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The role of parenting style and socio-economic status in child development: Understanding the underlying dynamics

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ABSTRACT

We apply latent class analysis to the German Family Panel data to identify latent family types and assess the association between various aspects of the home environment and child development. These aspects include family socio-economic background, parenting style, and parental involvement in children's learning activities. Child development is measured across several dimensions, including schooling outcomes, non-cognitive abilities, psychological well-being, and maintaining a healthy weight. Our findings suggest that a rich socio-economic background appears more strongly associated with schooling performance, social integration, and maintaining a healthy weight than parenting style. In contrast, self-esteem and psychological well-being are more closely related to parenting quality, indicating that good parenting may compensate for the disadvantages of growing up in a poor socio-economic family environment. For most outcomes, additive dynamics between parenting style and socio-economic status correspond to larger development gaps between children from the least and most advantaged families.

1. Introduction

Childhood and adolescence are critical periods for developing cognitive and non-cognitive skills, as well as socio-emotional and psychological well-being. Many scholars argue that investments and experiences during these years shape lifelong trajectories and future opportunities. As a result, there has been growing attention on early education programs aimed at equalizing life chances by compensating for initial disadvantages related to socio-economic background (Cunha and Heckman, 2007; Heckman, 2008). However, existing evidence remains inconclusive about the short- and long-term effects of these programs (van Huizen and Plantenga, 2018; Duncan et al., 2022), suggesting that factors beyond early education play a significant role in shaping children's development and life chances. Since children spend only a small fraction of their time in school, it becomes evident that family dynamics play a crucial role in influencing their development (Kalil, 2014). This paper contributes to the literature on the role of family in children's human capital development by exploring the interplay of multiple dimensions of the home environment, including socio-economic background, parenting style, and family home-based involvement in children's educational and learning activities, across a broad range of children's outcomes. Furthermore, we investigate the relative importance of these family environment dimensions and examine the underlying dynamics that shape children's development.

Since Baumrind's seminal works (1966, 1967), which introduced the characterization of parenting styles in terms of demandingness (control) and responsiveness (warmth), researchers across various disciplines have demonstrated that parenting influences child development through multiple channels. In the sociological literature, the influence of the family on social stratification remains a central topic, with ongoing debates about whether the family environment should be understood primarily in terms of economic resources or social class. Beyond financial means, families also transmit cultural and social capital (Bourdieu, 1986), shaping children's long-term opportunities. Moreover, in this strand of literature, research suggests that parenting styles tend to differ by social class: middle- and upper-class parents are more likely to practice concerted cultivation, i.e., actively structuring children's activities and fostering critical thinking, whereas working-class parents are more likely to emphasize natural growth, granting greater independence but providing fewer structured opportunities (Lareau, 2003). In the economic literature, family influence extends beyond socio-economic background to encompass parenting practices, which

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can serve as protective factors for children from disadvantaged backgrounds (Berger et al., 2009; Heckman, 2011; Cobb-Clark et al., 2019). This also explains why family influence is not easily mitigated by educational policies, as more advantaged families can better exploit opportunities arising from such policies (Cunha et al., 2006; Heckman and Landersø, 2022). Besides parenting style and practices, parental engagement plays a crucial role in shaping children's educational and personal outcomes. De Fraja et al. (2010) highlight that parents who are actively involved in their children's education, through supervision and engagement at home, significantly contribute to their children's educational attainment. Empirical evidence from several disciplines documents associations between parenting behavior and early school performance (Dornbusch et al., 1987; Spera, 2005; Parveen et al., 2016; Treyvaud et al., 2016; Berthelon et al., 2020), adolescent achievements (Steinberg et al., 1992; Parveen et al., 2016; Liu et al., 2025), the likelihood of attaining a high school diploma or a bachelor's degree (Majumder, 2016; Doepke et al., 2019), as well as healthier lifestyle choices and dietary habits (Kakinami et al., 2015; Schienkiewitz et al., 2018; Kiefner-Burmeister and Hinman, 2020).

This paper contributes to the literature on the role of family in children's development in several ways. First, while most studies focus on a single or narrow set of outcomes, we emphasize the multidimensional nature of children's human capital development by examining the association between the family environment and a wide range of child outcomes. These include: (i) school grades in mathematics, native language, and first foreign language; (ii) socio-emotional and psychological well-being, assessed using the Strengths and Difficulties Questionnaire (SDQ) along with additional measures of self-esteem and social integration; and (iii) healthy weight, proxied by Body Mass Index (BMI). Second, we analyze the relative importance of parenting style, parental involvement, and socio-economic background in relation to children's outcomes. Specifically, we investigate whether the various dimensions of the home environment act as compensatory, additive, or both types of dynamics in children's development, exploring whether good parenting can offset the disadvantages of a poor socio-economic background, and whether these factors instead combine in an independent additive manner, thereby deepening inequalities. Finally, we extend the analysis by incorporating a gender perspective, assessing whether the associations between home environment dimensions and children's outcomes differ for boys and girls.

The empirical analysis relies on data from waves 8, 10, 12, and 14 of the German Family Panel (pairfam), a multidisciplinary survey that provides a rich set of information on child development and the characteristics of the home environment. We apply Latent Class Analysis (LCA) to identify latent family types based on factors characterizing the family environment in terms of socio-economic background, parenting style, and family involvement in children's educational and learning activities. We identify four latent family types, characterized by high- or low-quality parenting and high or low socio-economic background, in which parental involvement does not form a separate dimension in the final typology.

Our findings suggest that child development is a complex process, with distinct patterns of association between different dimensions of the home environment and various children's outcomes. Socio-economic background is more strongly associated with school performance, social integration, and maintaining a healthy weight than parenting practices, which do not appear to offset the disadvantages linked to lower socio-economic status in these outcomes. By contrast, parenting style shows stronger associations with outcomes such as self-esteem and psychological well-being. In these domains, the results suggest a compensatory dynamic, in that good parenting can help mitigate the disadvantages of growing up in a poor socio-economic environment. Finally, we observe a few differences in these patterns between boys and girls.

Although our results cannot be interpreted causally, they nonetheless offer valuable insights, indicating that the family socio-economic background and the quality of parenting should be considered together rather than separately, as their interplay is closely associated with patterns observed in children's development.

The remainder of the paper is organized as follows. Sections 2 and 3 present the data and empirical methodology, respectively. Section 4 discusses the results, and Section 5 concludes.

2. Data

We use German pairfam data, a multi-disciplinary survey that collects a rich set of information from a nationwide random sample of more than 12,000 individuals spanning three birth cohorts: 1971–73, 1981–83, and 1991–93, along with their partners, parents, and children.[1] The survey addresses themes such as partnership dynamics, parenthood, intergenerational relationships, parenting and child development, as well as social embeddedness. Due to data availability on children's outcomes, we focus on waves 8, 10, 12, and 14, covering the years from 2015 to 2022. Our sample consists of 1015 boys and girls in late childhood and early adolescence (aged between 10 and 15 at the time of the interview) who live in nuclear families and for whom complete data are available on both outcomes and family characteristics. We cannot include children from single-parent families in our study because information on the non-cohabiting parent is unavailable. Research shows that while mothers and fathers within the same household often share similar parenting goals, their parenting styles may differ due to variations in personality traits, cultural expectations, and the division of parenting roles (Gozu et al., 2020). Moreover, maternal and paternal parenting may have heterogeneous effects on children's outcomes. For instance, Möller et al. (2016) found that paternal parenting had a greater influence on children's emotional well-being, whereas Checa et al. (2019) identified maternal parenting as a key predictor of children's academic performance. We acknowledge that excluding children living in single-parent families is a limitation of our study. However, including them would have required focusing primarily on the parenting style of one parent, typically the mother, which, from our perspective, would also limit the scope of the analysis.[2] Given the growing involvement of fathers in child-rearing, we choose to focus on nuclear families and account for both paternal and maternal influences in children's development.

2.1. Children's human capital

We consider the multifaceted nature of children's human capital, encompassing schooling outcomes, non-cognitive abilities, psychological well-being, and maintaining a healthy weight. Children report this information through the child questionnaire.

Schooling outcomes. These are assessed using school grades in Mathematics, German, and the First foreign language.[3] The German grading system employs a six-tier scale from 6 (*Insufficient*) to 1 (*Excellent*). For ease of interpretation, we reverse-code the scale so that higher values reflect better performance.

Non-cognitive abilities. This dimension refers to self-esteem and social integration. Self-esteem is evaluated using a 3-item scale assessing

[1] Analyses are based on data from the German Family Panel (pairfam), release 14.0 (Brüderl et al. 2023). A detailed description of the study can be found in Huinink et al. (2011).

[2] In pairfam data for the selected waves, among observations with complete information on children's outcomes and family characteristics, 334 children (25 % of the raw sample) live in single-parent families. Notably, only six of these children live with their father.

[3] School grades information is unavailable in the odd-numbered waves, which explains our focus on waves 8, 10, 12, and 14.

self-worth and self-appraisal.[4] Table A1 in the Appendix reports these items, which were answered using a 5-point Likert scale ranging from 1 (*Not at all*) to 5 (*Absolutely*). We sum the responses to create a composite self-esteem score, with higher values indicating greater self-esteem. Social integration, reflecting the child's active inclusion by peers in school or the community, is measured using a 6-item scale (Table A1), also rated on a 5-point scale from 1 (*Not at all correct*) to 5 (*Completely correct*). We sum the scores to create the social integration indicator, where higher values denote greater ability to form meaningful relationships with friends and integrate into social contexts.

Psychological well-being. We use the SDQ, which assesses 25 attributes across five domains: prosocial behavior, emotional symptoms, conduct problems, hyperactivity, and peer problems (Table A1).[5] Children respond on a 3-point scale (0 *Not true*, 1 *Somewhat true*, and 2 *Certainly true*). Following the approach commonly adopted in the psychiatric literature (Goodman and Goodman, 2009), we analyze prosocial behavior separately from behavioral problems. Higher prosocial behavior scores indicate stronger social skills, such as kindness, empathy, and cooperation toward others. Regarding socio-emotional and behavioral problems, the relevant items were reverse-coded such that higher values indicate fewer difficulties. A composite socio-emotional well-being score was then computed by summing these items, with higher scores representing better socio-emotional well-being.

Healthy weight. A healthy weight during adolescence can reduce the risk of obesity and other chronic diseases in adulthood (Schienkiewitz et al., 2018). We define a dummy variable for healthy weight, which is equal to one if the child's BMI is below the 90th age (in months)- and sex-specific World Health Organization percentile (Kromeyer-Hauschild et al., 2001).

Panel A of Table 1 shows descriptive statistics of all dimensions related to child development.

Table 1
Descriptive statistics.

	Mean	St. Dev.	Count
Panel A. Children's outcomes			
Average grade in Mathematics	4.602	0.949	1015
Average grade in German	4.610	0.840	1015
Average grade in First foreign language	4.605	0.874	1015
Self-esteem	10.001	1.596	1015
Social integration	25.152	3.343	1015
Prosocial behavior	8.192	1.706	1015
Socio-emotional well-being	31.200	4.655	1015
Healthy weight (1 = yes)	0.839	0.367	1015
Panel B. Family environment			
High-income family (1 = yes)	0.510	0.500	1015
Highly-educated father (1 = yes)	0.514	0.500	1015
Highly-educated mother (1 = yes)	0.413	0.493	1015
Empathetic father (1 = yes)	0.426	0.495	1015
Empathetic mother (1 = yes)	0.437	0.437	1015
Attentive father (1 = yes)	0.452	0.498	1015
Attentive mother (1 = yes)	0.377	0.485	1015
Consistent father (1 = yes)	0.545	0.498	1015
Consistent mother (1 = yes)	0.566	0.496	1015
Highly-involved family (1 = yes)	0.565	0.496	1015
Panel C. Other children's characteristics			
Early adolescent (1 = 13–15 years old)	0.516	0.500	1015
Female (1 = yes)	0.473	0.500	1015
Birth order	1.689	0.809	1015
West Germany (1 = yes)	0.632	0.483	1015
Urban area (1 = yes)	0.673	0.469	1015
Elementary school (1 = yes)	0.034	0.183	1015
Lower secondary school (1 = yes)	0.036	0.188	1015
Medium secondary school (1 = yes)	0.240	0.428	1015
Higher secondary school (1 = yes)	0.547	0.499	1015
Comprehensive, vocational, other school (1 = yes)	0.142	0.349	1015

2.2. Family environment

Our main explanatory variable is the type of family in which the child lives. We use LCA to identify latent family types based on information from the anchor and parenting questionnaires, focusing on the parents' socio-economic status, parenting style, home-based involvement and effort in their child's educational and learning activities (Table 1, Panel B).[6] All variables characterizing the home environment are one-year lagged with respect to child outcomes to avoid reverse causality. However, this approach does not fully eliminate endogeneity due to unobserved heterogeneity. Parenting style in year $t-1$ may still be influenced by child outcomes in year $t-2$, which are themselves shaped by even earlier outcomes and parenting styles in year $t-3$. As such, this dynamic process complicates the causal interpretation of our results, which remain correlations in nature.

Family Socio-Economic Status (SES). The indicators measuring family SES include dummy variables for a highly-educated mother (i.e., having at least a university degree), a highly-educated father, and living in a high-income family, defined as a family with an equivalized net monthly income above the (in-sample) wave-specific median value. Therefore, families classified as high SES typically feature highly educated parents alongside high household incomes.

Parenting Style (PS). We examine three dimensions: warmth and positive communication, monitoring, and consistent behavior. Warmth and positive communication involve physical affection, active listening, emotional validation, and empathetic interactions with children. Parents respond to six items (Table A2 in the Appendix) on a 5-point Likert scale ranging from 1 (*Never*) to 5 (*Very often*). We sum the scores and define a dummy variable equal to one if the total score is above the (in-sample) median, identifying an empathetic parent (Bertrand and Pan, 2013).

Parental monitoring assesses parents' endeavors to stay informed about their child's whereabouts, friendships, and behaviors. Parents rate four items (Table A2) on a 5-point Likert scale ranging from 1 (*Never*) to 5 (*Very often*). For each parent, we sum the item scores and define a dummy variable equal to one if the total monitoring score exceeds the (in-sample) median, implying an attentive parent.

Consistency in parenting behavior is a crucial aspect of parenting style, reflecting the stability and predictability of a parent's actions and rules. It entails the consistent application of expectations and discipline across time and various situations, providing children with a clear and coherent framework for understanding what is considered appropriate behavior. Consistent parenting is commonly associated with more favorable patterns in children's emotional well-being, behavior, and development (Halgunseth et al., 2013). We assess consistent parenting using a 4-item scale (Table A2). Parents rate all items on a 5-point Likert scale ranging from 1 (*Never*) to 5 (*Very often*). For each parent, we sum the item scores and define a dummy variable equal to one if the total

[4] Questions on self-esteem have been introduced since wave 8, and only for children aged 10 or older.

[5] Prosocial behavior reflects a child's social skills and ability to interact positively with peers. Emotional symptoms encompass feelings of unhappiness and physical manifestations of anxiety. Conduct problems refer to behavioral difficulties characterized by challenges in following rules and exhibiting socially appropriate behavior. Hyperactivity captures issues related to concentration, restlessness, and impulsivity. Peer problems arise when children struggle to establish friendships or experience difficulties in social interactions.

[6] Unfortunately, in the waves we consider, the parenting questionnaire does not include information on the time parents spend in shared activities with their children (e.g., going to the theatre, playing together) or on school-based involvement (e.g., participation in school activities, regular meetings with teachers). Parents influence child development in many ways beyond parenting style, involvement, and economic resources. For example, they choose the neighborhood where the family lives and the schools their children attend, both of which shape the child's social environment and opportunities. Moreover, peer effects are particularly influential during adolescence. Unfortunately, our dataset lacks data on these dimensions.

score exceeds the (in-sample) median, indicating consistent parenting.

Family effort. This measures parental involvement and interests in children's education, based on three items evaluating supervision and engagement in school-related activities (Table A2). Items are rated from 1 (*Daily*) to 6 (*Never*), and then reverse-coded. We sum the scores and define a dummy variable equal to one if at least one parent's score is above the (in-sample) median, identifying a highly involved family.[7]

3. Methodology

Our empirical methodology unfolds in two distinct stages. First, we run an LCA to identify latent family types that represent well-defined family environments, i.e., specific combinations of family SES, PS, and effort. Second, we use the identified latent family types as independent variables to examine their correlation with each of the children's outcomes outlined in Section 2.1.

3.1. Latent class analysis

Latent class models, introduced in the 1950s, gained popularity following the work by Goodman (1974). His contributions enabled the application of these models in various economic settings by developing algorithms for obtaining maximum likelihood estimates of the model parameters (Cameron and Trivedi, 2005; Vermunt, 2022).

The basic idea behind these models is that observed individuals represent draws from a population containing a finite number of latent classes, typically referred to as types (Aitkin and Rubin, 1985). Hence, latent class models decompose the observed joint distribution of observed and unobserved characteristics into a finite number of sub-population types, capturing the underlying unobserved heterogeneity. Importantly, these models offer researchers the flexibility to avoid specifying the number of latent classes in advance or providing predetermined groupings based on observed characteristics.[8]

Let $X_i = (X_{i1}, \ldots, X_{iJ})$ denote the vector of J observed indicator variables for individual i, capturing different dimensions of the family environment. Latent class models assume that the joint distribution of these indicators reflects an underlying latent family type F_i, where $F_i \in \{1, \ldots, K\}$, and the population consists of K unobserved family types (Goodman, 1974; Chan and Koo, 2011; Li Donni et al., 2015). The probability that an individual belongs to latent family type f is given by:

$$\Pr(F_i = f) = \frac{\exp(\alpha_f)}{\sum_{h=1}^{K} \exp(\alpha_h)}, \quad f = 1, \quad \ldots, \quad K, \tag{1}$$

where the α_f parameters are estimated from the model (Li Donni et al., 2015).[9]

The typical approach for performing an LCA involves a two-step process. The first step identifies the number of latent types in the data, while the second step estimates the probability of each individual belonging to each latent type given the observed characteristics. More specifically, the first step involves a step-wise process that begins with estimating a one-class model and then progressively includes one additional class at a time. Then, the most adequate number of latent types corresponds to the model with the lowest Bayesian Information Criterion (BIC). The second step uses model estimates to calculate for each individual with observed characteristics X_i, the posterior probability of belonging to type f using Bayes' rule:

$$\Pr(F_i = f|X_i) = \frac{\Pr(F_i = f)\Pr(X_i|F_i = f)}{\sum_{h=1}^{K} \Pr(F_i = h)\Pr(X_i|F_i = h)}, \tag{2}$$

where $\Pr(X_i|F_i = f) = \prod_{j=1}^{J} \Pr(X_{ij}|F_i = f)$. Then, using modal assignment, each individual is associated to the type with the highest $\Pr(F_i = f|X_i)$ probability (Vermunt and Magidson, 2004).[10]

3.2. OLS regression analysis

The second stage of our analysis involves examining the correlation between the identified family types and each specific outcome of child development. We estimate the following OLS specification:

$$Y_i = \delta + \beta F_i + \gamma Z_i + \epsilon_i, \tag{3}$$

where Y_i denotes the specific outcome of child i, F_i is a categorical variable indicating the latent family type, and Z_i is a vector of additional control variables. These controls include wave-fixed effects and child-specific characteristics such as age, gender, birth order, residence in West Germany, urban or rural location, and school type attended. Panel C of Table 1 reports summary statistics for these variables.

To investigate whether and to what extent the effect associated with the latent family type varies by child's gender, we augment model in Eq. (3) with interaction terms between the family type dummies and a gender dummy. Standard errors are clustered at the family level, and we use the estimated posterior probability of belonging to the assigned latent family type as a weight to account for the fact that the type is not directly observed.

4. Results

4.1. Latent family types

LCA identifies four distinct types of family environment, i.e., four latent family types.[11] Fig. 1 illustrates the probability distribution of each indicator variable used in the LCA, disaggregated by latent family type. Distinct patterns emerge across family types with respect to SES and PS. High SES families are characterized by highly educated parents and above-median household incomes, while low SES families show the opposite pattern. Families characterized by a high-quality PS show a higher probability of having empathetic, attentive, and consistent parents compared to those with lower-quality PS. Family effort appears to be associated with both lower- and higher-quality PS, as well as with low and high SES. In other words, high family effort does not seem to be exclusive to families with higher SES or higher-quality PS. More specifically, as illustrated in Fig. 1, low SES families, regardless of the quality of their PS, as well as, to a lesser extent, high SES families with high-quality PS, tend to devote more time to supervising homework and

[7] Due to the high number of missing values in the variable measuring parental effort, we define a variable at the family level, rather than separately for each parent.

[8] See Hagenaars and McCutcheon (2002) for a review of the statistical methods developed for the identification of latent classes in a population of interest.

[9] Different link functions have been proposed in the literature to estimate the unobserved number of types, with a logistic specification typically used when the observed characteristics are discrete (Hagenaars and McCutcheon, 2002).

[10] LCA is useful for identifying qualitatively different clusters (types) within a population that share some observed characteristics. In our context, this involves assigning each child to a specific latent family type. An alternative method for reducing data complexity and uncovering patterns is the Principal Component Analysis (PCA). However, while PCA produces continuous principal components that capture variation across dimensions, it does not create distinct clusters. Furthermore, unlike PCA, which relies on assumptions of linear relationships among variables, LCA is grounded in a probabilistic framework and does not impose such assumptions.

[11] Table A3 in the Appendix shows, for each estimated model, the value of the maximized log-likelihood and the BIC. The lowest BIC corresponds to the four-class model.

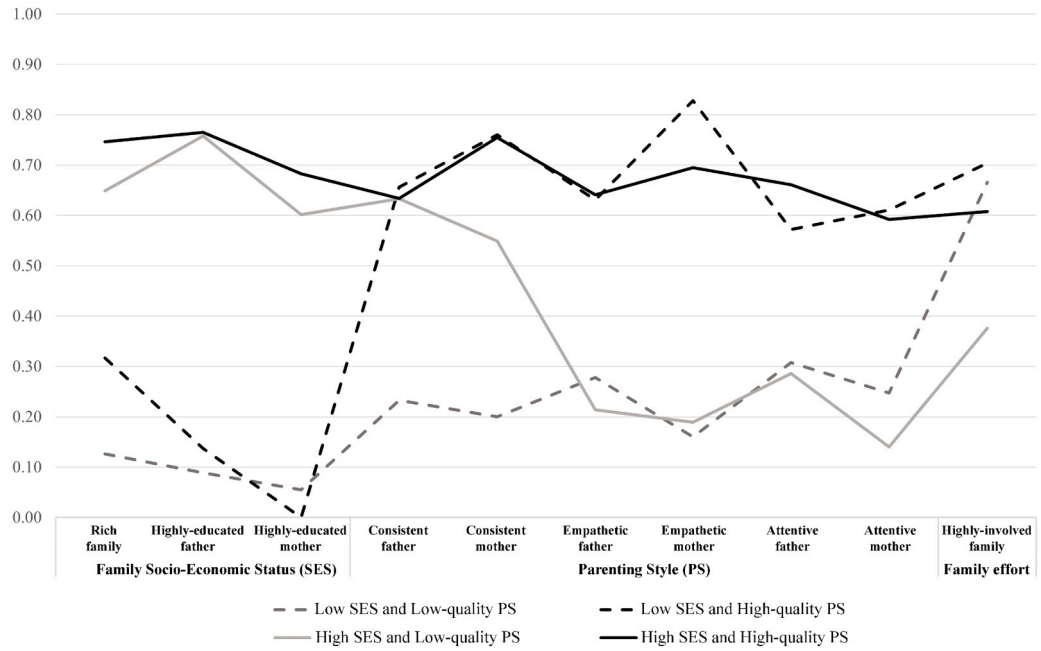

Fig. 1. Latent family types. Note: Results of an LCA based on ten indicator variables. See Section 2.1.2 for the definition of the indicator variables and Table 1, Panel B for descriptive statistics of these indicators.

discussing school-related activities with their children compared to high SES families with lower-quality PS. Overall, this evidence is consistent with Del Boca et al. (2014), who report a negative relationship between household income and parental time investment in child development. This pattern likely reflects the greater labor-market commitments faced by higher-income parents, which constrain the time available for direct engagement with their children and lead them to rely more on market-based substitutes. Similarly, De Fraja et al. (2010) argue that higher SES does not necessarily entail greater parental involvement in children's development.

Based on these patterns, we identify four latent family types that capture variation along both SES and PS dimensions, i.e., *High/Low SES* and *High-/Low-quality PS*. In the best-fitting four-type model, family effort does not emerge as an independent dimension beyond SES and PS; rather, it is conceptually embedded within the broader SES and parenting constructs.

We denote the generic family type as F_{sp} where $s,p = H,L$ refer to SES and PS, respectively. Specifically, F_{LL} represents families with *Low SES and Low-quality PS*, and F_{LH} denotes those with *Low SES and High-quality PS*. Likewise, F_{HL} and F_{HH} correspond to *High SES and Low-quality PS* families, and *High SES and High-quality PS* families, respectively. In our sample, 23 % of families fall into the F_{LL} type, 15 % into F_{LH} type, 31 % each into F_{HL} and F_{HH} types.[12]

The economic, psychological, and sociological literature emphasizes the significant role of family background in shaping children's human capital development. Children from socio-economically advantaged families have better opportunities than their peers from disadvantaged backgrounds (Heckman and Mosso, 2014). At the same time, good parenting, with parents engaging in collaborative problem-solving, establishing clear rules, and maintaining open communication, is positively associated with children's outcomes (Dooley and Stewart, 2007; Ermisch, 2008; Chan and Koo, 2011). In other words, various factors within the family environment, i.e., material resources (proxied here by parents' higher education and family income), together with parental effort, and parenting style, play distinct roles in determining children's development (Heckman, 2011; Cobb-Clark et al., 2019). We assess the importance of these factors in the following hypotheses:

Hypothesis 1. *(The importance of PS): Given the same family SES s, children in* F_{sH} families are expected to achieve better outcomes than those in F_{sL} families, with $s = L,H$.

Hypothesis 2. *(The importance of SES): Given the same PS p, children in* F_{Hp} families are expected to achieve better outcomes than those in F_{Lp} families, with $p = L,H$.

The first hypothesis posits that, holding family SES constant, children whose parents exhibit higher-quality parenting are expected to show more favorable outcomes than those whose parents display lower-quality parenting. The second hypothesis states that, across both high- and low-quality parenting contexts, children from higher socio-economic backgrounds are expected to have better outcomes than those from lower socio-economic backgrounds. In other words, we expect children from F_{LH} to exhibit better outcomes than those from F_{LL} (based on Hypothesis 1) and children from F_{HH} are expected to outperform those from F_{LH} (based on Hypothesis 2).[13] When both verified, these expectations reveal an additive pattern that we refer to as *additive dynamics*. Specifically, children from the most favorable family environments F_{HH}, characterized by both a high socio-economic background and high-quality parenting, are expected to achieve better outcomes than those from the least favorable environments F_{LL}, which combine low socio-economic background with low-quality parenting. This leads to the formulation of the following hypothesis:

Hypothesis 3. *(Additive dynamics): Children in* F_{HH} families are expected to achieve better outcomes than children in F_{LL} families.

The comparison between the role of parenting style (Hypothesis 1) and that of family socio-economic background (Hypothesis 2) in child

[12] As a robustness check, we estimated the LCA using continuous variables for the dimensions of parenting style. The analysis identified five *latent family types*, which overlap in approximately 80 % of cases with those obtained using discrete variables in the LCA.

[13] In parallel, children from F_{HH} are expected to achieve better outcomes than those from F_{HL} (based on Hypothesis 1) and children from F_{HL} should have better outcomes than those from F_{LL} (based on Hypothesis 2).

development makes it possible to assess whether a good quality of parenting style can compensate for a disadvantaged socio-economic context or, conversely, whether a bad parenting style can diminish the benefits associated with a more favorable socio-economic background. Based on these considerations, we formulate the following hypothesis on the relative importance of SES and PS in shaping children's development, which we interpret in terms of *compensatory dynamics*:

Hypothesis 4. *(Compensatory dynamics): If PS has a stronger association with child outcomes than family SES, children in* F_{LH} families are expected to achieve better outcomes than those in F_{HL} families.

To illustrate this comparison, we first consider the outcome of a child from an F_{LL} family (i.e., the most disadvantaged family type). The potential protective role of higher-quality parenting can be examined by comparing this outcome to that of a child raised in a socio-economically disadvantaged family but with higher-quality parenting, i.e., an F_{LH} family (Hypothesis 1). Similarly, the potential protective role of higher SES can be assessed by comparing the outcome of the child in an F_{LL} family to that of a child from a family with low-quality parenting but higher SES, i.e., an F_{HL} family (Hypothesis 2). If PS is more strongly associated with the outcome than SES, we would expect a child in an F_{LH} family to exhibit a more favorable outcome than a child in an F_{HL} family, suggesting that high-quality parenting may partly compensate for the disadvantages of a lower socio-economic context.

4.2. OLS estimation

Fig. 2 displays predicted values for each outcome by latent family type (on the horizontal axis) along with their 95 % confidence intervals. Table 2 shows pairwise comparisons of predicted outcomes and results of the hypothesis testing.[14]

To evaluate our hypotheses, we examine the predicted outcomes and their associated confidence intervals across the different family types. Specifically, to test Hypothesis 1, we analyze the difference in the predicted outcomes at F_{LH} and F_{LL} for *Low SES* families, and F_{HH} and F_{HL} for *High SES* families. A positive difference indicates that higher-quality PS corresponds to better outcomes for children within a given SES. Similarly, Hypothesis 2 is assessed by comparing the predicted outcomes at F_{HL} and F_{LL} for families with *Low-quality* PS, and F_{HH} and F_{LH} for families with *High-quality* PS. Hypothesis 3 is examined by comparing the predicted outcomes for children from the most advantaged (F_{HH}) and most disadvantaged (F_{LL}) family types. Finally, to explore the relative importance of PS and SES (Hypothesis 4), we compare the predicted outcomes at F_{LH} and F_{HL}. Note that if the importance of PS in a child outcome, measured by the difference $F_{LH} - F_{LL}$ (Hypothesis 1), is greater than the importance of SES, measured by the difference $F_{HL} - F_{LL}$ (Hypothesis 2), then a *High-quality PS* can compensate for the disadvantages of living in a *Low SES* family. In this case, a child from an F_{LH} family would score better in that outcome than a child from an F_{HL} background.

In what follows, we will state that our results support a specific hypothesis when the observed difference in children's outcomes between family types is both consistent with the hypothesis and statistically significant (i.e., p-value ≤ 0.05). When the difference aligns with the hypothesis but is not statistically significant, we will say that the results partially support the hypothesis. In all other cases, we will conclude that the results do not support the hypothesis, distinguishing between statistically significant and non-significant findings.

Schooling outcomes. Results support Hypothesis 1 in two cases: for German and First foreign language in *High SES* families. In the remaining cases, the hypothesis receives partial support, indicating that good parenting practices are associated with better outcomes within a given SES, albeit without statistical significance.

The results provide strong support for Hypothesis 2, indicating that family SES is significantly and meaningfully associated with children's higher schooling achievement.[15]

The results confirm Hypothesis 3, as children from F_{HH} families achieve significantly higher grades than their counterparts from F_{LL} backgrounds in all three school subjects. These results suggest that growing up in a *Low SES* and *Low-quality PS* family is a risk factor for children's poor schooling performance.

Lastly, empirical results do not provide support for Hypothesis 4. Indeed, on average, children from F_{HL} families achieve higher grades than their counterparts from F_{LH} families, with the difference being statistically significant in Mathematics and German. This finding suggests that good parenting is not sufficient to mitigate the adverse effects of living in a *Low SES* family. However, this does not discount the relevance of good parenting practices in children's schooling outcomes. Such practices, indeed, are associated with improved schooling performance (Hypothesis 1 is generally partially supported) and contribute to widening the gap in schooling achievements between children raised in the most advantaged and disadvantaged family backgrounds (Hypothesis 3).

Non-cognitive abilities. The results for self-esteem and social integration differ remarkably. For self-esteem, the findings support Hypotheses 1, 3, and 4, partially support Hypothesis 2 for children from *Low-quality PS* families, and do not support the same hypothesis for children from *High-quality PS* families. These results suggest that good parenting practices are more important than the family socio-economic background in fostering positive self-perceptions and feelings in children. In addition, they suggest that positive parenting can help mitigate the disadvantages of growing up in a *Low SES* environment.

Regarding social integration, the analysis supports Hypothesis 3, provides partial support for Hypotheses 1 and 2, and does not support Hypothesis 4. The inspection of Fig. 2 reveals that, qualitatively, the pattern for social integration and schooling outcomes is similar, whereas it differs from that of self-esteem. Therefore, for social integration, good parenting does not appear to mitigate the disadvantages of growing up in a *Low SES* family.

Overall, the evidence for non-cognitive outcomes suggests that children's self-esteem is largely associated with the quality of parent-child interactions, while social integration is somewhat more related to family socio-economic background. In this regard, Pinquart and Gerke (2019) argue that high parental warmth fosters positive regard and self-acceptance, while parental demandingness promotes competence and achievement, both of which are key sources of self-esteem (see also Barber et al., 1992). Additionally, in line with our results, Birndorf et al. (2005) reported that positive family communication, rather than parental involvement or education, predicts higher self-esteem.

[14] Table OA1 in the Online Appendix shows the complete set of OLS regression results. Figure OA1 in the Online Appendix presents OLS estimates for family-type dummy variables using standardized outcome measures. Because our study relies on self-reported data, measurement error is a potential concern. Misreporting in the independent variables related to the family environment can lead to attenuation bias, reducing the magnitude of the estimated coefficients and potentially yielding non-significant results even when true effects exist. Null findings should therefore be interpreted with caution. To assess the relevance of potential errors-in-variables bias, we re-estimated our models assuming different values for the reliability parameter for family-type dummies, ranging from 0.80 to 0.90. The reliability parameter indicates the proportion of the observed regressor's variation attributable to true variation. For instance, a reliability coefficient of 0.85 implies that 85 % of the variation in the observed regressor reflects true variation, while the remaining 15 % is attributable to measurement error. The results remain largely unchanged in terms of both statistical significance and conclusions of the hypothesis tests. Full results are available from the authors upon request. For details on estimating errors-in-variables regressions, see Lockwood and McCaffrey (2020).

[15] Only for First foreign language in *Low-quality* PS families, results partially support Hypothesis 2.

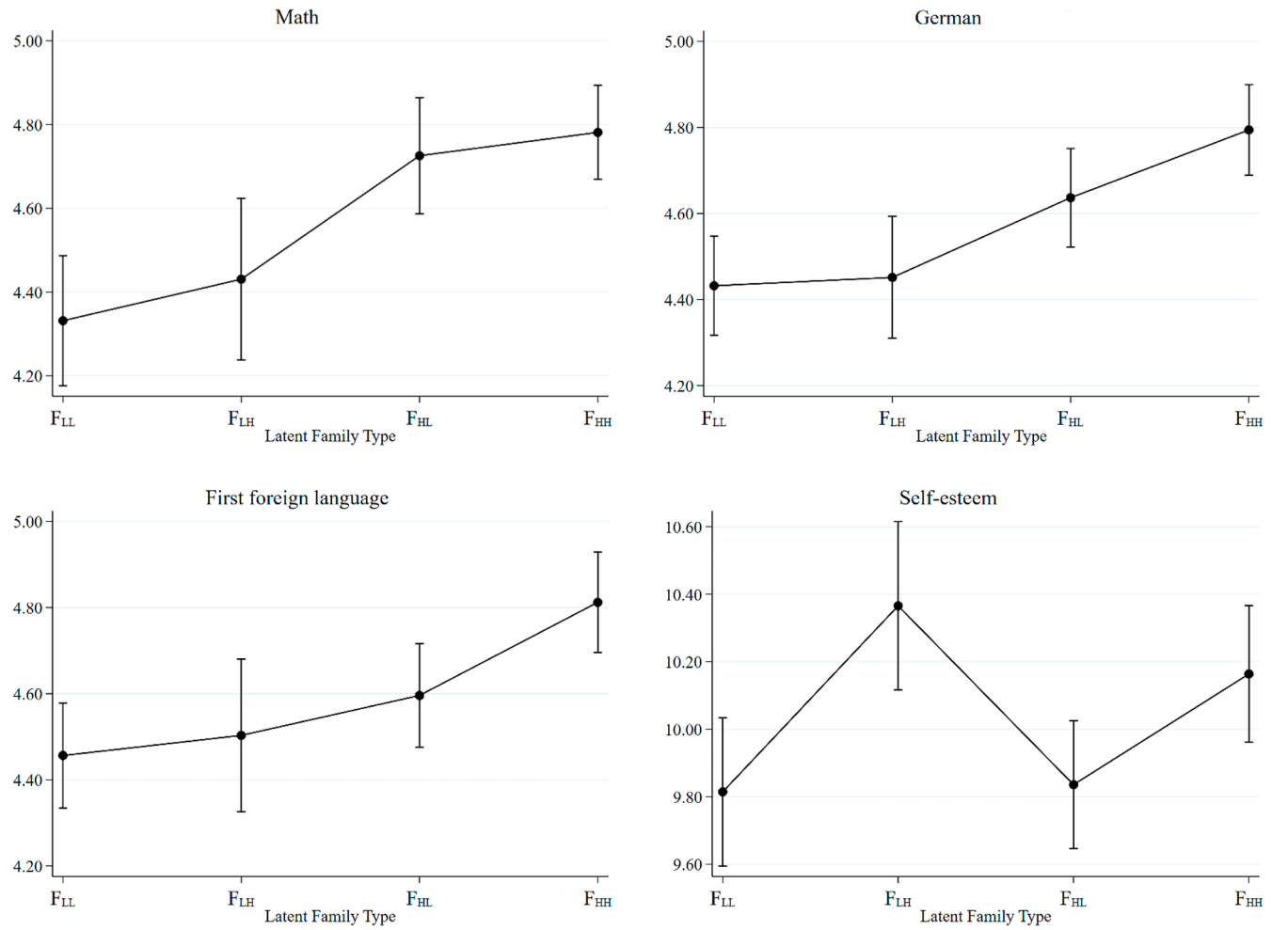

Fig. 2. Predicted outcomes by latent family type. Note: Predicted outcomes and 95 % confidence intervals based on OLS estimates (Table OA1 in the Online Appendix). On the horizontal axis, latent family types are: F_{LL} = *Low SES and Low-quality PS*, F_{LH} = *Low SES and High-quality PS*, F_{HL} = *High SES and Low-quality PS*, F_{HH} = *High SES and High-quality PS*.

Regarding social integration, Martínez-Ferrer et al. (2019) found that high-quality parenting is linked to greater social integration in children, although the effect was not statistically significant. As noted by Bradley and Corwyn (2002), family SES may influence children's social integration by shaping their access to resources, extracurricular opportunities, and broader social networks.

Psychological well-being. The results for prosocial behavior provide support for Hypotheses 1, 3, and 4, and partial support for Hypothesis 2. Regarding socio-emotional well-being, the findings support Hypothesis 1 in *High SES* families and 3, while providing partial support for Hypothesis 1 in *Low SES* families, as well as Hypotheses 2 and 4. These findings qualitatively align with the pattern observed for self-esteem, indicating that PS plays a crucial role in shaping both children's behavioral outcomes and their self-esteem (Singh, 2017; Garcia and Serra, 2019; Repetti et al., 2002).

Healthy weight. The results provide partial support for Hypotheses 2 and 3, but no support for Hypotheses 1 and 4. Overall, the evidence indicates that children from *High SES* families are more likely to maintain a healthy weight than those from *Low SES* families, while PS appears to play no significant role. This pattern is consistent with the existence of a socio-economic gradient in children's weight, as documented in previous studies (Martínez-Vizcaíno et al., 2015; Akkoyun-Farinez et al., 2018). Family SES shapes the behaviors and lifestyle patterns that influence children's weight. In particular, parents with higher levels of education are better equipped to understand and apply health information, enabling them to make healthier decisions regarding their children's diets and daily routines. This includes encouraging healthier eating habits (such as limiting sugar-sweetened beverages and ensuring regular breakfast), reducing screen time, and promoting regular physical activity, all key factors in preventing childhood obesity (Seum et al., 2022). The lack of an association between children's BMI and PS has also been reported in several empirical studies (see Kiefner-Burmeister and Hinman, 2020, for a review).

To summarize, children from the most advantaged family type (F_{HH}) experience significantly better outcomes than those from the most disadvantaged environment (F_{LL}), except for healthy weight. This overall pattern supports Hypothesis 3, which posits the existence of additive dynamics between PS and SES. Two key patterns emerge from the analysis. First, results indicate that family SES is the primary driver of schooling outcomes, providing general support for Hypothesis 2. Second, in the domains of self-esteem, prosocial behavior, and socio-emotional well-being, good parenting is a more relevant determinant of these outcomes, generally confirming Hypothesis 1. Lastly, good parenting helps mitigate the disadvantages associated with a *Low SES* background, thus supporting (or partially supporting) Hypothesis 4 for self-esteem and prosocial behavior (socio-emotional well-being). This suggests that, for these outcomes, compensatory dynamics exist between SES and PS, such that children from F_{LH} families perform better than those from F_{HL} families. The opposite pattern, however, emerges for schooling outcomes, social integration, and maintaining a healthy

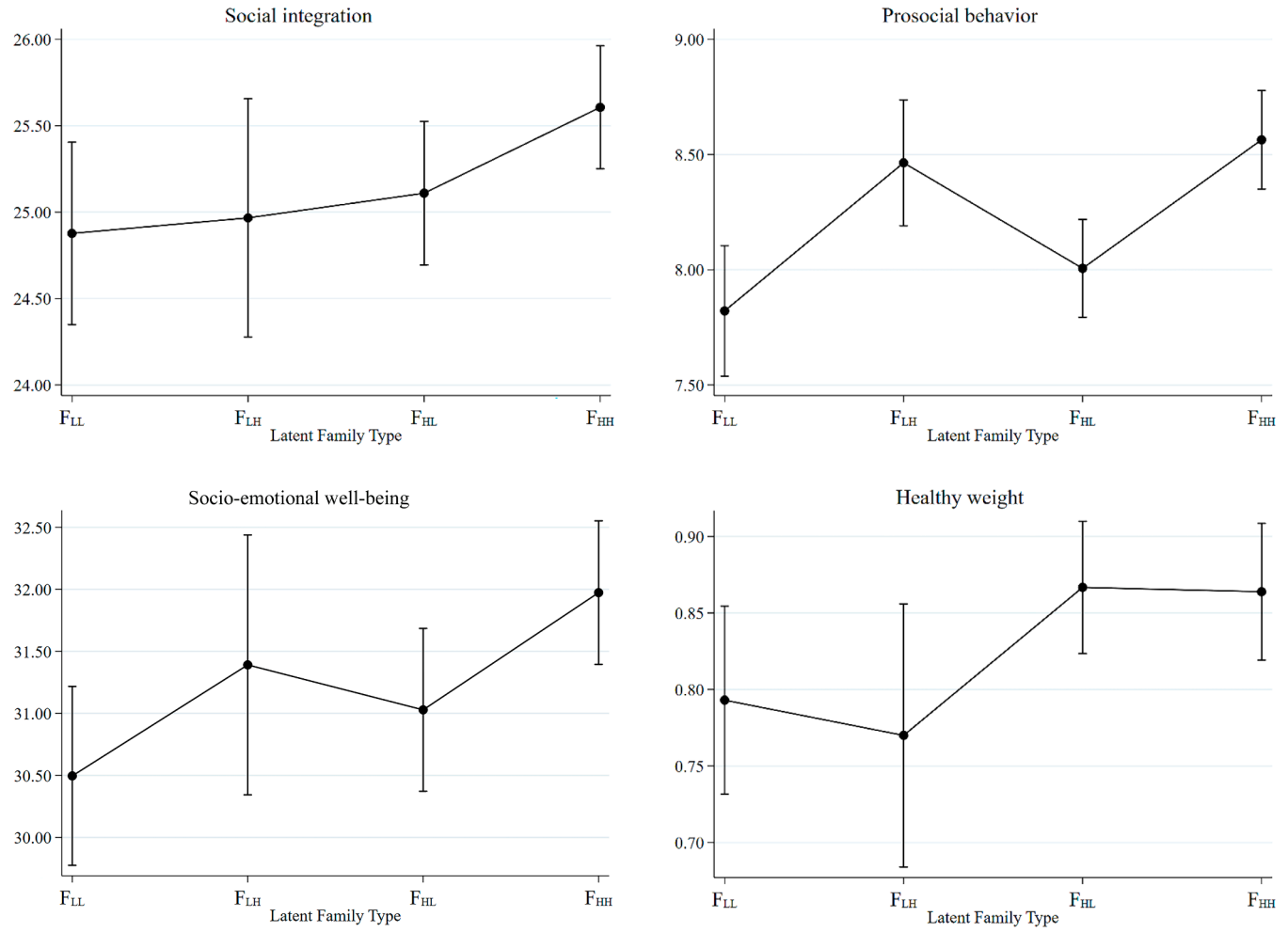

Fig. 2. (*continued*).

weight.

To explain these differing compensatory dynamics across outcomes, we refer to Fig. 1, which shows that F_{HL} families exhibit particularly low levels of family involvement combined with low empathy and attentiveness, features typically associated with a neglectful PS. Such a style has been widely linked to adverse outcomes for children (Pinquart and Gerke, 2019). The heterogeneity observed between children from F_{LH} and F_{HL} families across outcomes can be explained by the different substitutability of parental inputs through market-based resources. For schooling outcomes, parents can rely on external supports such as childcare services, private tutors, or high-quality educational materials, which can partially compensate for limited parental involvement and still yield satisfactory school performance. Similarly, parents of rich SES families can facilitate children's social integration by providing access to extracurricular activities and diverse social networks. In contrast, affection, attention, and emotional support, which are crucial for self-esteem and psychological well-being, cannot be externally substituted, leaving children from F_{HL} families at a disadvantage in these domains compared to children from F_{LH} families.

Fig. 3 displays the linear predictions of children's outcomes by latent family type and child's gender, along with 95 % confidence intervals, while Tables A4 and A5 in the Appendix show the results of the hypothesis testing for boys and girls, respectively.[16]

Overall, the results for hypothesis testing, as discussed for the entire sample, generally align qualitatively with those obtained for the subsamples of boys and girls. We discuss only the hypotheses for which the results differ by gender. Specifically, for schooling outcomes (German and First foreign language), Hypothesis 1 is supported only for girls from *High SES* families. Living in F_{LL} families appears to be a risk factor for lower self-esteem among girls. However, within *Low SES* contexts, a high-quality PS may foster self-worth and positive self-appraisal, thereby supporting Hypothesis 1. Furthermore, the results for girls only support Hypothesis 4, indicating the existence of compensatory dynamics between PS and SES for this outcome. Boys from F_{LL} families are particularly at risk of low prosociality, and for this group only, the results support Hypothesis 3. Finally, with regard to BMI, living in a *High SES* family appears to serve as a protective factor for maintaining a healthy weight exclusively among girls.

We now discuss gender differences in outcomes by family type. OLS estimations (see Table OA1 in the Online Appendix) indicate that girls outperform boys in both German and First foreign language, as well as exhibit better social functioning (including higher levels of social integration and prosocial behavior) and maintain a healthy weight, although they report lower levels of self-esteem. Table OA3 in the Online Appendix presents the gender gap in each outcome by latent family type, based on OLS estimates presented in Table OA2. This analysis provides further insights to complement the information presented in Fig. 3, helping to assess whether the observed gender gap within each family type is statistically significant. The gender gaps in German and First foreign language are significant across all family types, with girls

[16] These estimates stem from incorporating interaction terms between the latent family-type dummies and the child's gender dummy into the baseline model, as shown in Eq. (3).

Table 2
Pairwise comparisons of predicted outcomes for hypothesis testing.

Hypothesis	Comparison	Difference (St. Err.)		P-value	Test	Difference (St. Err.)		P-value	Test
		Math				**German**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.099	(0.121)	0.411	✓	0.019	(0.090)	0.831	✓
High SES	$F_{HH} - F_{HL}$	0.056	(0.086)	0.519	✓	0.158	(0.078)	0.043	✓*
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.394	(0.106)	0.000	✓*	0.204	(0.083)	0.014	✓*
High-quality PS	$F_{HH} - F_{LH}$	0.351	(0.116)	0.003	✓*	0.343	(0.088)	0.000	✓*
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.450	(0.098)	0.000	✓*	0.362	(0.081)	0.000	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.295	(0.122)	0.016	×*	-0.185	(0.091)	0.044	×*
		First foreign language				**Self-esteem**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.047	(0.102)	0.646	✓	0.551	(0.169)	0.001	✓*
High SES	$F_{HH} - F_{HL}$	0.216	(0.085)	0.012	✓*	0.328	(0.134)	0.014	✓*
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.139	(0.088)	0.115	✓	0.021	(0.147)	0.885	✓
High-quality PS	$F_{HH} - F_{LH}$	0.309	(0.110)	0.005	✓*	-0.202	(0.166)	0.225	×
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.356	(0.087)	0.000	✓*	0.349	(0.163)	0.032	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.093	(0.110)	0.401	×	0.530	(0.162)	0.001	✓*
		Social integration				**Prosocial behavior**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.090	(0.418)	0.830	✓	0.643	(0.197)	0.001	✓*
High SES	$F_{HH} - F_{HL}$	0.497	(0.256)	0.053	✓	0.558	(0.141)	0.000	✓*
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.233	(0.338)	0.491	✓	0.185	(0.182)	0.310	✓
High-quality PS	$F_{HH} - F_{LH}$	0.640	(0.393)	0.105	✓	0.100	(0.180)	0.580	✓
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.729	(0.333)	0.029	✓*	0.743	(0.189)	0.000	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.143	(0.407)	0.726	×	0.458	(0.177)	0.010	✓*
		Socio-emotional well-being				**Healthy weight**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.895	(0.625)	0.153	✓	-0.023	(0.049)	0.640	×
High SES	$F_{HH} - F_{HL}$	0.945	(0.428)	0.028	✓*	-0.003	(0.029)	0.923	×
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.533	(0.495)	0.283	✓	0.074	(0.039)	0.060	✓
High-quality PS	$F_{HH} - F_{LH}$	0.583	(0.608)	0.339	✓	0.094	(0.050)	0.062	✓
3 - Additive dynamics	$F_{HH} - F_{LL}$	1.478	(0.493)	0.003	✓*	0.071	(0.040)	0.078	✓
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	0.362	(0.629)	0.565	✓	-0.097	(0.049)	0.050	×*

Note: Test: ✓* = Supported (differences in outcomes between family types are both consistent with the hypothesis and statistically significant with a p-value ≤ 0.05); ✓= Partially supported (difference aligns with the hypothesis but is not statistically significant); ×* = Not supported (difference not consistent with the hypothesis and statistically significant); × = Partially not supported (difference not consistent with the hypothesis and not statistically significant).

achieving significantly higher grades than boys. Notably, these gaps are slightly larger in *High-quality PS* families, suggesting that girls benefit more from high-quality parenting than boys. The gender gap in prosocial behavior is also significant across all family types and is largest in F_{LL} families, where boys appear particularly disadvantaged. Lastly, a significant gender gap in maintaining a healthy weight is found among *High SES* families, indicating that higher family SES serves as a more protective factor for girls than for boys.

4.3. Robustness checks

In the LCA, each child is assigned the family type with the highest probability of belonging. However, in some cases, this assignment may be uncertain, for example, when a child has two latent family types with very similar probabilities. As a robustness analysis, we exclude cases where the difference between the two highest probabilities is less than 20 percentage points and those where the highest probability is below 60 %. This selection leaves us a sample of 839 children (out of 1015). Results based on this sub-sample (Table OA4 – Panel a) are consistent with those of the baseline analysis (Table OA1).

Given the potential correlation between children's outcomes, we estimated a Seemingly Unrelated Regression (SUR) model. Empirical evidence supports this approach, as the Breusch-Pagan test rejects the null hypothesis of independence. The results remain consistent in terms of magnitude and statistical significance with the baseline analysis (Table OA4 – Panel b).

Finally, results are robust to the exclusion of weights, aligning closely with the baseline analysis (Table OA4 – Panel c).

5. Concluding remarks

This study examines the relative importance of different dimensions of the family environment for child development and assesses whether these dimensions display compensatory, additive, or both types of dynamics. The characterization of the home environment, in terms of latent family types, relies on a rich set of attributes encompassing family human capital (as measured by parents' educational level and family income), parenting style (as measured by parents' warmth, monitoring, and consistent behavior), and involvement in children's schooling and learning activities. We consider a comprehensive set of children's outcomes, including schooling performance (i.e., grades in Mathematics, German, and First foreign language), non-cognitive abilities (i.e., self-esteem and social integration), psychological well-being (i.e., prosocial behavior and socio-emotional well-being), and maintaining a healthy weight.

Our results suggest that living in a disadvantaged family

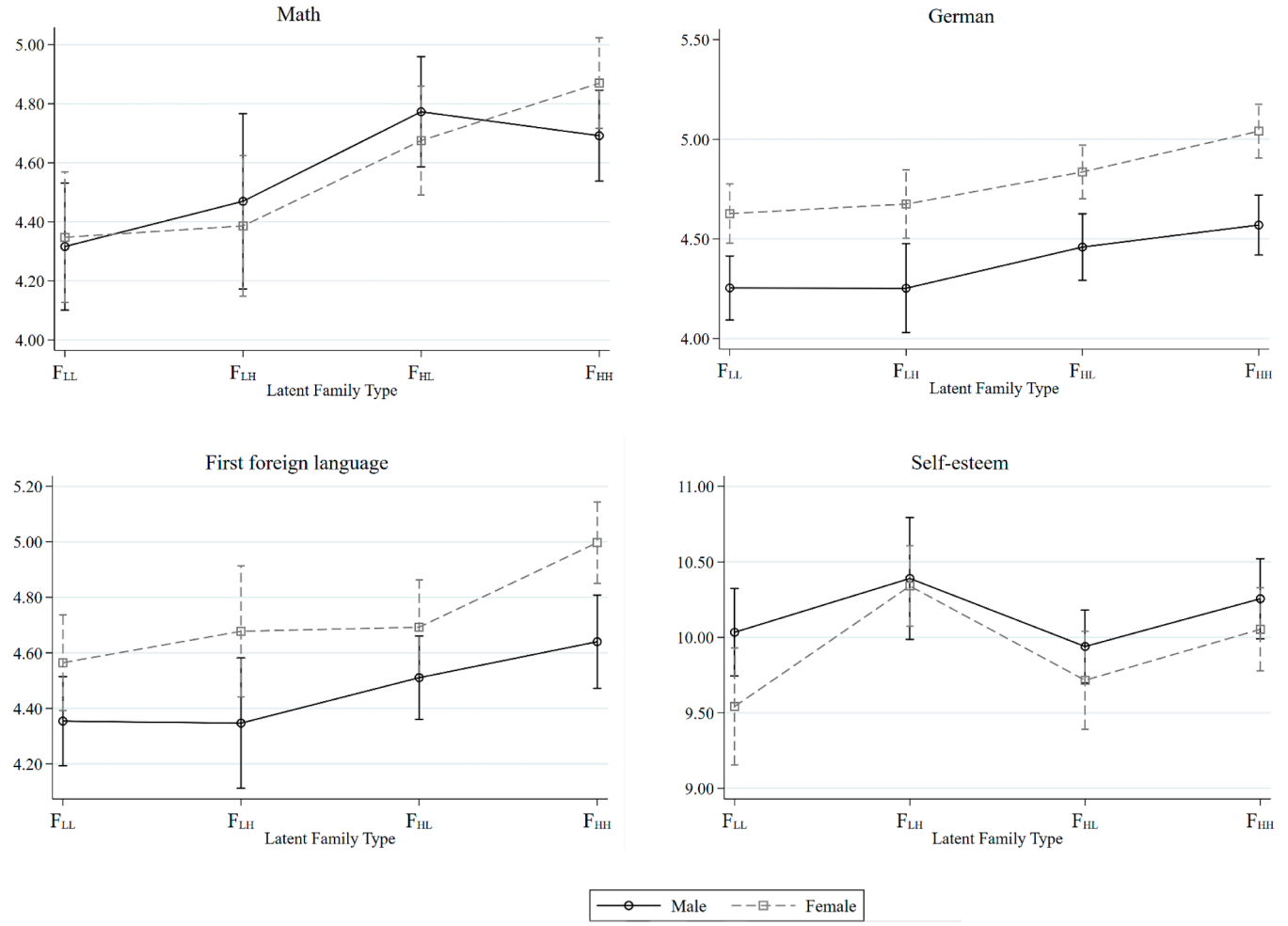

Fig. 3. Predicted outcomes by latent family type and child's gender. Note: Predicted outcomes and 95 % confidence intervals based on OLS estimates (Table OA2 in the Online Appendix). On the horizontal axis, latent family types are: F_{LL} = *Low SES and Low-quality P*, F_{LH} = *Low SES and High-quality PS*, F_{HL} = *High SES and Low-quality PS*, F_{HH} = *High SES and High-quality PS*.

environment, characterized by both low-quality parenting and low socio-economic background, represents a risk factor for child development. Improvements in parenting style or greater availability of economic resources are associated with better outcomes, although the effects vary depending on the outcome considered. In particular, socio-economic background plays a more decisive role in school performance, social integration, and maintaining a healthy weight. Differently, for self-esteem and psychological well-being, the quality of parenting is crucial. For these latter outcomes, in particular, high-quality parenting can compensate for the disadvantage of growing up in a poor SES family. This pattern can be attributed to the fact that, for schooling outcomes, parents can draw on external supports, such as tutoring and structured learning resources, that help compensate for limited parental involvement. Moreover, high SES families are better positioned to foster wider social networks and to support healthy weight maintenance by shaping good dietary habits. In contrast, the emotional warmth, responsiveness, and daily encouragement that are essential for children's self-esteem and psychological well-being cannot be easily outsourced or substituted.

Our results are correlational in nature. Consequently, the direction of the relationships remains open to interpretation, which limits the extent to which these findings can inform policy directly. Nevertheless, some interesting insights emerge from our study. Specifically, family SES appears to be an important driver of children's outcomes, but on its own it is insufficient to ensure adequate human development, especially for children's non-cognitive skills and psychological well-being. It is the interaction between family SES and the quality of parenting, not each factor in isolation, that plays a crucial role in shaping children's developmental trajectories. As Heckman (2011: p. 33) notes: "*The problem is not just income. […] parental income is an inadequate measure of the resources available to a child. Good parenting is more important than cash.*"

Indeed, poor parenting can undermine public policies aimed at enhancing children's development, such as investments in high-quality early childhood education or targeted preschool programs like the HighScope Perry Preschool Program and the Abecedarian Project. These types of programs, while universally available, may inadvertently exacerbate inequalities if more advantaged families are better able to access, utilize, and benefit from them (Heckman and Landersø, 2022). Other interventions, such as the Nurse-Family Partnership, have focused directly on improving parenting skills, working with mothers to enhance their capacity to provide supportive and stimulating home environments. Direct investment in children's outcomes and investment in improving the family environment are distinct, yet complementary, as Heckman observes: "*Improvements in either input improve child outcomes. Improvements in both are the wisest investment*" (Heckman, 2011: pp. 35).

This discussion highlights that the design of educational and public policies must take into account the pivotal role of the family in children's development, given that children spend more time at home than in school and that family influence is multifaceted. Parents shape children's outcomes in several ways, such as selecting neighborhoods, providing access to extracurricular activities, and fostering stimulating

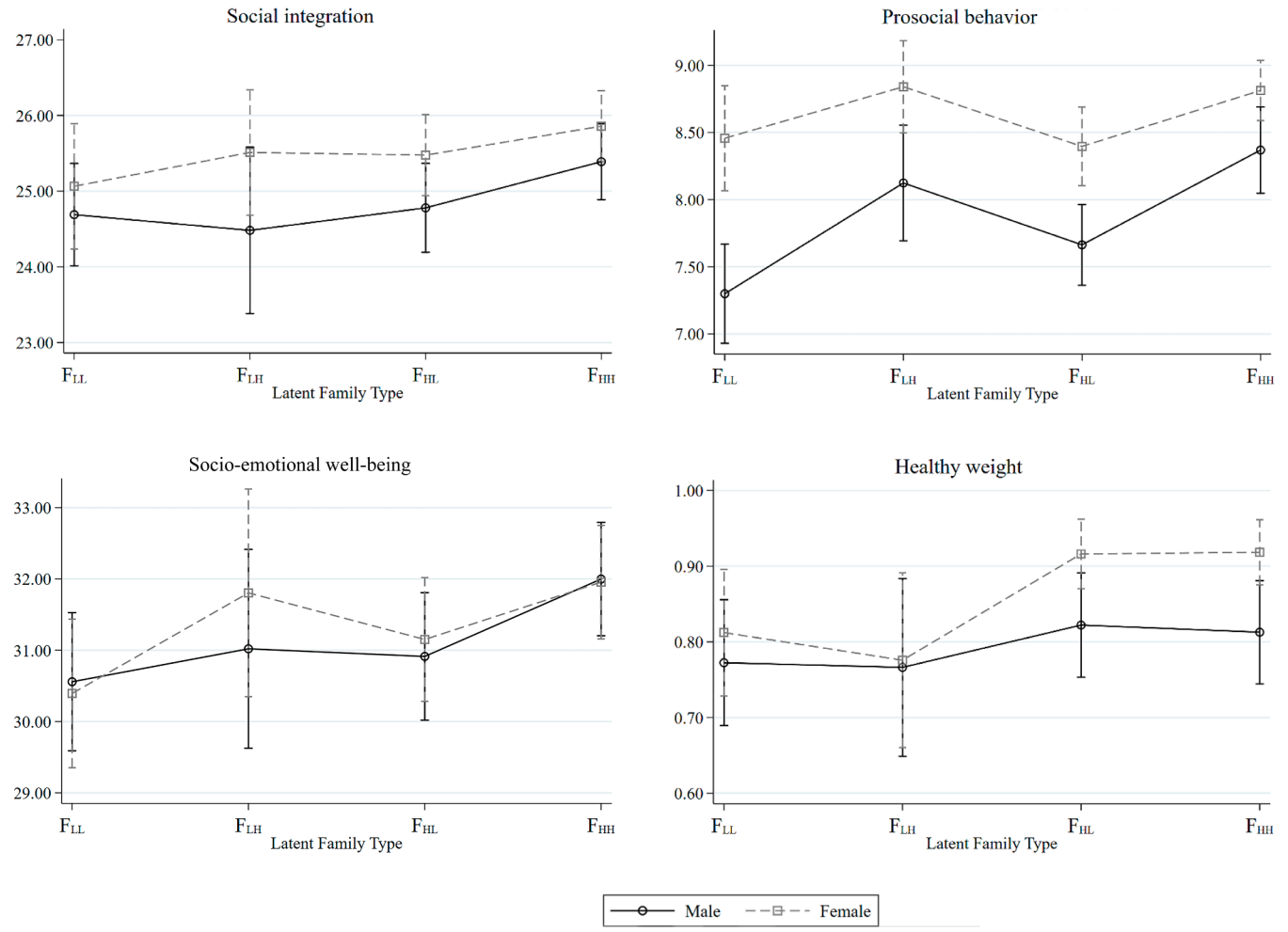

Fig. 3. (*continued*).

social networks, factors often linked to a high SES, as well as through good parenting practices and involvement in children's schooling and learning activities, which are not necessarily associated with a higher SES. The interplay of these family environment dimensions in children's development is complex and warrants further investigation.

CRediT authorship contribution statement

Eleonora Matteazzi: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Vincenzo Prete:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization.

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DEclaration of Competing Interest

The authors have no competing interests to declare that are relevant to the content of this article.

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Appendix

Table A1
Details on items for children's non-cognitive skills and psychological well-being

Outcome	Items
Non-cognitive abilities	
Self-esteem	1. Sometimes I believe that I'm worthless*
	2. I like myself just the way I am
	3. All in all, I am pleased with myself
Social integration	1. I would rather be alone than with others*
	2. I have many friends
	3. It is easy for me to find new friends
	4. Others are mean to me*
	5. Often, others don't let me do things with them*
	6. Often, others don't pay attention to me*
Psychological well-being (SDQ)	
Prosocial behavior	1. I am kind to younger children
	2. I usually share with others (for example, candy, games, markers)
	3. I try to be nice to other people. I care about their feelings
	4. I am helpful if someone is hurt, upset or feeling ill
	5. I often offer to help others (parents, teachers, children)
Emotional symptoms	1. I am nervous in new situations. I easily lose confidence.*
	2. I get a lot of headaches, stomach-aches or sickness*
	3. I have many fears, I am easily scared*
	4. I am often unhappy, depressed or tearful*
	5. I worry a lot*
Conduct problems	1. I get very angry and often lose my temper*
	2. I am often accused of lying or cheating*
	3. I fight a lot. I can make other people do what I want*
	4. I take things that are not mine (from home, schools or elsewhere)*
	5. I usually do as I am told
Hyperactivity	1. I am restless, I cannot stay still for long*
	2. I am constantly fidgeting or squirming*
	3. I am easily distracted, I find it difficult to concentrate*
	4. I think before I do things
	5. I finish the work I'm doing. My attention is good
Peer problems	1. I would rather be alone than with others*
	2. I have one good friend or more
	3. Other people my age generally like me
	4. Other children or young people pick on me or bully me*
	5. I get on better with adults than with people of my age*

Note: * items are reversed when computing the score for each outcome

Table A2
Indicators for parenting style and family effort. Details on items for each dimension

Dimension	Items
Parenting style	
Warmth and positive communication	1. You cheer up your child when he/she is sad
	2. You show your child with words and gestures that you like him/her
	3. You praise your child
	4. You criticize your child*
	5. You tell at your child because he/she did something wrong*
	6. You scold your child because you are angry at him/her*
Monitoring	1. When your child makes new friends, you talk to him/her about them
	2. When your child goes out, you know exactly where he/she is
	3. When your child goes out, you ask what he/she did and experienced
	4. When your child makes new friends, you get to know them soon thereafter
Consistent parenting	1. You lessen a punishment or end it early*
	2. On some days you are stricter than on others*
	3. You threaten your child with a punishment but don't follow through*
	4. You find it hard to set and keep consistent rules for your child.*
Family effort	1. Help your child with things that he/she has to do for school
	2. Ask your child what he/she learned at school
	3. Check that your child did his/her homework

Note: * items are reversed when computing the score for each dimension.

Table A3
Estimated latent class models

Model	Observations	Maximized loglikelihood	Degrees of Freedom	BIC
2-class	1015	-6714.65	21	13574.68
3-class	1015	-6604.13	32	13429.79
4-class	1015	-6563.36	43	13424.42

Note: the entropy of LCA on family types is 0.62.

Table A4
Pairwise comparisons of predictive outcomes for hypothesis testing - Boys

Hypothesis	Comparison	Difference (St. Err.)		p-value	test	Difference (St. Err.)		p-value	Test
		Math				**German**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.153	(0.179)	0.392	✓	-0.001	(0.138)	0.991	×
High SES	$F_{HH} - F_{HL}$	-0.081	(0.118)	0.493	×	0.111	(0.115)	0.337	✓
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.456	(0.145)	0.002	✓*	0.205	(0.118)	0.083	✓
High-quality PS	$F_{HH} - F_{LH}$	0.222	(0.172)	0.198	✓	0.317	(0.135)	0.019	✓*
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.375	(0.136)	0.006	✓*	0.316	(0.113)	0.005	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.303	(0.178)	0.090	×	-0.207	(0.142)	0.145	×
		First foreign language				**Self-esteem**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	-0.007	(0.138)	0.958	×	0.357	(0.252)	0.158	✓
High SES	$F_{HH} - F_{HL}$	0.130	(0.114)	0.257	✓	0.316	(0.179)	0.078	✓
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.157	(0.115)	0.173	✓	-0.094	(0.195)	0.629	×
High-quality PS	$F_{HH} - F_{LH}$	0.294	(0.148)	0.048	✓*	-0.134	(0.243)	0.580	×
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.286	(0.119)	0.016	✓*	0.222	(0.211)	0.293	✓
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.164	(0.143)	0.253	×	0.451	(0.241)	0.062	✓
		Social integration				**Prosocial behavior**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	-0.208	(0.625)	0.740	×	0.825	(0.290)	0.005	✓*
High SES	$F_{HH} - F_{HL}$	0.610	(0.366)	0.096	✓	0.705	(0.215)	0.001	✓*
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.090	(0.448)	0.841	✓	0.364	(0.245)	0.137	✓
High-quality PS	$F_{HH} - F_{LH}$	0.908	(0.610)	0.137	✓	0.245	(0.275)	0.374	✓
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.700	(0.439)	0.111	✓	1.070	(0.259)	0.000	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.297	(0.633)	0.639	×	0.461	(0.267)	0.085	✓
		Socio-emotional well-being				**Healthy weight**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.462	(0.859)	0.591	✓	-0.006	(0.069)	0.929	×
High SES	$F_{HH} - F_{HL}$	1.085	(0.600)	0.071	✓	-0.009	(0.047)	0.843	×
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.355	(0.669)	0.596	✓	0.050	(0.055)	0.362	✓
High-quality PS	$F_{HH} - F_{LH}$	0.978	(0.814)	0.230	✓	0.046	(0.070)	0.506	✓
3 - Additive dynamics	$F_{HH} - F_{LL}$	1.440	(0.649)	0.027	✓*	0.040	(0.056)	0.472	✓
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	0.107	(0.844)	0.899	✓	-0.056	(0.070)	0.423	×

Note: Test: ✓* = Supported (differences in outcomes between family types are both consistent with the hypothesis and statistically significant with a p-value ≤ 0.05); ✓= Partially supported (difference aligns with the hypothesis but is not statistically significant); ×* = Not supported (difference not consistent with the hypothesis and statistically significant); × = Partially not supported (difference not consistent with the hypothesis and not statistically significant).

Table A5
Pairwise comparisons of predictive outcomes for hypothesis testing - Girls

Hypothesis	Comparison	Difference (St. Err.)		p-value	Test	Difference (St. Err.)		p-value	Test
		Math				**German**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.039	(0.158)	0.807	✓	0.048	(0.113)	0.674	✓
High SES	$F_{HH} - F_{HL}$	0.194	(0.115)	0.091	✓	0.205	(0.093)	0.028	✓*
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.327	(0.148)	0.027	✓*	0.209	(0.104)	0.045	✓*
High-quality PS	$F_{HH} - F_{LH}$	0.483	(0.145)	0.001	✓*	0.366	(0.111)	0.001	✓*
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.522	(0.137)	0.000	✓*	0.413	(0.104)	0.000	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.289	(0.155)	0.063	×	-0.161	(0.110)	0.143	×

(*continued on next page*)

Table A5 (*continued*)

Hypothesis	Comparison	Difference (St. Err.)		p-value	Test	Difference (St. Err.)		p-value	Test
		First foreign language				**Self-esteem**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.113	(0.142)	0.427	✓	0.798	(0.239)	0.001	✓*
High SES	$F_{HH} - F_{HL}$	0.305	(0.114)	0.008	✓*	0.337	(0.200)	0.093	✓
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.128	(0.124)	0.303	✓	0.173	(0.254)	0.494	✓
High-quality PS	$F_{HH} - F_{LH}$	0.320	(0.143)	0.026	✓*	-0.287	(0.201)	0.154	×
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.433	(0.116)	0.000	✓*	0.511	(0.244)	0.037	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	-0.015	(0.147)	0.920	×	0.624	(0.216)	0.004	✓*
		Social integration				**Prosocial behavior**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	0.447	(0.588)	0.447	✓	0.383	(0.259)	0.139	✓
High SES	$F_{HH} - F_{HL}$	0.382	(0.346)	0.270	✓	0.416	(0.177)	0.019	✓*
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.411	(0.504)	0.415	✓	-0.061	(0.246)	0.805	×
High-quality PS	$F_{HH} - F_{LH}$	0.346	(0.483)	0.474	✓	-0.028	(0.215)	0.897	×
3 - Additive dynamics	$F_{HH} - F_{LL}$	0.793	(0.486)	0.104	✓	0.356	(0.233)	0.127	✓
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	0.036	(0.498)	0.943	✓	0.444	(0.233)	0.057	✓
		Socio-emotional well-being				**Healthy weight**			
1 - Importance of PS in:									
Low SES	$F_{LH} - F_{LL}$	1.410	(0.892)	0.114	✓	-0.036	(0.070)	0.603	×
High SES	$F_{HH} - F_{HL}$	0.804	(0.554)	0.148	✓	0.002	(0.028)	0.940	✓
2 - Importance of SES in:									
Low-quality PS	$F_{HL} - F_{LL}$	0.757	(0.680)	0.266	✓	0.104	(0.049)	0.035	✓*
High-quality PS	$F_{HH} - F_{LH}$	0.150	(0.851)	0.860	✓	0.143	(0.063)	0.024	✓*
3 - Additive dynamics	$F_{HH} - F_{LL}$	1.561	(0.681)	0.022	✓*	0.106	(0.048)	0.028	✓*
4 - Compensatory dynamics	$F_{LH} - F_{HL}$	0.654	(0.860)	0.448	✓	-0.140	(0.064)	0.028	×*

Note: Test: ✓* = Supported (differences in outcomes between family types are both consistent with the hypothesis and statistically significant with a p-value ≤ 0.05); ✓= Partially supported (difference aligns with the hypothesis but is not statistically significant); ×* = Not supported (difference not consistent with the hypothesis and statistically significant); × = Partially not supported (difference not consistent with the hypothesis and not statistically significant).

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ehb.2026.101584.

Data availability

The authors do not have permission to share data.

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