traits influence learning in this particular educational context.

6.5.1 Limitations and Future Research

This study suffers from some limitations. First, after the training program, we assessed participants' knowledge in the short term, but not in the middle or long term, due to contextual restrictions. In addition, it was not possible to completely randomize the participants and the classes in the experimental and control conditions. To meet the standards of evidence-based research (Flay et al., 2005), future studies should include middle or long-term assessments and randomization. Researchers could assess the

stability of learning in similar training programs by using follow-up questionnaires conducted at least 3 to 6 months after the intervention. Additionally, participants or classes should be assigned randomly to the two groups. Second, we assessed only how the training program influenced adolescents' emotional competence on a knowledge-based level, without measuring changes in their skills in real-life contexts. Future research should investigate whether even short interventions have an impact on their ability to recognize, discuss, and manage emotions, and more generally on their well-being. Third, this study involved a small sample of sixth and seventh-graders attending school in Italy (i.e., a Western, educated, industrialized, rich, and democratic, WEIRD, country). This specificity could limit the generalization of our findings. Further studies could investigate the efficacy of this training program in other contexts, also involving different age groups (e.g., children, adults).

6.6 Conclusion

This study demonstrated the efficacy of a brief training program in enhancing adolescents' knowledge of emotional facial expressions, emotional vocabulary, and emotion regulation strategies, while also examining the role of the Big Five personality traits. The findings highlight the value of even short school-based interventions for strengthening emotional competence during adolescence, particularly among individuals who tend to struggle more with managing negative emotions.

Chapter 7. General Discussion and Conclusion

7.1 Overview of the Main Results

The five studies included in this dissertation contribute to the literature by integrating the study of three different constructs, namely personality, achievement emotions, and emotion regulation. The focus was on different learning contexts (primary and secondary schools, universities, and a training program on emotional competence), and the samples included people in different developmental stages (children, adolescents, and adults). The following paragraphs summarize the main findings from the five studies, highlighting the connections between them.

7.1.1 Study 1

In the first study, we conducted a systematic review of the literature to identify scientific articles describing the development or validation of self-report questionnaires specifically designed for measuring children and/or adolescents' Big Five personality traits. We selected 24 articles, describing the development ($n = 10$) or the validation ($n = 14$) of 10 instruments, i.e., the *Big Five Questionnaire – Children version* (BFQ-C; Barbaranelli et al., 2003), the *Adolescent Personality Style Inventory* (APSI; Lounsbury et al., 2003), the *Pictorial Personality Traits Questionnaire for Children* (PPTQ-C; Maćkiewicz & Cieciuch, 2016), the *NEO Personality Inventory-3* (NEO-PI-3; McCrae et al., 2005), the *Big Five Personality Trait Short Questionnaire* (BFPTSQ; Morizot, 2014), the *Junior version of the Spanish NEO Personality Inventory–Revised* (JS NEO; Ortet et al., 2012), the *SENNAI.0* (Primi et al., 2016), the *Five-Factor Model Adolescent Personality Questionnaire* (FFM-APQ; Rogers & Glendon, 2018), the *THE WAY I AM* (Ruisel, 1998), and the set of bipolar items developed by Scholte et al. (1997).

We provided a detailed description of the main characteristics of each questionnaire, including the ages of the samples involved in the studies, available languages, dimensions, facets, number and type of items, response scale, and procedure used by the authors to develop items. Interestingly, we found a paucity of questionnaires designed specifically for children, as most were targeted at adolescents. In addition, most questionnaires comprised more than 50 items – with psychometric advantages but also disadvantages related to their difficult applicability in contexts characterized by time constraints (e.g., school) – and all of them utilized response scales comprising 3 to 7 points. These conclusions served as a guide for Study 5, in which we developed a

new brief instrument for measuring the Big Five traits in both children and adolescents, using a dichotomous response scale.

In addition, given the importance of relying on valid and reliable measures, we reported and evaluated the available evidence about the structural validity and internal consistency of the retrieved questionnaires, by adapting the COSMIN guideline (Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018). Six out of 10 instruments demonstrated a strong factorial structure in analyses of very good quality. Internal consistency was investigated in nine out of 10 questionnaires: in most cases, the analyses supported the reliability of the five main factors, with few exceptions. Validity and reliability properties were considered when selecting the instrument to be used in Studies 2 and 5 (i.e., the FFM-APQ; Rogers & Glendon, 2018).

7.1.2 Study 2

In the second study, we investigated how 10 school-related achievement emotions were related to demographic variables (sex and age), Big Five personality traits, and four emotion regulation strategies in a sample of 330 fourth, sixth, and seventh-graders in Italy. Based on the evidence from Study 1, we utilized the FFM-APQ (Rogers & Glendon, 2018) to measure the Big Five traits. We conducted 10 hierarchical multiple regressions, one for each emotion.

As concerns sex, our results revealed that females were characterized by higher levels of anxiety and lower levels of boredom than males. They were in line with previous studies describing females as more prone to experience test anxiety (Aydin, 2019; Hoferichter & Raufelder, 2015; Putwain, 2007; Putwain & Daly, 2014), and males as more likely to feel bored due to the higher need for external stimulation (Vodanovich & Kass, 1990; Vodanovich et al., 2011).

As for age, consistent with our expectations, we found that older students were characterized by less enjoyment, and more anxiety and boredom than younger students. Such findings are in line with a detrimental trend often outlined in previous literature, documenting a decrease in positive emotions and an increase in negative emotions at increasing ages (Gentry et al., 2002; Lichtenfeld et al., 2023; Meyer & Schlesier, 2022; Raccanello et al., 2013, 2019; Sakaki et al., 2024; Vierhaus et al., 2016).

In terms of personality, our findings align with our hypotheses and previous studies (Raccanello et al., 2025), suggesting that Extraversion, Conscientiousness, and Openness act as protective factors for school-related emotional well-being, while Neuroticism constitutes a risk factor. However, contrary to our expectations but

consistent with findings from other studies on university students (de la Fuente et al., 2020; Pekrun et al., 2023), relief was positively associated with Neuroticism. In line with Pekrun et al. (2023), this result is plausible when considering that highly neurotic individuals often experience negative emotions and may therefore be more prone to experiencing relief, which is the emotion that often follows a resolved negative experience. Finally, Agreeableness did not show significant relations to any emotions.

Regarding emotion regulation strategies, the results supported the hypotheses concerning the adaptive nature of Actively Approaching and Positive Refocusing, as well as the maladaptive nature of Withdrawal and Catastrophizing. The adaptive strategies were positively associated with some positive emotions and negatively associated with some negative emotions. Conversely, the maladaptive strategies exhibited the opposite pattern. These findings build on previous research that has shown both the adaptability and maladaptability of certain strategies in relation to psychological symptoms (Garnefski et al., 2001, 2007, 2017; Kraaij & Garnefski, 2019; Şevki Keskiner et al., 2025). The current study demonstrates that these strategies can be either beneficial or harmful, also in learning environments (Mudło-Głagolska & Larionow, 2023).

In summary, these findings support the Control Value Theory (CVT; Pekrun, 2006, 2024) and contribute to the literature by exploring how various well-documented or almost neglected antecedents relate to a variety of school-related emotions.

7.1.3 Study 3

In the third study, we investigated the relation between Big Five personality traits, four emotion regulation strategies, and study-related achievement emotions in a sample of 754 university students enrolled in Bachelor's or Master's courses in Italy or the United Kingdom. We conducted two path analyses (one for positive and one for negative emotions), and, for each, we also tested the structural invariance of the relations across gender and country.

All the significant relations between personality traits and emotion regulation strategies were in the expected directions. On the one hand, Extraversion and Agreeableness demonstrated positive associations with both Actively Approaching and Refocus on Planning, and negative associations with Withdrawal, while Conscientiousness and Openness were positively related to both adaptive strategies (Actively Approaching and Refocus on Planning). On the other hand, Negative Emotionality was negatively related to adaptive strategies and positively related to

maladaptive strategies (Withdrawal and Catastrophizing). Such findings were in line with meta-analytic results documenting that extraverted, agreeable, conscientious, and open-minded people tend to use adaptive strategies more frequently and maladaptive strategies less frequently, and vice versa for neurotic individuals (Barańczuk, 2019).

As for the links between emotion regulation strategies and study-related achievement emotions, our hypothesis was only partially confirmed. Coherently with our expectations, Actively Approaching demonstrated positive relations with enjoyment, pride, and relaxation; Withdrawal a positive link with boredom; and Catastrophizing positive associations with anxiety, anger, shame, and hopelessness. These findings expand previous research that has documented the adaptability of Actively Approaching and maladaptability of Withdrawal and Catastrophizing for mental health (Garnefski & Kraaij, 2007; Kraaij & Garnefski, 2019; Şevki Keskiner et al., 2025), providing further evidence about their role in academic contexts (Kamel, 2018; Mudło-Głagolska & Larionow, 2023). However, contrary to our hypothesis, we also found a positive relation between Catastrophizing and hope. This result shows how the tendency to dwell on negative past experiences could elicit both retrospective and prospective emotions, also with a positive valence.

Concerning the associations between the Big Five traits and study-related achievement emotions, most of the results supported our hypothesis, with some exceptions. Agreeableness and Conscientiousness were related positively to certain positive emotions and negatively to some negative emotions; Negative Emotionality demonstrated negative associations with all positive emotions, and positive links to all negative emotions; and, for Openness, a negative relation with boredom emerged. These findings align with previous studies that have documented how the Big Five personality traits can be beneficial or detrimental to people's emotional states, also in educational settings (Pekrun et al., 2023; von der Embse et al., 2018). Moreover, Actively Approaching, Withdrawal, and Catastrophizing acted as partial or total mediators in some of these relations, supporting previous research that explored this issue involving different emotion regulation strategies in academic or non-academic contexts (Berkovich & Eyal, 2021; de la Fuente et al., 2024; Kobylińska et al., 2022; Xu et al., 2024). However, unexpectedly, we also found a positive relation between Extraversion and anger, and a negative one between Agreeableness and relief. Because both traits have a strong social component (Tov et al., 2016), it is possible that highly extraverted and agreeable students experienced fewer opportunities for social

interaction during study activities, resulting in more negative or less positive emotions.

Finally, based on the assumptions of CVT (Pekrun, 2006, 2024), we studied the structural invariance of the tested models. While the model for positive emotions was invariant for gender and country, the one for negative emotions was invariant only for gender. Some of the associations between the Big Five traits and emotion regulation strategies or achievement emotions differed for university students attending university in Italy and the United Kingdom. These results could reflect cultural differences between Northern European and Mediterranean countries rooted in emotion socialization practices (Bozicevic et al., 2021).

In conclusion, based on the CVT framework, this study contributes to our understanding of the relation between the Big Five personality traits and achievement-related emotions in university settings, specifically by examining the mediation of emotion regulation strategies that have not been thoroughly examined in such contexts. Moreover, it gives preliminary evidence on how such relations may vary across different cultural and educational environments.

7.1.4 Study 4

In the fourth study, we developed a new self-report questionnaire to measure young people's Big Five personality traits, namely the *15-Item Dichotomous Big Five Inventory-2* (BFI-2-15D). We tested its psychometric characteristics (structural validity, internal consistency, measurement invariance, discriminant validity, and concurrent validity) involving a sample of 970 children (second and fourth-graders) and adolescents (sixth and seventh-graders). Based on the gaps on the available scales emerged in Study 1, our objectives were to create an instrument being: (a) age-appropriate, featuring items and response options that are easy for younger children to understand (Coombes et al., 2021); (b) brief, allowing for a quick personality assessment even in research contexts with time constraints (Soto & John, 2017a); (c) broad in describing the five factors, with item equally representing three facets for each trait (Soto & John, 2017a); and (d) psychometrically sound, while acknowledging the internal reliability challenges associated with brief instruments (Gosling et al., 2003; Maćkiewicz & Cieciuch, 2016; Soto & John, 2017a).

We explored the structural validity and internal consistency of the scale. Through a hierarchical confirmatory factor analysis (CFA), we found a satisfying model including, beyond the five first-order factors, an additional general second-order factor. As for internal consistency, consistent with previous studies on brief scales

(Gosling et al., 2003; Soto & John, 2017a), we found some low values in ordinal alpha (α) and omega (ω), but adequate corrected item-total correlations (CITCs). Moreover, the BFI-2-15D resulted invariant across sex and age level, at the configural, metric, and scalar levels. Finally, we examined additional aspects of validity, confirming the discriminant validity of the five factors and their convergent validity with the corresponding factors of the FFM-APQ (Rogers & Glendon, 2018).

Overall, although there are some limitations, such as issues with internal consistency, this new instrument serves as a valuable alternative to longer scales for evaluating the Big Five personality traits in young people. It is particularly useful in situations where time is limited or when it is important to consider factors like respondent fatigue and cognitive load. However, this study should be considered preliminary, as more research is needed to confirm its psychometric properties.

7.1.5 Study 5

In the fifth study, the main aim was to test the efficacy of a training program (i.e., *A compass for emotions*) aimed at improving adolescents' emotional competence. Furthermore, a secondary aim was to explore how the Big Five personality traits were related to participants' learning after the intervention.

For these purposes, we involved 236 sixth and seventh-graders using a quasi-experimental design. We divided them into an experimental group (which attended the four-unit intervention) and a control group (which did not participate in any training program). By adapting previous programs (Raccanello et al., 2023, 2024), the intervention involved online and onsite activities focused on: (a) non-verbal expression of emotions; (b) emotional lexicon to verbally communicate affective states; (c) intensity of emotions and their antecedents; and (d) emotion regulation strategies. Among the emotion regulation strategies we promoted during the training program, there were also those that proved more beneficial for both young and adult students in Studies 2 and 3. These included, for example, problem solving (somewhat similar to the strategies of Actively Approaching and Refocus on Planning), social support (the opposite of the detrimental strategy of Withdrawal), and accommodation (including aspects pertaining to Positive Refocusing).

In line with the large amount of evidence concerning the effectiveness of programs to enhance socio-emotional learning (SEL; Durlak et al., 2011, 2022), we found a clear improvement in knowledge about facial expressions of emotions, emotional lexicon, and emotion regulation strategies in participants who took part in

the training program, compared to those of the control group. Such results confirmed the efficacy of initiatives promoting emotional competence, also in adolescence, a developmental stage where knowledge about emotions is already rich due to socialization processes, but still offers opportunities for further improvement.

Regarding the relation between personality traits and learning, we found that participants who were highly agreeable and conscientious learned more about the emotional lexicon, while those who were highly neurotic showed a greater increase in their knowledge of emotion regulation strategies. These results are particularly interesting, as they help shed light on which personality characteristics influence learning in training programs focused on emotional competence. Agreeableness is usually associated with strong perspective-taking skills (Soto et al., 2021, 2022), which are key components of the theory of mind (Astington & Baird, 2005). Individuals with a well-developed theory of mind generally possess a rich psychological vocabulary for describing both their own and others' emotional states (de Villiers & de Villiers, 2014). These factors may help explain why highly agreeable people tend to be more motivated to expand their emotional vocabulary. In addition, Conscientiousness is, among the Big Five traits, the factor most closely associated with learning and academic performance (Chen et al., 2025; Woods et al., 2016); therefore, it is not surprising that it also plays a key role in training programs focused on emotional competence. However, the most interesting finding regards Neuroticism. People characterized by high levels of this trait are more likely to experience negative emotions such as anxiety, sadness, and anger (John et al., 2008). In this study, we found that highly neurotic adolescents increased their wealth of knowledge of emotion regulation strategies more than their counterparts. Such a result is promising as it shows that interventions aimed at increasing emotional competence, including emotion regulation skills, could be particularly useful for those who are more in need of it.

7.2 Methodological, Theoretical, and Applied Significance

This dissertation holds significance in three key areas: methodological, theoretical, and applied. First, Studies 1 and 4 are especially relevant from a methodological perspective. On the one hand, the systematic review presented in Study 1 can be particularly useful for researchers and practitioners looking to assess the Big Five personality traits in young people through self-report instruments. It outlines the key features of various questionnaires and provides data on their validity and reliability, which can assist in selecting the most suitable instrument for each specific context. On

the other hand, Study 4 provides preliminary evidence of the psychometric properties of a new brief self-report instrument for evaluating the Big Five personality traits in children and adolescents (i.e., the BFI-2-15D). Despite some limitations in its internal consistency – primarily due to its brevity and dichotomous response format – it can serve as a good alternative to longer instruments for researchers and practitioners working with young children or in contexts characterized by time constraints.

Second, this dissertation makes a significant theoretical contribution by advancing our understanding of the relation among personality traits, emotion regulation strategies, and achievement emotions. While the CVT (Pekrun, 2006, 2024) has served as a primary theoretical framework for research on emotions in educational settings over the past two decades, there remains a lack of research exploring how personality traits and various emotion regulation strategies jointly influence these emotions. Studies 2 and 3 aimed to fill this gap by addressing these relations in both primary and middle school, as well as at university. Our findings highlighted the role of both more stable personality characteristics and more malleable emotion regulation strategies in influencing the emotions that students feel in relation to school/university, in line with the CVT model. Particularly, Study 3 provided further evidence about the mediation role that emotion regulation strategies could play between Big Five traits and achievement emotions. Additionally, Study 5 shed light on how personality traits influence learning in a training program designed to enhance adolescents' emotional competence. Particularly, it showed that participants with high levels of Neuroticism are those who benefit more from activities aimed at increasing knowledge of emotion regulation strategies.

Third, from an applied perspective, the results derived from Studies 2 and 3, although preliminary, can help practitioners identify the most adaptive emotion regulation strategies for students of different ages, which can also be enhanced through targeted training initiatives. Additionally, the results of these studies can provide insights into the personality traits of students who may benefit most from these interventions, such as those exhibiting high levels of Neuroticism. Finally, Study 5 demonstrated the effectiveness of an evidence-based psychoeducational intervention designed to enhance adolescents' emotional competence. The training program included both online and onsite activities that can be implemented by educators, teachers, psychologists, or parents who are interested in improving young people's understanding of facial expressions, expanding their emotional vocabulary, and

developing effective emotion regulation strategies.

7.3 Limitations and Future Directions

This dissertation has a number of limitations that can inform future research directions.

First, there are issues concerning research designs. Three out of five studies employed correlational designs. Particularly, Studies 2 and 3 tested models of relations among personality traits, emotion regulation strategies, and achievement emotions, also hypothesizing specific directions of influence, based on the CVT (Pekrun, 2006, 2024), notwithstanding the use of cross-sectional data. Future research is needed to confirm our findings when data are collected longitudinally, leading to conclusions about causal relations (Pekrun, 2024). In addition, Study 4 developed and tested the validity and reliability of a new self-report instrument to assess the Big Five personality traits in children and adolescents. However, despite the importance of measuring test-retest reliability when personality is assessed using a hierarchical model (McCrae, 2015), we could not test it due to the cross-sectional design. In the future, longitudinal studies should be implemented to measure the stability of responses to the BFI-2-15D. Finally, although in Study 5 we employed an experimental design and collected data longitudinally at two time points, we were unable to obtain mid or long-term data to evaluate the stability of the knowledge acquired during the intervention. Considering the importance of follow-up assessments for evaluating the efficacy of an intervention according to the evidence-based standards (Flay et al., 2005), future research should incorporate at least a third data collection session to evaluate the durability of the improvements.

Second, data collected in Studies 2, 3, 4, and 5 were based on self-report measures. Despite the previously discussed advantages of self-report instruments for personality and emotional assessment (Dodorico McDonald, 2008; Pekrun, 2020), they can also have disadvantages, such as the desirability bias. Future research could benefit from integrating self-report measures with other assessment methods, such as physiological indicators or observational measures, or by comparing responses from multiple informants, including self, parents, and teachers.

Third, in Studies 2 and 3, we used single items. While they are useful in contexts characterized by time constraints (e.g., school) and with individuals who have limited cognitive resources (e.g., young children), longer multi-item measures should be preferred as more robust from a psychometric perspective (Goetz et al., 2010).

Fourth, the generalization of the findings should be considered as limited. Most of the studies – Studies 2, 4, and 5 – included samples of children and/or adolescents living and attending school in Italy. Moreover, although Study 3 is a cross-cultural work involving students attending university in Italy or in the United Kingdom, both countries are Western, educated, industrialized, rich, and democratic (WEIRD). As a consequence, further research is needed to test the generalizability of our findings in different, underrepresented countries, characterized by different cultures and education systems (Laajaj et al., 2019).

7.4 Concluding Remarks

This dissertation is the description of a journey – a journey through the complex world of emotions, learning, individual differences, and strategies for feeling better. Beyond providing researchers and practitioners with instruments to assess personality in young people, the findings from the studies included here highlight the significance of personal characteristics and emotion regulation strategies in understanding how individuals – be they children, adolescents, or adults – feel and learn in educational contexts.

The availability of valid, reliable, and age-appropriate instruments for assessing personality traits at different stages of development is a prerequisite for studying how individual differences influence the way people feel and regulate their emotions throughout life. Notwithstanding some exceptions, our findings confirmed that, among the Big Five factors, Extraversion, Agreeableness, Conscientiousness, and Openness are usually the most beneficial traits, as they showed positive links to positive emotions and adaptive emotion regulation strategies, and negative ones to negative emotions and maladaptive emotion regulation strategies, also in educational contexts. The opposite pattern was found for Neuroticism, confirming its detrimental role for emotional well-being also at school or university.

While individual dispositions tend to be relatively stable, emotion regulation strategies are considered more malleable and can be promoted through specific training programs. Our results indicate that in educational contexts, strategies such as Actively Approaching, Positive Refocusing, and Refocus on Planning are associated positively with positive emotions and negatively with negative emotions. Conversely, strategies such as Withdrawal and Catastrophizing exhibited the opposite pattern. Although we should be cautious in distinguishing between adaptive and maladaptive ways to manage emotions, these results shed light on how different underexplored emotion regulation

strategies can impact the emotions that young or adult students may experience in academic contexts. This knowledge can also serve as the basis for interventions aimed at training students in the use of diverse strategies, enabling them to become more skilled at managing their emotions in various situations.

Another important and innovative finding relates to how the Big Five personality traits impact SEL. In addition to demonstrating the efficacy of a training program aimed at enhancing emotional competence in adolescents, we described how certain personality characteristics can predict learning outcomes in this context. The most intriguing and promising result pertains to Neuroticism: individuals with high levels of this trait exhibited a greater increase in their knowledge of emotion regulation strategies. This suggests that interventions designed to promote SEL could be especially beneficial for those who are most in need of them.

In conclusion, this dissertation suggests that understanding students' individual characteristics and equipping them with a repertoire of effective strategies to cope with challenges are essential steps toward fostering their emotional well-being – and ultimately, their success – in learning environments.

Appendix A. Supplemental Materials of Chapter 2

A.1 Study Quality Assessment Procedure

For assessing the quality of the included questionnaires, we used a selection of standards and criteria suggested by the COSMIN (CONsensus-based Standards for the selection of health Measurements) guideline for systematic reviews of Patient-Reported Outcome Measures (PROM; Tables A.1 and A.2; Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018).

Table A.1

Adaptation of the COSMIN Standards for Assessing Structural Validity (Adapted From Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018)

	Very good	Adequate	Doubtful	Inadequate	Not applicable
1. For CTT: was EFA or CFA or a similar analysis performed?	CFA OR ESEM performed	EFA OR PCA performed	-	No CFA or ESEM or EFA or PCA performed	Not applicable
2. For IRT/Rasch: does the chosen model fit the research question?	The chosen model fits well with the research question	Assumable that the chosen model fits well with the research question	Doubtful if the chosen model fits well with the research question	Chosen model does not fit the research question	Not applicable
3. Was the sample size included in the analysis adequate?	FA: 7 times the number of items, and ≥ 100	FA: at least 5 the times number of items, and ≥ 100 ; OR at least 6 times the number of items, but < 100	FA: 5 times the number of items, but < 100	FA: < 5 times the number of items	-
	Rasch/1PL models: ≥ 200 subjects	Rasch/1PL models: 100-199 subjects	Rasch/1PL models: 50-99 subjects	Rasch/1PL models: < 50 subjects	-
	2PL (or more) parametric IRT models or Mokken scale analysis: ≥ 1000 subjects	2PL (or more) parametric IRT models or Mokken scale analysis: 500-999 subjects	2PL (or more) parametric IRT models or Mokken scale analysis: 250-499 subjects	2PL (or more) parametric IRT models or Mokken scale analysis: < 250 subjects	-
4. Were there any other important flaws in the design or statistical methods of the study?	No other important methodological flaws	-	Other minor methodological flaws (e.g., rotation/estimation method not described)	Other important methodological flaws (e.g., inappropriate rotation/estimation method)	-

Note. CFA = confirmatory factor analysis; CTT = classical test theory; EFA = exploratory factor analysis; ESEM = exploratory structural equation modelling; FA = factor analysis; IRT = item response theory; PCA = principal component analysis; 1PL = one-parameter logistic; 2PL = two-parameter logistic.

Table A.2

Adaptation of the COSMIN Standards for Assessing Internal Consistency (Adapted From Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018)

	Very good	Adequate	Doubtful	Inadequate	Not applicable
1. Was an internal consistency statistic calculated for each unidimensional scale or subscale separately?	Internal consistency statistics calculated for each unidimensional scale or subscale	-	Unclear whether scale or subscale is unidimensional	Internal consistency statistic NOT calculated on a unidimensional scale	-
2. For continuous scores: was Cronbach's α or ordinal α or McDonald's ω calculated?	Cronbach's α OR ordinal α OR McDonald's ω calculated	-	Only item-total correlations calculated	No Cronbach's α or ordinal α or McDonald's ω and no item-total correlations calculated	Not applicable
3. For dichotomous scores: was Cronbach's α or KR-20 calculated?	Cronbach's α OR KR-20 calculated	-	Only item-total correlations calculated	No Cronbach's α or KR-20 and no item-total correlations calculated	Not applicable
4. For IRT-based scores: was SE(θ) or reliability coefficient of estimated latent trait value (e.g., PSI) calculated?	SE(θ) OR reliability coefficient calculated	-	-	SE(θ) or reliability coefficient NOT calculated	Not applicable

Note. IRT = item response theory; KR-20 = Kuder Richardson reliability; PSI = person separation index; SE(θ) = standard error of the theta; α = alpha; ω = omega.

On the one hand, the COSMIN standards help in assessing the quality of the utilized designs and statistical methods (with five possible ratings: very good, adequate, doubtful, inadequate, and not applicable). The rating given to the methodology quality of each analysis (Table 2.3) was established by selecting the lower rating assigned to the standards (Tables A.1 and A.2). On the other hand, the criteria provide indications for evaluating the findings about the measurement properties of the questionnaires (with three possible ratings: “+” if sufficient, “-” if insufficient, and “?” if indeterminate).

We focused on two domains, i.e., validity and reliability. We decided to evaluate, respectively, the measurement properties pertaining to structural validity (defined by the COSMIN guideline as an aspect of construct validity) and internal consistency. Structural validity is the degree to which the scores of a questionnaire adequately reflect the dimensions of the examined construct (Mokkink et al., 2010) and is usually investigated through confirmatory factor analysis (CFA), exploratory factor analysis (EFA), item response theory (IRT), and/or Rasch model. Internal consistency indicates the extent to which the items belonging to the same scale are intercorrelated (Mokkink et al., 2010) and is usually evaluated through Cronbach's (1951) alpha (α),

ordinal α (Zumbo et al., 2007), and/or McDonald's (1999) omega (ω), following the classical theory test (CTT), and person separation index (PSI), following the IRT or Rasch approach.

Even though the COSMIN guideline also suggests grading the overall quality of the evidence for each questionnaire (helpful in providing recommendations), we decided not to do this part because of the small number of studies available for most of the selected questionnaires.

Table A.3

Adapted COSMIN Criteria for Evaluating the Results Related to Structural Validity and Internal Consistency (Adapted From Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018)

Measurement property	Rating	Criteria
Structural validity	+	<i>For CTT:</i> CFA/ESEM/EFA: CFI or TLI or comparable measure $> .95$ OR RMSEA $< .06$ OR SRMR $< .08$ <i>For IRT/Rasch:</i> No violation of unidimensionality: CFI or TLI or comparable measure $> .95$ OR RMSEA $< .06$ OR SRMR $< .08$ OR eigenvalue < 2 in PCA of standardized residual correlations OR t -tests outside the range $\pm 1.96 < 5\%$ AND No violation of local independence: residual correlations among the items after controlling for the dominant factor $< .20$ OR $Q3 > 0.20$ and < 0.30 AND No violation of monotonicity: adequate looking graphs OR item scalability > 0.30 AND Adequate model fit: IRT/Rasch: $\chi^2 > 0.01$ OR Rasch: infit and outfit mean squares ≥ 0.5 and ≤ 1.5 OR Z-standardized values > -2.00 and < 2.00
	?	<i>For CTT:</i> Not all information for “+” reported <i>For IRT/Rasch:</i> Model fit not reported
	-	Criteria for “+” not met
Internal consistency	+	At least low evidence for sufficient structural validity AND Cronbach's α or ordinal α or McDonald's ω or PSI $\geq .70$ for each unidimensional scale or subscale
	?	Criteria for “At least low evidence for sufficient structural validity” not met
	-	At least low evidence for sufficient structural validity AND Cronbach's α or ordinal α or McDonald's ω or PSI $< .70$ for each unidimensional scale or subscale

Note. + = sufficient; ? = doubtful; - = insufficient; CFA = confirmatory factor analysis; CFI = comparative fit index; CTT = classical test theory; EFA = exploratory factor analysis; ESEM = exploratory structural equation modelling; IRT = item response theory; PCA = principal component analysis; PSI = person separation index; Q3 = Yen's Q3; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residuals; TLI = Tucker Lewis index; α = alpha; ω = omega.

A.1.1 Adaptation of the COSMIN Standards and Criteria

We adapted some standards and criteria suggested by the COSMIN guideline (Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018). The adapted COSMIN standards used for evaluating structural validity and internal consistency are described, respectively, in Tables A.1 and A.2. The adapted criteria for interpreting the corresponding results are reported in Table A.3.

For structural validity, the COSMIN standards consider CFA as a “very good” statistical method and EFA as an “adequate” statistical method (Table A.1). As many studies performed also other types of analyses for investigating the factorial structure of the questionnaires, we decided to broaden these indications. We rated the use of exploratory structural equation modelling (ESEM) as “very good”, being a statistical method that incorporates the best aspects of CFA and EFA (Marsh, 2014). The use of principal component analysis (PCA) was considered comparable to an EFA – as both methods have the aim to find components in a set of data, notwithstanding their remarkable differences (Bryant & Yarnold, 1995) – and for this reason we evaluated it as “adequate”. When the articles compared more than one model (e.g., testing the goodness-of-fit of models comprising different number of factors) using the same sample, we took into account only the one considered the best by the author/s (Bore et al., 2020; Holgado-Tello et al., 2009; Kokkinos & Markos, 2017; Kokkinos et al., 2020; Morizot, 2014; Ortet et al., 2022; Robles-Haydar et al., 2022; Rogers & Glendon, 2018; Scholte et al., 1997).

As for the COSMIN criteria concerning structural validity, we extended them to evaluate what is sufficient for the IRT or Rasch approach. We added new criteria to confirm the unidimensionality of each factor based on PCA of standardized residual correlations (Chou & Wang, 2010; Linacre, 2023; Raiche, 2005) or paired *t*-tests between two subsets of items, one with positive residual loadings and one with negative residual loadings on the first principal component (the *t*-tests aimed at verifying that the estimates for each person were significantly different; for verifying unidimensionality, not more than 5% of *t*-tests should be outside the range ± 1.96 ; Tennant & Pallant, 2006), modified the criteria to confirm the absence of local dependence based on Yen’s Q3 (e.g., González-de la Torre et al., 2023), and partially modified the criteria for adequate model fits (i.e., $\chi^2 > 0.01$ was applied not only to IRT but also to Rasch models). For internal consistency, we added the threshold to rate the ordinal α (Zumbo et al., 2007) and the PSI (Wright & Masters, 1982; Wright & Stone, 1999). In addition, we

considered satisfied the prerequisite of “at least low evidence for sufficient structural validity” when at least one analysis of structural validity was conducted.

A.2 Validity and Reliability of the Selected Questionnaires

A.2.1 Structural Validity

The factor structure was tested for all the questionnaires using a variety of statistical methods (Table 2.3).

Following a CTT approach, 14 articles performed CFA (Barbaranelli et al., 2003, 2008; Bore et al., 2020; Bouvard & Roulin, 2017; del Barrio et al., 2006; Holgado-Tello et al., 2009; Kokkinos & Markos, 2017; Kokkinos et al., 2020; Lounsbury et al., 2003; Markos & Kokkinos, 2017; Primi et al., 2016; Robles-Haydar et al., 2022; Rogers & Glendon, 2018; Scholte et al., 1997), 4 ESEM (Maćkiewicz & Ciecuch, 2016; Morizot, 2014; Ortet et al., 2022; Primi et al., 2016), 6 EFA (Bore et al., 2020; Bouvard & Roulin, 2017; Holgado-Tello et al., 2009; Lounsbury et al., 2003; Robles-Haydar et al., 2022; Ruisel, 1998), and 7 PCA (Barbaranelli et al., 2003; Costa et al., 2008; McCrae et al., 2005; Muris et al., 2005; Olivier & Herve, 2015; Ortet et al., 2012; Scholte et al., 1997). Eight articles used more than one statistical method to investigate structural validity: PCA and CFA (Barbaranelli et al., 2003; Scholte et al., 1997), EFA and CFA (Bore et al., 2020; Bouvard & Roulin, 2017; Holgado-Tello et al., 2009; Lounsbury et al., 2003; Robles-Haydar et al., 2022), or CFA and ESEM (Primi et al., 2016). Ruisel (1998) did not specify the type of factor analysis used for evaluating the structural validity of the THE WAY I AM; however, from the use of varimax rotation we can infer that it was an EFA.

The structure of the brief Greek version of the BFQ-C was also tested using an IRT approach (Markos & Kokkinos, 2017) and its Spanish translation through the Rasch model (Cupani et al., 2020).

Considering the sample size, when the studies followed the CTT approach, the number of participants was evaluated as “very good” or “adequate” in most cases. The sample size was rated as “inadequate” for the Dutch validation of the BFQ-C (Muris et al., 2005), the NEO-PI-3 (Costa et al., 2008; McCrae et al., 2005), and the JS NEO (Ortet et al., 2012). Moreover, the sample size was “very good” for the IRT analysis (Markos & Kokkinos, 2017) and the Rasch model (Cupani et al., 2020) performed for the Spanish and Greek versions of the BFQ-C.

In addition, some minor methodological flaws (corresponding to a “doubtful” rating) were identified for the CFA performed in the original BFQ-C (Barbaranelli et

al., 2003) and the Scholte et al.'s (1997) set, and for the EFA performed in the APSI (Lounsbury et al., 2003), as the articles did not specify the estimation (in CFA) or the rotation method (in EFA).

As regards the results, the fit indexes for the EFA were reported only by Bore et al. (2020), Bouvard and Roulin (2017), and Lounsbury et al. (2003). In the former two, they were sufficient (“+”) while, in the latter, the index reported was insufficient (“-”). In all the other EFA and PCA, they were not specified, so the evidence is considered indeterminate (“?”). The fit indexes of CFA and ESEM were sufficient (“+”) in most cases. They were insufficient (“-”) for the CFA conducted on the Spanish BFQ-C by del Barrio et al. (2006; only for the 12-to-15-year-old and female samples) and by Holgado-Tello et al. (2009), on the SENNA1.0 (Primi et al., 2016), and on the Scholte et al.'s (1997) set. As for the IRT approach, in Markos and Kokkinos (2017) the results were rated insufficient (“-”) on the whole, as the fit indexes for the EFA conducted to verify unidimensionality were not reported, monotonicity was not investigated, and the fit indexes of the models were not specified. In Cupani et al. (2020) the findings of the Rasch model were rated sufficient (“+”) only for Conscientiousness and Negative Emotionality as, for the other three factors, the monotonicity assumption was violated.

A.2.2 Internal Consistency

Cronbach's (1951) α , ordinal α , McDonald's (1999) ω , and/or PSI were calculated in at least one study for each questionnaire, except the THE WAY I AM (Ruisel, 1998; Table 2.3).

Even though the article describing the development of the BFQ-C did not report any index about internal consistency (Barbaranelli et al., 2003), this questionnaire demonstrated to be a reliable questionnaire in subsequent validation studies. The α and ω values of the five traits in the 65-item questionnaire were sufficient (“+”) and ranged, respectively, from .71 to .95 (Barbaranelli et al., 2008; Kokkinos & Markos, 2017; Markos & Kokkinos, 2017; Muris et al., 2005; Olivier & Herve, 2015) and from .79 to .83 (Markos & Kokkinos, 2017). Moreover, the English 20-item version had acceptable ordinal α (from .70 to .86; Bore et al., 2020) and the Greek 30-item version was reliable as well, with α values ranging from .70 to .82 (Markos & Kokkinos, 2017) and ω values ranging from .77 to .85 (Kokkinos et al., 2020; Markos & Kokkinos, 2017). The Spanish 30-item BFQ-C showed sufficient (“+”) reliability for all the factors except Intellect/Openness ($\alpha = .64$; $\omega = .65$; Robles-Haydar et al., 2022). In addition, the PSI calculated for a modified version of this questionnaire ranged from .66 to .78 (Cupani

et al., 2020): the less reliable dimension was Energy/Extraversion, with a value insufficient (“-”), below the threshold.

A sufficient (“+”) internal consistency of the five main traits emerged also for the APSI ($\alpha = .73-.85$; Lounsbury et al., 2003), the NEO-PI-3 ($\alpha = .84-.93$; Costa et al., 2008; McCrae et al., 2005), the BFPTSQ ($\alpha = .71-.81$ and $\omega = .73-.81$; Morizot, 2014; Ortet et al., 2022), the JS NEO ($\alpha = .84-.90$; Ortet et al., 2012), the SENNA1.0 ($\alpha = .78-.91$; Primi et al., 2016), and the FFM-APQ ($\alpha = .73-.81$; Rogers & Glendon, 2018).

The Scholte et al.’s (1997) set satisfied the criteria for a sufficient (“+”) internal consistency for Extraversion, Agreeableness, and Emotional Stability ($\alpha = .74-.77$) but not for Conscientiousness ($\alpha = .60$) and Openness to Experience-Intellect ($\alpha = .59$).

The PPTQ-C (Maćkiewicz & Cieciuch, 2016) is the questionnaire with the lower evidence for internal consistency given that all the factors had insufficient (“-”) α values ranging from .44 to .69.

Few reliability problems also emerged for the facets assessed in the NEO-PI-3 and the JS NEO. McCrae et al. (2005), Costa et al. (2008), and Ortet et al. (2012) found, respectively, that nine, 14, and 25 out of 30 facets had α values $< .70$.

A.2.3 Summarized Evidence About Validity and Reliability for Each Instrument

A.2.3.1 Big Five Questionnaire – Children Version

The factorial structure of the BFQ-C was investigated through a variety of statistical methods. Five factors emerged from EFA or PCA and/or were confirmed through CFA for the Italian, French, Spanish, Greek, and Dutch 65-item versions (Barbaranelli et al., 2003, 2008; Bouvard & Roulin, 2017; del Barrio et al., 2006; Markos & Kokkinos, 2017; Muris et al., 2005; Olivier & Harve, 2015), and for the English, Spanish, and Greek shorter versions (Bore et al., 2020; del Barrio et al., 2006; Holgado-Tello et al., 2009; Markos & Kokkinos, 2017; Robles-Haydar et al., 2022), notwithstanding the presence of some indexes below the thresholds in one study (del Barrio et al., 2006) and some problems with some loadings (mainly regarding the Intellect/Openness factor; Barbaranelli et al., 2003; Bouvard & Roulin, 2017; Holgado-Tello et al., 2009; Muris et al., 2005; Olivier & Harve, 2015). The five factors were confirmed also for the Greek 65-item version through IRT analysis (although insufficient data were reported; Markos & Kokkinos, 2017) and for a modified version of the Spanish translation using the Rasch model (with monotonicity problems for three out of five dimensions; Cupani et al., 2020). However, conducting CFA, Holgado-Tello

et al. (2009), Kokkinos and Markos (2017), and Kokkinos et al. (2020) found different factorial structures. For the Spanish shorter version, a four-factor model (obtained by redistributing the Intellect/Openness items in other factors) was considered better than the hypothesized one, despite insufficient fit indexes; and, for both the long and the short Greek versions, a bifactor model with five specific factors and a general factor was selected.

Even though the article about the development of the BFQ-C does not report data about its internal consistency (Barbaranelli et al., 2003), nine out of 12 validation studies calculated α , ordinal α , ω , and/or PSI for each of the five dimensions (no data was available in Bouvard & Roulin, 2017; del Barrio et al., 2006; Holgado-Tello et al., 2009). These indexes were appropriate (i.e., $\geq .70$) in most cases, both for the 65-item and the shorter versions. Problems with the Intellect/Openness factor were identified for the short Spanish BFQ-C (Robles-Haydar et al., 2022). In addition, Cupani et al. (2020) found a PSI below the threshold for the Energy/Extraversion dimension after modifying the questionnaire through Rasch modelling.

A.2.3.2 Adolescent Personality Style Inventory

The five-factor structure of the APSI emerged from both a CFA and an EFA (even though they were conducted using 56 items instead of the final 55 items). Lounsbury et al. (2003) found sufficient internal consistency in testing the questionnaires with three different samples.

A.2.3.3 Pictorial Personality Traits Questionnaire for Children

Maćkiewicz and Cieciuch (2016), conducting separate ESEM for younger and older children, confirmed the five dimensions of the PPTQ-C; however, they found some loading problems, especially in the Openness to Experience items. As for internal consistency, the PPTQ-C appeared to be the questionnaire with the lowest α (ranging from .44 to .69), with the worst values found for Openness to Experience. Considering that their questionnaire has only three items for dimension, the authors discussed these results, explaining that α depends on the number of items (with higher values at increasing numbers).

A.2.3.4 NEO Personality Inventory-3

The structural validity of the NEO-PI-3 was explored only through PCA and using small samples considering the high number of items (McCrae et al., 2005; Costa et al., 2008). Five factors emerged from the analyses despite a few problems with loadings. Concerning internal consistency, both studies found high α values for the

main five factors. However, McCrae et al. (2005) and Costa et al. (2008) reported α values below the threshold for nine and 14 out of 30 facets, respectively.

A.2.3.5 Big Five Personality Trait Short Questionnaire

ESEM with correlated uniqueness were conducted for both the French and Spanish versions of the BFPTSQ (Morizot, 2014; Ortet et al., 2022). They mostly confirmed the five factors of the questionnaire, but they also highlighted problems with some loadings (mainly, the Spanish version presents some problems in the Openness factor; Ortet et al., 2022). The internal consistency was good for both versions.

A.2.3.6 Junior Version of the Spanish NEO Personality Inventory-Revised

The five-factor structure of the JS NEO was clearly recognized through a PCA, and the facets had higher loadings on their intended factor, despite important secondary loadings (Ortet et al., 2012). The questionnaire had sufficient α for the five main traits, but the values were below the threshold for 25 out of 30 facets.

A.2.3.7 SENNA1.0

Primi et al. (2016) confirmed the six factors of the SENNA1.0 with both a CFA (although the fit indexes were below the thresholds) and an ESEM (despite some cross-loadings). As for internal consistency, the α values were high for all the five traits.

A.2.3.8 Five-Factor Model Adolescent Personality Questionnaire

The CFA conducted separately for the five dimensions of the FFM-APQ confirmed its structure (Rogers & Glendon, 2018). The internal consistency of the factors was good.

A.2.3.9 THE WAY I AM

Five factors were found through EFA in the THE WAY I AM (Ruisel, 1998). For this questionnaire, no data about internal consistency was available.

A.2.3.10 Scholte et al.'s Set

Scholte et al. (1997) found five dimensions using a PCA, despite some loading problems, and, after testing different CFA models, confirmed the five-factor structure of the questionnaire (however, the fit index reported was below the threshold).

As for internal consistency, the set developed by Scholte et al. (1997) presents adequate values for three out of five dimensions (i.e., Extraversion, Agreeableness, and Emotional Stability). A poor internal consistency emerged for Conscientiousness and Openness to Experience-Intellect.

Appendix B. Supplemental Materials of Chapter 3

B.1 Factorial Structure of the Measures

B.1.1 Method

We conducted the analyses in Mplus (version 8.10; Muthén & Muthén, 2017). The factorial structures of the five traits of the *Five-Factor Model – Adolescent Personality Questionnaire* (FFM-APQ; Rogers & Glendon, 2018) and of the four selected dimensions of the *Cognitive Emotion Regulation Questionnaire* (CERQ; Garnefski et al., 2007; Italian version of Carolini et al., 2022; Presaghi & Ercolani, 2005) and *Behavioral Emotion Regulation Questionnaire* (BERQ; Kraaij & Garnefski, 2019) were tested using confirmatory factor analyses (CFAs). We used the Weighted Least Squares Mean and Variance adjusted (WLSMV) estimator for categorical and ordinal data. As we derived the Italian versions of the FFM-APQ and BERQ through back-translation, we report the text of the items in Table B.1.

To evaluate the goodness of the model fit, we took into account the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root-mean-square error of approximation (RMSEA), and the standardized root mean residual (SRMR). The model was considered acceptable with CFI and TLI $> .90$ and preferably close to .95, and RMSEA and SRMR $< .10$ and preferably close to .06 (Hu & Bentler, 1999).

B.1.2 Results

First, we conducted a CFA to test the five-factor structure of the FFM-APQ. The model had an acceptable fit, CFI = .923, TLI = .912, RMSEA = .060, SRMR = .062. Factor loadings ranged from .51 to .76 for Extraversion, from .45 to .76 for Agreeableness, from .46 to .76 for Conscientiousness, from .40 to .93 for Neuroticism, and from .52 to .83 for Openness. Second, we conducted a CFA to confirm the four-factor structure of the selected dimensions of the BERQ (i.e., Actively Approaching and Withdrawal) and CERQ (i.e., Positive Refocusing and Catastrophizing). The model fit indexes were good, CFI = .975, TLI = .969, RMSEA = .056, SRMR = .047. The factor loadings ranged from .52 to .84 for Actively Approaching, from .56 to .76 for Withdrawal, from .78 to .92 for Positive Refocusing, and from .24 to .91 for Catastrophizing.

B.2 Preliminary Checks

Before running the 10 hierarchical regressions, we conducted preliminary checks concerning missing data, adequacy of the sample size, normality of the distribution, and multicollinearity problems.

Table B.1

Italian Version of the Five-Factor Model – Adolescent Personality Questionnaire (FFM-APQ; Rogers & Glendon, 2018) and of the Behavioral Emotion Regulation Questionnaire (BERQ; Kraaij & Garnefski, 2019) Obtained Through Back-Translation

Dimensions	Items
FFM-APQ - Extraversion	Che è molto socievole Che è molto espansiva Che ha sempre qualcosa di cui parlare Che dice sempre “Facciamo qualcosa” Che ha più amici delle altre persone
FFM-APQ - Agreeableness	Che pensa sempre a come si sentono le altre persone Che mette i bisogni degli altri prima dei propri A cui piace aiutare gli altri Che è premurosa verso gli altri Che dà le cose agli altri
FFM-APQ - Conscientiousness	Che si sa organizzare bene Che gestisce bene il suo tempo Che si concentra sulle cose da fare Che ha sempre un piano
FFM-APQ - Neuroticism	Che stabilisce degli obiettivi per sé stessa Che si infastidisce facilmente Che si irrita per le piccole cose Che può infastidirsi per le cose più piccole Che è lunatica un sacco di volte Che è piuttosto ansiosa un sacco di volte
FFM-APQ - Openness	Che ha molte idee Che è fantasiosa Che sa un sacco di cose Che fa molte domande Che è piuttosto curiosa
BERQ - Actively Approaching	Cerco di fare qualcosa a riguardo Lavoro su ciò che è accaduto Mi attivo per affrontarlo Faccio tutto il necessario per affrontarlo
BERQ - Withdrawal	Evito le altre persone Mi ritiro Mi isolo Mi chiudo in me stesso/a

Across all participants, 0.29% ($n = 51$) of the data was missing. As Little's (1988) test was non-significant, $\chi^2(1716) = 1805.48, p = .065$, we could assume missing completely at random (MCAR). We used mean imputation as a method for handling missing data (Buczak et al., 2023).

Using G*Power (version 3.1.9.7; Faul et al., 2009), we ran an a priori sample size computation: results indicated that a minimum sample of 178 participants would

have been required to obtain a medium effect size ($f^2 = 0.15$) at standard α (.05) and power (.95) when conducting linear multiple regression models with 11 independent variables. Since our sample size was almost double the minimum number ($n = 330$), it can be considered adequate.

Skewness and kurtosis values ranged between -2 and 2 (with the only exception of sex; Table B.2), indicating an almost normal distribution of all the variables (George & Mallery, 2016).

Finally, we checked for multicollinearity using the variance inflation factor (VIF) as an indicator. All the VIFs were around 1, indicating the absence of multicollinearity problems (Shrestha, 2020).

Table B.2

Pearson's Intercorrelation, Means (M), 95% Confidence Interval (CI), Standard Deviations (SD), Skewness, Kurtosis, Cronbach's Alpha (α), and McDonald's Omega (ω) for All the Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Enjoyment	-																				
2. Pride	.36***	-																			
3. Hope	.21***	.27***	-																		
4. Relief	.30***	.31***	.40***	-																	
5. Relaxation	.38***	.19***	.04	.16**	-																
6. Anxiety	-.17**	-.04	.23***	.03	-.23***	-															
7. Anger	-.30***	-.02	.06	.03	-.26***	.26***	-														
8. Shame	-.01	.01	.06	.13*	-.16**	.10	.18**	-													
9. Hopelessness	-.30***	-.14*	.09	-.07	-.26***	.24***	.42***	.25***	-												
10. Boredom	-.32***	-.07	.03	-.03	-.13*	.20***	.38***	.17**	.19***	-											
11. Sex ^a	.06	-.04	.01	.02	.12*	.13*	-.04	.13*	.10	-.13*	-										
12. Age	-.25***	-.13*	.01	-.09	-.19***	.25***	.10	-.05	.09	.19***	.04	-									
13. Extraversion	.30***	.17**	.22***	.14*	.15**	-.05	-.07	-.01	-.07	-.20***	-.06	-.09	-								
14. Agreeableness	.16**	.05	.08	.03	.08	.04	-.02	.09	.06	-.16**	.11*	.02	.40***	-							
15. Conscientiousness	.23***	.32***	.13*	.21***	.24***	-.06	-.05	-.03	.01	-.19***	-.05	-.14**	.44***	.31***	-						
16. Neuroticism	-.11*	-.01	.10	.09	-.12*	.31***	.31***	.27***	.27***	-.10	-.03	.14*	-.02	.05	-.15**	-					
17. Openness	.24***	.27***	.17**	.18***	.21***	-.04	.01	-.03	.05	-.19***	-.03	.14*	.54***	.31***	.50***	.07	-				
18. Actively Approaching	.21***	.13*	.10	.13*	.19***	-.08	-.05	-.03	-.06	-.19***	-.18***	-.13*	.30***	.25***	.36***	.08	.21***	-			
19. Withdrawal	-.21***	-.08	-.05	-.02	-.12*	.17**	.20***	.20***	.31***	.13*	.08	-.08	-.16**	-.01	-.11*	.35***	-.05	-.25***	-		
20. Positive Refocusing	.31***	.25***	.20***	.17**	.24***	-.16**	-.07	-.07	-.09	-.09	.07	-.17**	.24***	.04	.24***	-.06	.18**	.21***	.24***	-	
21. Catastrophizing	-.06	.03	.09	.03	.04	.22***	.13*	.06	.26***	.06	.01	-.06	.03	.07	.02	.23***	.15**	.01	.24***	.11*	-
M	3.82	2.95	3.04	2.91	3.60	3.03	2.36	1.95	2.07	2.74	0.52	10.96	3.40	3.43	3.31	2.73	3.59	3.17	2.34	3.15	-
95% CI	[3.69, 3.95]	[2.81, 3.10]	[2.90, 3.18]	[2.77, 3.05]	[3.46, 3.73]	[2.87, 3.18]	[2.23, 2.49]	[1.82, 2.08]	[1.94, 2.19]	[2.61, 2.86]	[0.47, 0.58]	[10.82, 11.10]	[3.31, 3.49]	[3.35, 3.52]	[3.22, 3.40]	[2.63, 2.84]	[3.50, 3.68]	[3.07, 3.27]	[2.23, 2.45]	[3.02, 3.28]	[2.55, 2.75]
SD	1.19	1.32	1.30	1.28	1.23	1.42	0.62	1.21	1.16	1.17	0.50	1.30	0.85	0.77	0.85	0.96	0.83	0.92	1.00	1.20	0.96
Skewness	-0.72	-0.03	-0.05	0.16	-0.50	-0.01	0.62	1.21	0.91	0.23	-0.09	0.17	-0.37	-0.13	-0.08	0.25	-0.31	0.01	0.63	-0.17	0.20
Kurtosis	-0.48	-1.04	-1.07	-1.04	-0.75	-1.32	-0.60	0.45	-0.08	-0.81	-2.01	-1.45	-0.25	-0.11	-0.32	-0.44	-0.38	-0.67	-0.39	-1.03	-0.75
α	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ω	-	-	-	-	-	-	-	-	-	-	-	-	.71	.68	.74	.78	.72	.72	.73	.87	.70

Note. ^aSex was coded using 0 for males and 1 for females. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table B.3

Unstandardized Coefficients (B) and Associated Standard Error (SE) of the Hierarchical Multiple Regressions

	Enjoyment		Pride		Hope		Relief		Relaxation		Anxiety		Anger		Shame		Hopelessness		Boredom	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Step 1																				
Sex ^a	.17	.13	-.09	.15	.02	.14	.06	.14	-.27*	.13	.35*	.15	-.12	.14	.33*	.13	.23	.13	-.33*	.13
Age	-.23***	.05	-.13*	.06	.01	.06	-.09	.06	-.18***	.05	.27***	.06	.10	.05	-.05	.05	.08	.05	.18***	.05
Step 2																				
Sex ^a	.22	.12	-.03	.14	.04	.14	.09	.14	-.24	.13	.28	.15	-.19	.13	.24	.13	.17	.13	-.38**	.12
Age	-.19***	.05	-.07	.06	.03	.06	-.06	.06	-.13*	.05	.22***	.06	.06	.05	-.10*	.05	.06	.05	.13**	.05
Extraversion	.31***	.09	-.01	.10	.28**	.11	.09	.10	.01	.10	-.05	.11	-.12	.10	.01	.10	-.21*	.09	-.22*	.09
Agreeableness	.05	.09	-.13	.10	-.07	.10	-.14	.10	.04	.10	.02	.11	-.01	.10	.14	.09	.07	.09	-.13	.09
Conscientiousness	.10	.09	.40***	.10	.10	.10	.28**	.10	.20*	.09	.05	.11	.04	.09	.03	.09	.09	.09	-.10	.09
Neuroticism	-.10	.07	.04	.08	.15	.08	.16*	.08	-.10	.07	.41***	.08	.40***	.07	.37***	.07	.27***	.07	.31***	.07
Openness	.05	.09	.24*	.11	.08	.11	.10	.11	.15	.10	-.02	.11	.04	.10	-.15	.10	.12	.10	.08	.09
Step 3																				
Sex ^a	.20	.12	-.08	.14	.01	.14	.09	.14	-.26	.13	.31*	.15	-.19	.14	.25	.13	.18	.12	-.44***	.12
Age	-.19***	.05	-.05	.06	.05	.06	-.05	.06	-.10	.05	.23***	.06	.08	.05	-.10	.05	.09	.05	.13**	.05
Extraversion	.22*	.09	-.06	.11	.22*	.11	.04	.11	-.06	.10	.01	.11	-.09	.10	.05	.10	-.13	.09	-.20*	.09
Agreeableness	.08	.09	-.10	.10	-.05	.10	-.14	.10	.05	.10	-.01	.11	-.02	.10	.13	.10	.03	.09	-.10	.09
Conscientiousness	.04	.09	.37***	.10	.05	.10	.23*	.10	.14	.10	.08	.11	.04	.10	.04	.10	.11	.09	-.06	.09
Neuroticism	-.02	.07	.06	.08	.14	.08	.17*	.08	-.09	.08	.33***	.09	.34***	.08	.33***	.08	.13	.07	.30***	.07
Openness	.06	.09	.23*	.11	.06	.11	.11	.11	.14	.10	-.06	.11	.03	.10	-.14	.10	.10	.09	.06	.09
Actively Approaching	.07	.07	-.02	.09	.03	.09	.08	.09	.07	.08	.01	.09	.01	.08	.01	.08	.03	.08	-.16*	.08
Withdrawal	-.17**	.07	-.06	.08	-.05	.08	-.02	.08	-.06	.08	.07	.08	.13	.08	.12	.07	.26***	.07	.02	.07
Positive Refocusing	.16	.05	.19**	.06	.18**	.06	.11	.06	.19**	.06	-.11	.07	-.01	.06	-.06	.06	-.07	.06	.03	.06
Catastrophizing	-.04	.07	.03	.08	.11	.08	-.01	.08	.08	.07	.24**	.08	.06	.07	-.03	.07	.20**	.07	.02	.07

Note. ^aSex was coded using 0 for males and 1 for females. * $p < .05$. ** $p < .01$. *** $p < .001$.

Appendix C. Supplemental Materials of Chapter 4

C.1 Factorial Structure of the Measures and Descriptive Statistics

C.1.1 Data Analysis

We used the R software (R Core Team, 2025; version 4.5.0; lavaan package; Rosseel, 2012).

We ran three confirmatory factor analyses (CFAs) to verify the five-factor structure of the *Big Five Inventory-2* (BFI-2; Soto & John, 2017b; Italian adaptation with Rasch analysis, *Big Five Inventory-2 Rasch Analysis*, BFI-2-R; Burro et al., 2025) and the two-factor structure of the *Behavioral Emotion Regulation Questionnaire* (BERQ; Kraaij & Garnefski, 2019) and *Cognitive Emotion Regulation Questionnaire* (CERQ; Garnefski & Kraaij, 2007; Italian version of Cerolini et al., 2022; Presaghi & Ercolani, 2005) using the diagonally weighted least squares (DWLS) estimator. In the CFAs for BERQ and CERQ, the two strategies have been covaried. We examined the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the square root mean residual (SRMR) as model-fit indexes. Models were considered acceptable when CFI and TLI $> .90$ and preferably close to $.95$, and RMSEA and SRMR $< .10$ and preferably close to $.06$ (Hu & Bentler, 1999).

The internal consistency of the three instruments was evaluated by considering Cronbach's (1951) alpha (α) and McDonald's (1999) omega (ω). Values $\geq .70$ were considered adequate.

C.1.2 Results

First, we conducted the CFA on the 60-item BFI-2. It had an unsatisfactory fit, CFI = .845, TLI = .839, RMSEA = .102, SRMR = .103. After selecting three items for each trait (based on factor loadings, cross-loadings, and R^2), we obtained a 15-item five-factor model with a good fit, CFI = .975, TLI = .970, RMSEA = .074, SRMR = .077. Second, we conducted two CFAs on the two emotion regulation questionnaires. The models had a good fit for both the BERQ, CFI = .999, TLI = .998, RMSEA = .050, SRMR = .001, and the CERQ, CFI = .995, TLI = .993, RMSEA = .077, SRMR = .049. Internal consistency was good for all the dimensions, with the only exception of Agreeableness, which had α and ω values slightly under the threshold.

Descriptive statistics, internal consistency, and factor loadings for all the variables (Big Five traits, emotion regulation strategies, and achievement emotions) are

reported in Table C.1 and Pearson's intercorrelations in Table C.2. For all variables, skewness and kurtosis ranged from -2 to 2, indicating an approximately normal distribution (George & Mallery, 2016).

Table C.1

Descriptive Statistics, Reliability Indexes, and Factor Loadings for Big Five Personality Traits, Emotion Regulation Strategies, and Achievement Emotions

	Number of Items	Mean	SD	95% CI	Skewness	Kurtosis	α/ω	Factor Loadings
Extraversion	3	8.98	3.01	[8.77, 9.20]	-0.05	-0.83	.75/.76	.59-.88
Agreeableness	3	13.40	1.48	[13.30, 13.51]	-0.97	1.23	.66/.66	.69-.83
Conscientiousness	3	10.03	3.19	[9.80, 10.25]	-0.21	-0.84	.82/.83	.70-.92
Negative Emotionality	3	9.63	3.00	[9.41, 9.84]	-0.15	-0.70	.78/.81	.53-.91
Open-Mindedness	3	11.46	2.69	[11.27, 11.65]	-0.63	-0.16	.73/.75	.57-.85
Actively Approaching	4	13.54	3.83	[13.26, 13.81]	0.16	-0.10	.90/.90	.82-.93
Withdrawal	4	12.05	4.56	[11.73, 12.38]	0.18	-0.58	.91/.91	.82-.94
Refocus on Planning	4	14.40	3.69	[14.14, 14.67]	0.03	0.26	.90/.90	.80-.91
Catastrophizing	4	9.08	3.61	[8.83, 9.34]	0.70	0.42	.78/.80	.50-.90
Enjoyment	1	4.31	1.27	[4.22, 4.40]	-0.24	-0.07	-	-
Pride	1	4.57	1.47	[4.46, 4.67]	-0.41	-0.35	-	-
Hope	1	4.67	1.29	[4.58, 4.76]	-0.47	0.04	-	-
Relief	1	3.46	1.46	[3.35, 3.56]	0.03	-0.59	-	-
Relaxation	1	4.18	1.32	[4.08, 4.27]	-0.19	-0.14	-	-
Anxiety	1	4.52	1.57	[4.40, 4.63]	-0.32	-0.57	-	-
Anger	1	2.08	1.33	[1.99, 2.18]	1.36	1.46	-	-
Shame	1	1.93	1.30	[1.84, 2.03]	1.46	1.59	-	-
Hopelessness	1	2.57	1.41	[2.47, 2.67]	0.84	0.18	-	-
Boredom	1	3.43	1.26	[3.34, 3.52]	0.58	0.03	-	-

Note. 95% CI = 95% confidence interval; *SD* = standard deviation; α = Cronbach's alpha; ω = McDonald's omega.

Table C.2

Pearson's Intercorrelations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Extraversion	-																	
2. Agreeableness	-.04	-																
3. Conscientiousness	-.02	.15***	-															
4. Negative Emotionality	-.26***	-.09*	-.13***	-														
5. Open-Mindedness	.07	.18***	-.08*	.04	-													
6. Actively Approaching	.23***	.24***	.13***	-.31***	.18***	-												
7. Withdrawal	-.31***	-.11**	-.08*	.38***	.03	-.22***	-											
8. Refocus on Planning	.24***	.18***	.16***	-.32***	.14***	.68***	-.25***	-										
9. Catastrophizing	-.04	-.06	-.01	.33***	-.04	-.16***	.25***	-.15***	-									
10. Enjoyment	.15***	.08*	.13***	-.26***	.08*	.22***	-.14***	.21***	-.06	-								
11. Pride	.14***	.09*	.14***	-.23***	.05	.25***	-.13***	.24***	-.04	.55***	-							
12. Hope	.12***	.16***	.11**	-.23***	.09*	.23***	-.15***	.23***	-.02	.45***	.46***	-						
13. Relief	.04	-.03	.10**	-.18***	-.02	.14***	-.11**	.14***	-.02	.48***	.41***	.34***	-					
14. Relaxation	.09*	.10**	.11**	-.32***	.05	.24***	-.10**	.21***	-.17***	.36***	.29***	.23***	.31***	-				
15. Anxiety	-.12***	-.01	-.06	.41***	.04	-.17***	.19***	-.14***	.27***	-.13***	-.12***	-.05	-.16***	-.45***	-			
16. Anger	.05	-.29***	-.08*	.21***	-.06	-.11**	.13***	-.12**	.19***	-.23***	-.19***	-.19***	-.05	-.27***	.22***	-		
17. Shame	-.12***	-.20***	-.05	.26***	-.07	-.16***	.17***	-.19***	.17***	-.14***	-.24***	-.21***	-.01	-.18***	.22***	.37***	-	
18. Hopelessness	-.06	-.28***	-.08*	.41***	-.04	-.22***	.23***	-.24***	.25***	-.34***	-.27***	-.24***	-.14***	-.37***	.38***	.52***	.43***	-
19. Boredom	-.02	-.26***	-.16***	.19***	-.16***	-.20***	.17***	-.17***	.14***	-.41***	-.33***	-.23***	-.18***	-.22***	.14***	.35***	.24***	.42***

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Appendix D. Supplemental Materials of Chapter 5

D.1 Confirmatory Factor Analysis of the Five-Factor Model – Adolescent Personality Questionnaire

D.1.1 Method

The *Five-Factor Model – Adolescent Personality Questionnaire* (FFM-APQ; Rogers & Glendon, 2018) includes 25 items, equally distributed to assess the Big Five traits in adolescence, namely Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. The factorial structure of the original English version of the FFM-APQ has been confirmed in a previous study involving a sample of adolescents (Rogers & Glendon, 2018). However, the Italian version of this instrument has not been validated yet, so we derived the items through back-translation (Table D.1).

Table D.1

Italian Version (Obtained Through Back-Translation) of the Items of the Five-Factor Model – Adolescent Personality Questionnaire (FFM-APQ), and Corresponding Traits

Item order	FFM-APQ (Italian version)	Trait
1	Che pensa sempre a come si sentono le altre persone	Agreeableness
2	Che mette i bisogni degli altri prima dei propri	Agreeableness
3	A cui piace aiutare gli altri	Agreeableness
4	Che è premurosa verso gli altri	Agreeableness
5	Che dà le cose agli altri	Agreeableness
6	Che è molto socievole	Extraversion
7	Che è molto espansiva	Extraversion
8	Che ha sempre qualcosa di cui parlare	Extraversion
9	Che dice sempre “Facciamo qualcosa”	Extraversion
10	Che ha più amici delle altre persone	Extraversion
11	Che si sa organizzare bene	Conscientiousness
12	Che gestisce bene il suo tempo	Conscientiousness
13	Che si concentra sulle cose da fare	Conscientiousness
14	Che ha sempre un piano	Conscientiousness
15	Che stabilisce degli obiettivi per sé stessa	Conscientiousness
16	Che si infastidisce facilmente	Neuroticism
17	Che si irrita per le piccole cose	Neuroticism
18	Che può infastidirsi per le cose più piccole	Neuroticism
19	Che è lunatica un sacco di volte	Neuroticism
20	Che è piuttosto ansiosa un sacco di volte	Neuroticism
21	Che ha molte idee	Openness
22	Che è fantasiosa	Openness
23	Che sa un sacco di cose	Openness
24	Che fa molte domande	Openness
25	Che è piuttosto curiosa	Openness

We checked the factorial structure of the FFM-APQ by conducting CFAs. As the FFM-APQ is an instrument originally designed for and validated with adolescents (Rogers & Glendon, 2018), first, we ran a CFA considering only a sample of 168 adolescents (11-to-12-year-olds, $M_{age} = 12.11$, $SD = 0.61$, range: 11.01–14.01; 55% females). However, since the items of the instrument are easy to understand also for younger participants, we decided to use it also with 9-year-olds. For such a reason, we tested a CFA also including an additional sample of 139 children ($M_{age} = 9.70$, $SD = 0.31$, range: 8.97–10.67; 50% females), for a total number of 307 participants.

We specify that we have excluded from the analyses for the convergent validity (see paragraph 5.3) those participants who did not complete the *15-Item Dichotomous Big Five Inventory-2* (BFI-2-15D; Table D.2), i.e., 23 children and 43 adolescents.

D.1.2 Results

Preliminarily, we tested the appropriateness of the data for factor analysis in both samples, i.e., only adolescents, and both children and adolescents. Bartlett's test of sphericity (only adolescents: $\chi^2(300) = 1602.97$, $p < .001$; both children and adolescents: $\chi^2(300) = 2372.19$, $p < .001$) and Kaiser-Meyer-Olkin (KMO) test of sampling adequacy (only adolescents: KMO = .78; both children and adolescents: KMO = .83) indicated that the data were appropriate. We then conducted a hierarchical CFA for each sample, testing a model with a general second-order factor (i.e., personality) and five first-order factors (i.e., the Big Five traits).

The model was good both in the sample with only adolescents, CFI = .971, TLI = .967, RMSEA = .070, and SRMR = .087, and in the sample with both children and adolescents, CFI = .955, TLI = .950, RMSEA = .072, and SRMR = .079. Factor loadings ranged from .110 to .870 and from .099 to .844 for the general second-order factor and from .338 to .975 and from .415 to .947 for the first-order traits, respectively, in the two samples. The explained variance (R^2) of the five latent factors ranged from .012 to .758 in the sample with only adolescents, and from .010 to .712 in the sample with both children and adolescents.

D.2 Scoring Key and Discriminative Capacity of the BFI-2-15D

D.2.1 Scoring Key

TRUE (or *VERO*, in Italian) answers should be coded as 1, while *FALSE* (or *FALSO*, in Italian) answers should be coded as 0. Items followed by the letter *R* are reversed items: in these cases, *TRUE* answers should be coded as 0, and *FALSE* answers as 1.

D.2.1.1 Traits

The value for each trait should be calculated by summing the related items, as follows:

- Extraversion: $1 + 6 + 11$;
- Agreeableness: $2 + 7 + 12$;
- Conscientiousness: $3R + 8 + 13R$;
- Negative Emotionality: $4R + 9 + 14R$;
- Open-Mindedness: $5 + 10R + 15$.

D.2.1.2 Facets

The value for each facet corresponds to the value of the single item representing it, as follows:

- For Extraversion:
 - Sociability: 1;
 - Assertiveness: 6;
 - Energy Level: 11;
- For Agreeableness:
 - Compassion: 2;
 - Trust: 7;
 - Respectfulness: 12;
- For Conscientiousness:
 - Responsibility: 3R;
 - Productiveness: 8;
 - Organization: 13R;
- For Negative Emotionality:
 - Emotional Volatility: 4R;
 - Depression: 9;
 - Anxiety: 14R;
- For Open-Mindedness:
 - Intellectual Curiosity: 5;
 - Creative Imagination: 10R;
 - Aesthetic Sensitivity: 15.

D.2.2 Discriminative Capacity

For each trait, each person can be inserted in one out of four categories that

indicate “how much” of the corresponding trait that person possesses. The following categories correspond to the sum of the items representing each trait:

- 0 = low;
- 1 = medium-low;
- 2 = medium-high;
- 3 = high.

Table D.2

Initial Pool of Items of the English and the Italian Versions of the 15-Item Dichotomous Big Five Inventory-2 (BFI-2-15D), Items From the Original English Big Five Inventory-2 (BFI-2), Items of the Italian Adapted Big Five Inventory-2-Rasch Analysis (BFI-2-R), and Corresponding Second-Order Traits and First-Order Facets. The Final 15 Items of the BFI-2-15D Are in Bold. Instructions for Administering the BFI-2-15D: “Below Are Some Sentences That Can Describe You. For Each Sentence, Indicate Whether it is TRUE or FALSE for You. Answer Thinking About Yourself.” (Italian Version: “Di Seguito Sono Riportate Alcune Frasi che ti Possono Descrivere. Per Ogni Frase, Indica se è VERA o FALSA per Te. Rispondi Pensando a Te.”)

Item order	BFI-2-15D (English version)	BFI-2-15D (Italian version)	BFI-2 (English)	BFI-2-R (Italian)	Second-order trait	First-order facet
1	I like spending time with others	Mi piace stare con gli altri	Is outgoing, sociable	È estroversa, socievole	Extraversion	Sociability
2	I like helping others	Aiuto volentieri gli altri	Is compassionate, has a soft heart	È compassionevole, ha il cuore tenero	Agreeableness	Compassion
3R	I am often inaccurate	Spesso sono impreciso/a	Tends to be disorganized	Tende a essere disorganizzata	Conscientiousness	Organization
4R	I am calm	Sono tranquillo/a	Is relaxed, handles stress well	È tranquilla, gestisce bene lo stress	Negative Emotionality	Anxiety
5R	I like drawing a little	Mi piace poco disegnare	Has few artistic interests	Ha pochi interessi artistici	Open-Mindedness	Aesthetic Sensitivity
6	I say what I think	Dico quello che penso	Has an assertive personality	Ha una personalità decisa, che sa farsi ascoltare	Extraversion	Assertiveness
7	I respect others	Rispetto gli altri	Is respectful, treats others with respect	È rispettosa, tratta gli altri con rispetto	Agreeableness	Respectfulness
8R	I am often lazy	Spesso sono pigro/a	Tends to be lazy	Tende a essere pigra	Conscientiousness	Productiveness
9R	I am optimistic	Sono ottimista	Stays optimistic after experiencing a setback	Rimane ottimista di fronte agli ostacoli	Negative Emotionality	Depression
10	I am curious	Sono curioso/a	Is curious about many different things	È incuriosita da molte cose diverse	Open-Mindedness	Intellectual Curiosity
11R	There are few times when I am really happy	Poche volte mi sento davvero felice	Rarely feels excited or eager	Raramente si sente elettrizzata o appassionata	Extraversion	Energy Level
12R	I often find fault with others	Spesso trovo i difetti negli altri	Tends to find fault with others	Tende a trovare difetti negli altri	Agreeableness	Trust

13	Others trust me	Gli altri si fidano di me	Is dependable, steady	È regolare, costante	Conscientiousness	Responsibility
14	I change my mood quickly	Cambio umore velocemente	Is moody, has up and down mood swings	È lunatica, ha sbalzi d'umore	Negative Emotionality	Emotional Volatility
15	I have a lot of imagination	Ho molta fantasia	Is inventive, finds clever ways to do things	È inventiva, trova modi ingegnosi per fare le cose	Open-Mindedness	Creative Imagination
16R	I am often silent	Spesso resto in silenzio	Tends to be quiet	È tendenzialmente silenziosa	Extraversion	Sociability
17R	I find it hard to understand how others feel	Faccio fatica a capire come si sentono gli altri	Feels little sympathy for others	Prova poca empatia per gli altri	Agreeableness	Compassion
18	I am tidy	Sono ordinato/a	Is systematic, likes to keep things in order	È sistematica, ama tenere le cose in ordine	Conscientiousness	Organization
19	Sometimes I am nervous	A volte sono nervoso/a	Can be tense	Può essere nervosa	Negative Emotionality	Anxiety
20	I like art, music, books	Mi piacciono l'arte, la musica, i libri	Is fascinated by art, music, or literature	È affascinata dall'arte, dalla musica, o dalla letteratura	Open-Mindedness	Aesthetic Sensitivity
21	Others listen to me	Gli altri mi ascoltano	Is dominant, acts as a leader	È dominante, agisce da leader	Extraversion	Assertiveness
22R	I argue easily with others	Litigo facilmente con gli altri	Starts arguments with others	Provoca litigi con gli altri, attacca brighe	Agreeableness	Respectfulness
23R	I find it hard to get things started	Faccio fatica a iniziare a fare le cose	Has difficulty getting started on tasks	Fa fatica a iniziare un lavoro	Conscientiousness	Productiveness
24R	I feel self-confident	Mi sento sicuro/a di me	Feels secure, comfortable with self	Si sente sicura, a proprio agio con se stessa	Negative Emotionality	Depression
25R	I avoid complicated discussions	Evito i discorsi complicati	Avoids intellectual, philosophical discussions	Evita discussioni intellettuali, filosofiche	Open-Mindedness	Intellectual Curiosity
26R	I move less than others	Mi muovo meno degli altri	Is less active than other people	È meno attiva di altre persone	Extraversion	Energy Level
27	I forgive others easily	So perdonare gli altri facilmente	Has a forgiving nature	È, di natura, incline a perdonare	Agreeableness	Trust
28R	Sometimes I am a slacker	A volte sono uno/a scansafatiche	Can be somewhat careless	Può essere un po' sbadata	Conscientiousness	Responsibility
29R	I do not get angry easily	Non mi arrabbio facilmente	Is emotionally stable, not easily upset	È emotivamente stabile, non si turba facilmente	Negative Emotionality	Emotional Volatility
30R	I am little creative	Sono poco creativo/a	Has little creativity	Ha poca creatività	Open-Mindedness	Creative Imagination
31R	Sometimes I am shy	A volte sono timido/a	Is sometimes shy, introverted	Qualche volta è timida, introversa	Extraversion	Sociability
32	I am not selfish	Non sono egoista	Is helpful and unselfish with others	È di aiuto e generosa con gli altri	Agreeableness	Compassion
33	I keep things tidy	Tengo le cose al loro posto	Keeps things neat and tidy	Tiene le cose con cura	Conscientiousness	Organization

34	I worry a lot	Mi preoccupo molto	Worries a lot	Si preoccupa molto	Negative Emotionality	Anxiety
35	Art is important for me	Per me l'arte è importante	Values art and beauty	Apprezza l'arte e la bellezza	Open-Mindedness	Aesthetic Sensitivity
36R	I find it hard to change others' mind	Faccio fatica a far cambiare idea agli altri	Finds it hard to influence people	Trova difficile influenzare le persone	Extraversion	Assertiveness
37R	Sometimes I mistreat others	A volte tratto male gli altri	Is sometimes rude to others	Qualche volta è scortese con gli altri	Agreeableness	Respectfulness
38	If I begin something, then I finish it	Se inizio una cosa poi la finisco	Is efficient, gets things done	È efficiente, ottiene risultati	Conscientiousness	Productiveness
39	I often feel sad	Spesso mi sento triste	Often feels sad	Si sente spesso triste	Negative Emotionality	Depression
40	I think a lot	Penso molto	Is complex, a deep thinker	È complessa, riflette molto	Open-Mindedness	Intellectual Curiosity
41	I am full of energy	Ho molta energia	Is full of energy	È piena di energie	Extraversion	Energy Level
42R	I do not trust others	Non mi fido degli altri	Is suspicious of others' intentions	È sospettosa delle intenzioni altrui	Agreeableness	Trust
43	Others count on my help	Gli altri contano sul mio aiuto	Is reliable, can always be counted on	È affidabile, una persona su cui si può sempre contare	Conscientiousness	Responsibility
44R	I control my emotions	Controllo le mie emozioni	Keeps their emotions under control	Tiene sotto controllo le proprie emozioni	Negative Emotionality	Emotional Volatility
45R	I find it hard to imagine things	Faccio fatica a immaginare le cose	Has difficulty imagining things	Ha difficoltà a immaginare le cose	Open-Mindedness	Creative Imagination
46	I talk a lot	Parlo molto	Is talkative	Parla molto	Extraversion	Sociability
47R	Sometimes I do not worry about others	A volte non mi preoccupo degli altri	Can be cold and uncaring	Può essere fredda e insensibile	Agreeableness	Compassion
48R	I do not tidy up things	Non rimetto in ordine le cose	Leaves a mess, doesn't clean up	Lascia il caos, non pulisce	Conscientiousness	Organization
49R	Rarely I feel anxious or afraid	Poche volte mi sento ansioso/a o impaurito/a	Rarely feels anxious or afraid	Raramente si sente ansiosa o spaventata	Negative Emotionality	Anxiety
50R	Poetry is boring	Le poesie sono noiose	Thinks poetry and plays are boring	Pensa che la poesia e le opere teatrali siano noiose	Open-Mindedness	Aesthetic Sensitivity
51R	I prefer to have others make decisions	Preferisco che decidano gli altri	Prefers to have others take charge	Preferisce che siano gli altri a prendere il comando	Extraversion	Assertiveness
52	I am polite and kind	Sono educato/a e gentile	Is polite, courteous to others	È educata, gentile con gli altri	Agreeableness	Respectfulness
53	When I do a thing, I do not give up	Quando faccio una cosa, non mi arrendo	Is persistent, works until the task is finished	È tenace, lavora fino a quando un compito è finito	Conscientiousness	Productiveness
54	I cry often	Spesso piango	Tends to feel depressed, blue	Tende a sentirsi depressa, giù di morale	Negative Emotionality	Depression

55R	I do not like very much abstract ideas	Mi piacciono poco le idee astratte	Has little interest in abstract ideas	Si interessa poco di idee astratte	Open-Mindedness	Intellectual Curiosity
56	I show a lot of enthusiasm	Mostro molto entusiasmo	Shows a lot enthusiasm	Mostra molto entusiasmo	Extraversion	Energy Level
57	I think well of people	Penso bene delle persone	Assumes the best about people	Pensa il meglio delle persone	Agreeableness	Trust
58R	Sometimes I misbehave	A volte mi comporto male	Sometimes behaves irresponsibly	Talvolta si comporta in modo irresponsabile	Conscientiousness	Responsibility
59	I get emotional easily	Mi emoziono facilmente	Is temperamental, gets emotional easily	È volubile, si lascia sopraffare dalle emozioni	Negative Emotionality	Emotional Volatility
60	I come up easily with new ideas	Mi vengono facilmente nuove idee	Is original, comes up with new ideas	È originale, propone nuove idee	Open-Mindedness	Creative Imagination

Note. R = reversed item. The English items of the BFI-2 correspond to the original adult version (Soto & John, 2017b). Copyright 2015 by Oliver P. John and Christopher J. Soto. Reprinted with permission. The Italian items of the BFI-2-R correspond to the Italian adult adaptation of the BFI-2 with Rasch analysis (Burro et al., 2025). The English version items of the BFI-2-15D were obtained by back-translating the Italian version.

Appendix E. Supplemental Materials of Chapter 6

E.1 Factorial Structure and Internal Consistency of the Adapted BFI-2-15D

E.1.1 Method

For this analysis, we considered the entire sample of 236 students, including both the experimental and control groups – although the analysis on the influence of personality traits on learning was conducted only on the experimental group (see Chapter 6).

We ran the analyses using R (version 4.5.1; R Core Team, 2025). The model fit for the original version of the *15-item Dichotomous Big Five Inventory-2* (BFI-2-15D; Vicentini et al., 2025a) was unsatisfactory. Therefore, we adapted the instrument by substituting eight items with some alternatives from the initial pool of 60 items from which it was derived. These alternative items were chosen to ensure that we included one item for each facet of the trait. The selected items are presented in Table E.1. The factorial structure of the adapted version was tested using a hierarchical confirmatory factor analysis (CFA) including five first-order factors (the Big Five traits) and a general second-order factor (personality). We used the diagonally weighted least squares (DWLS) estimation method for ordinal data. To evaluate the goodness of fit of the models, we considered the root-mean-square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the standardized root mean residual (SRMR). The model was considered acceptable with CFI and TLI $> .90$ and preferably close to .95, and RMSEA and SRMR $< .10$ and preferably close to .06 (Hu & Bentler, 1999).

To evaluate internal consistency, we computed ordinal Cronbach's (1951) alpha (α), ordinal McDonald's (1999) omega (ω), and the corrected item-total correlations (CITCs; Streiner et al., 2015). For α and ω , values are considered satisfying when $\geq .70$, while for CITC, when ranging between .20 and .80.

Finally, we explored the similarity between the original and the adapted versions of the BFI-2-15D by calculating the bivariate correlations between the corresponding factors. Following Cohen (1988), values of Pearson's r between .10 and .30 were considered small, between .30 and .50 moderate, and higher than .50 large.

E.1.2 Results

E.1.2.1 Hierarchical Confirmatory Factor Analysis

The hierarchical CFA testing the factorial structure of the adapted BFI-2-15D

Table E.1

English and Italian Items of the Adapted Version of the 15-Item Dichotomous Big Five Inventory-2 (BFI-2-15D) Used in This Study, and Corresponding Traits and Facets. Items in Bold Substituted the Items Pertaining to the Corresponding Facet in the Original Version of the BFI-2-15D

Item order	Adapted BFI-2-15D (English version)	Adapted BFI-2-15D (Italian version)	Trait	Facet
1	I like spending time with others	Mi piace stare con gli altri	Extraversion	Sociability
2	I like helping others	Aiuto volentieri gli altri	Agreeableness	Compassion
3R	Sometimes I am a slacker	A volte sono uno/a scansafatiche	Conscientiousness	Responsibility
4R	I control my emotions	Controllo le mie emozioni	Negative Emotionality	Emotional Volatility
5	I come up easily with new ideas	Mi vengono facilmente nuove idee	Open-Mindedness	Intellectual Curiosity
6	Others listen to me	Gli altri mi ascoltano	Extraversion	Assertiveness
7	I think well of people	Penso bene delle persone	Agreeableness	Trust
8R	I am often lazy	Spesso sono pigro/a	Conscientiousness	Productiveness
9	I often feel sad	Spesso mi sento triste	Negative Emotionality	Depression
10R	I avoid complicated discussions	Evito i discorsi complicati	Open-Mindedness	Creative Imagination
11	I am full of energy	Ho molta energia	Extraversion	Energy Level
12	I respect others	Rispetto gli altri	Agreeableness	Respectfulness
13R	I am often inaccurate	Spesso sono impreciso/a	Conscientiousness	Organization
14	Sometimes I am nervous	A volte sono nervosa/a	Negative Emotionality	Anxiety
15	Art is important for me	Per me l'arte è importante	Open-Mindedness	Aesthetic Sensitivity

Note. R = reversed item.

yielded an almost acceptable fit, with CFI = .956, TLI = .946, and RMSEA = .041. The only exception was the SRMR = .127, which was slightly higher than the threshold. This was probably due to the use of dichotomous items. The DWLS method utilizes the polychoric correlation matrix, which is an estimate of the correlation between two items if their underlying latent variables were continuous and normally distributed. This estimate can be unstable, especially if some cells in the 2×2 contingency table (between the two possible values, 0 and 1, of one item and the two of the other item) are empty or have very low frequencies (e.g., no one answered “1” or “0” to an item).

Factor loadings ranged from .53 to .97 for Extraversion, from .69 to .90 for Agreeableness, from .46 to .92 for Conscientiousness, from .46 to .84 for Negative Emotionality, and from .25 to .73 for Open-Mindedness. Factor loadings for the general personality factor ranged from .62 to .81.

E.1.2.2 Internal Consistency

Ordinal α and ordinal ω values were, respectively, .78 and .85 for Extraversion, .81 and .84 for Agreeableness, .74 and .78 for Conscientiousness, .67 and .68 for Negative Emotionality, and .48 and .49 for Open-Mindedness. Low values were expected, in line with the instrument's characteristics (Vicentini et al., 2025a) and previous evidence related to other brief personality questionnaires (Gosling et al., 2003; Maćkiewicz & Ciecuch, 2016; Soto & John, 2017a).

As for CITCs, values ranged from .21 to .37 for Extraversion, from .29 to .42 for Agreeableness, from .29 to .50 for Conscientiousness, from .25 to .33 for Negative Emotionality, and from .16 to .21 for Open-Mindedness. A value slightly under the threshold was found only for the trait of Open-Mindedness, in line with previous findings about the low reliability of this factor, especially in young samples (Maćkiewicz & Ciecuch, 2016; Robles-Haydar et al., 2022; Scholte et al., 1997; Vicentini et al., 2025b).

E.1.2.3 Correlations Between the Adapted and the Original BFI-2-15D

The correlations between the two versions of the BFI-2-15D (Vicentini et al., 2025a) were large for Extraversion ($r = .77, p < .001$), Conscientiousness ($r = .65, p < .001$), and Negative Emotionality ($r = .70, p < .001$). For Open-Mindedness, the correlation was moderate ($r = .49, p < .001$). For Agreeableness, the correlation was perfect ($r = 1.00, p < .001$), as the items were identical in the two versions. Overall, these results show a good degree of similarity in the results of the two versions.

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