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Are we what others see? Parental perspective on offspring's personality

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Prologue

Human genetic material is 99.9% identical yet there exist endless variations of human nature. This is due to 0.1% genetic variations as well as psychological differences. The field of interindividual differences investigates how psychological differences between people emerge. Which life choices, experiences, and background characteristics lead to those differences are topics of personality psychology. Manifold research lines all try to capture a similar question: Why are people different from one another? Naturally, life circumstances differ dramatically. While one person gets the opportunity to attend Oxford University and become prime minister, another suffers to feed the family in a South African village. Nobody can decide in which environment they are born into. In which capacity any single person is capable and willing to develop in their environment is the subject of developmental psychology. One aspect of human nature that emerges during the life course is a specific personality. But why is it important to investigate when there are more objective and easily measurable differences in physiological or economic features. For one, it is how people describe themselves. The most widely used personality model was derived from adjectives used to describe human characteristics. Personality, moreover, motivates human behavior. Choosing an activity for Saturday evening, making educational choices, finding a specific partner - all influenced by the personality and enabled by life circumstances. It could be asked then, at which point someone has developed into the person they strive to be. Here, personal interests and values come into play. Normatively postulated expectations also influence humans – no one would strive to become highly neurotic. What parents aspire their children to become or develop into should be a good measure of what a certain society decides to be most desirable. Additionally, certain characteristics facilitate progression in life. A highly agreeable person will certainly find it easier to fit into groups and meet new people. Whether this should be the normative standard, is a socio-philosophical question. Developmentally a highly relevant time, adolescence is the threshold to becoming a self-determined adult. This is a time where

competences, interests, and values develop at a rapid pace. In the midst of it all, a person with a certain personality profile arises. It is also a phase when parental influence starts to wane and social groups become more and more influential. This culminates in an individual ready to make conscious decisions.

What kind of person do highly privileged environments produce compared to underprivileged ones? Beyond evident economic differences, this is also a psychological question. The former might form a confident individual and the latter a worried one. At the same time, the confident individual might feel entitled and lack humility, while the worried one develops strength and resilience to deal with adverse life circumstances. All these characteristics are results of interactions between person and environment (Roberts & Wood, 2006). Environments pose requirements to which individuals react. Reactions stem from stable patterns of thinking and acting. They also reinforce those characteristics with which they correspond. These two pathways constitute the interaction. Personality psychology can contribute to understanding individual formation by illuminating modes of action therein. How interindividual differences are shaped by environmental aspects is of importance both for personality and developmental psychologists, and established the field of personality development. The sociological dimension is rarely considered in psychological research, however it is the nexus of interindividual processes. Individuals live and act in a society from which they are not independent. Modern western societies reproduce capitalist structures that separate the wealthy from the ones in need. This is the background against which the lives of the Oxfordian prime minister and the South African villager are organized. To what extent these societal structures caused those life situations is an economic question. In what way they influence, form, and affect individuals, should, on the other hand, be a psychological one. Sociologists have postulated the concept of *Entfremdung* (Jaeggi, 2016): Individuals feel alienated from their life's fate because they are not the winners of capitalism but the gears that make it run. Psychological investigations of this sociological reality and its psychological consequences are scarce and

difficult to design. It can be approached initially by reviewing existing research under this sociological aspect. It should, furthermore, be addressed by examining the impact of socioeconomic background on psychological constructs such as personality aspects. How are children and their individual differences affected in those sort of familial set ups? A starting point could be to analyze parents' view on their own children depending on the familial socioeconomic background.

The investigation of parental perceptions of their children also bears reference to the fulcrum of personality psychology – Who is a person: the human they describe themselves as or the one others perceive? As such, it is not only of interest how someone becomes who they are, but also how to capture their traits. This, of course, is an issue of universal interest since it relates the fundamental interpretation of human nature. At the beginning of the 20th century, German Neo-Kantian philosopher Ernst Cassirer advocated individual autonomy through active involvement in one's own life instead of the passive witnessing of the manifestation of a predetermined essence, thereby defying conservative metaphysical notions of a "true character of a human being" (Eilenberger, 2020). He postulated that reactions and behaviors in a respective context express the nature of an individual and should therefore constitute the basis of characterizations rejecting concepts of abstract, predestined, and final judgments. Personality questionnaires indeed try to capture emotional, intellectual, and behavioral tendencies. Different contexts, however, in which individuals have the chance to exhibit certain reactions are rarely considered. Perceptions of individuals not only depend on features of the specific perceived trait – internal states are notoriously difficult to observe – but also on the perceiver – not every person, given identical cues, would arrive at the same impression. They should, additionally, be viewed within the context wherein they arise, for example socioeconomic circumstances. All in all, perceiver effects exemplify the complexity of being a human – we exist not only in our mind and the world, but also in the minds of others, ultimately connecting us to each other and the universe.

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Summary

Parental perceptions of their offspring with regard to children's and adolescents' Big Five have, thus far, rarely been investigated. The current dissertation aims at enhancing empirical knowledge in that respect by combining notions from personality and developmental psychology as well as educational sciences into a framework and examining three overarching research questions. Three empirical studies were conducted to explore a) the agreement of parental reports on personality of youth with self- and teacher-reports, b) the interplay of familial socioeconomic background and the unique parental perspective on offspring's personality, as well as c) the role of that parental perspective in their children's academic achievement.

Study 1 employed a CT-C(M-1) model (Eid, 2000; Eid, Lischetzke, Nussbeck, & Trierweiler, 2003) on data from the German National Educational Panel Study (NEPS) examining the lower bound of agreement of parent-reports and adolescents' self-reports on the Big Five. The parental perspective was, moreover, used as a predictor of adolescents' school grades and competences. Results showed differences in congruence of reports in line with theoretical expectations. Parents' unique perspective incrementally predicted the level of as well as change in academic achievement over and above trait illustrating the validity of parental personality reports.

Study 2 focused on parent- and teacher-reports on elementary school students' personality drawing on NEPS data in Sample 1 and the TIMMS-Transition study in Sample 2. Method effects within the CT-C(M-1) model (Eid, 2000; Eid et al., 2003) were investigated in order to gauge associations between familial socioeconomic background and parents' unique perspective. The results revealed that parents with a higher SES described their offspring less favorably than class teachers, but that increased highbrow culture participation was associated with a more positive parental perspective on children's personality.

Study 3 examined latent interactions between parental personality reports and

familial socioeconomic background in the prediction of adolescents' school grades. To do so, the Latent Moderated Structural Equations (LMS) method (Klein & Moosbrugger, 2000) was applied to NEPS data revealing some evidence for positive interactions of parental reports on Openness and Conscientiousness as well as socioeconomic status (SES) with cultural capital in line with the *Matthew effect*. Results also demonstrated strong main effects of these parent-rated Big Five dimensions over and above fluid intelligence, school track, gender, migration status, as well as socioeconomic background.

Taken together, the current dissertation provided evidence for the accuracy of the parental perspective on offspring's personality as parental reports showed agreement with self- as well as teacher-reports in accordance with theoretical predictions. The relatively strong agreement of teacher- and parent ratings on school-relevant personality facets suggests, in particular, that parents possess a high level of expertise with regard to their children's characteristics. The prediction of different measures of academic achievement by the unique parental perspective, furthermore, illustrates its relevance for educational trajectories. This dissertation, additionally, revealed that parents' perspective is not independent of socioeconomic background highlighting the importance of context variables for understanding interindividual differences. The interplay of the parental perspective with socioeconomic background in the prediction of academic achievement, lastly, demonstrates the interconnectedness of *identity*, *reputation*, and *context*. One possible implication might be that the parental perspective could constitute a psychological resource in the development of children's personality. Overall, the present dissertation exemplifies a comprehensive approach to the study of youth personality.

Zusammenfassung

Die elterliche Wahrnehmung der Big Five-Persönlichkeit von Kindern und Jugendlichen ist bisher kaum untersucht worden. Die vorliegende Dissertation zielt darauf ab, die emiprische Evidenz in diesem Bereich zu erweitern und hat hierfür Konzepte aus der Persönlichkeits- und Entwicklungspsychologie sowie Bildungsforschung in einem Framework kombiniert, um damit drei übergreifende Forschungsfragen zu untersuchen. Hierfür wurden drei empirische Studien durchgeführt, die sich mit a) der Übereinstimmung von elterlichen Berichten zur Persönlichkeit Heranwachsender mit Selbst- und Lehrer-Berichten, b) dem Zusammenspiel zwischen familiärem sozioökonomischem Hintergrund und der elterlichen Perspektive auf die Persönlichkeit ihres Nachwuchses, sowie c) der Bedeutung dieser elterlichen Perspektive bei der Vorhersage des akademischen Erfolgs Heranwachsender befassten.

Studie 1 wendete das CT-C(M-1) Modell (Eid, 2000; Eid et al., 2003) auf Daten des deutschen Nationalen Bildungspanels (NEPS) an, um die untere Grenze der Übereinstimmung zwischen Eltern- und Selbstberichten zu den Big Five von Jugendlichen zu untersuchen. Die elterliche Perspektive wurde darüber hinaus zur Vorhersage von Schulnoten und Kompetenzen der Jugendlichen herangezogen. Die Ergebnisse zeigten, dass die Kongruenz beider Berichte übereinstimmend mit theoretischen Vorhersagen variierte. Außerdem sagte die elterliche Perspektive das Niveau von sowie die Änderung im akademischen Erfolg der Heranwachsenden über den Trait hinaus vorher, wodurch die Validität der elterlichen Persönlichkeitsberichte verdeutlicht wird.

Studie 2 befasste sich mit Eltern- und Lehrkraftberichten zu der Persönlichkeit von Grundschüler:innen. Hierfür wurden in Stichprobe 1 NEPS-Daten eingesetzt und in Stichprobe 2 Daten aus der TIMMS-Übergangsstudie herangezogen. Anhand von Methodeneffekten innerhalb des CT-C(M-1) Modells (Eid, 2000; Eid et al., 2003) wurden mögliche Zusammenhänge zwischen familiärem sozioökonomischem Hintergrund und der elterlichen Perspektive untersucht. Es zeigte sich, dass Eltern mit einem höheren SES ihr Kind weniger vorteilhaft beschrieben als Klassenlehrer:innen, aber eine häufigere

Partizipation an Hochkultur mit einer positiveren elterlichen Perspektive auf die kindliche Persönlichkeit verknüpft war.

Studie 3 untersuchte latente Interaktionen zwischen Persönlichkeitsberichten der Eltern und dem familiären sozioökonomischen Hintergrund bei der Vorhersage von Schulnoten von Jugendlichen. Hierfür wurde die Latent Moderated Structural Equations (LMS) Methode (Klein & Moosbrugger, 2000) auf NEPS-Daten angewendet. Dabei wurden Hinweise auf eine positive Interaktion zwischen Elternberichten zu Offenheit und Gewissenhaftigkeit und sozioökonomischem Status (SES) sowie Kulturkapital gefunden, die für den *Matthäus-Effekt* sprechen. Die Ergebnisse zeigten aber auch starke Haupteffekte dieser beiden Persönlichkeitsdimensionen über fluide Intelligenz, Schulform, Geschlecht, Migrationsstatus sowie sozioökonomischen Hintergrund hinaus.

Zusammengefasst lieferte die vorliegende Dissertation empirische Evidenz für die Genauigkeit der elterlichen Perspektive auf die Persönlichkeit ihrer Kinder, da Elternberichte Übereinstimmung sowohl mit Selbst- als auch mit Lehrkraftberichten zeigten, die theoretischen Vorhersagen entsprach. Die vergleichsweise starke Übereinstimmung zwischen Lehrkraft- und Elternberichten zu schulbezogenen Persönlichkeitsfacetten spricht für die hohe Expertise, die Eltern im Bezug auf die Charakteristika ihres Kindes innehaben. Die Vorhersagekraft der elterlichen Perspektive bei verschiedenen Maßen akademischen Erfolgs veranschaulicht weiterhin ihre Relevanz für Bildungsverläufe. Diese Dissertation zeigte zusätzlich, dass die elterliche Perspektive nicht unabhängig vom sozioökonomischen Hintergrund ist, wodurch die Bedeutsamkeit kontextueller Variablen für das bessere Verständnis interinidividueller Unterschiede herausgestellt wird. Das Zusammenspiel zwischen elterlicher Perspektive und sozioökonomischem Hintergrund bei der Vorhersage akademischen Erfolgs illutriert schließlich auch die Verwebung von *Identität*, *Reputation* sowie dem *Kontext*. Mögliche Implikationen könnten sich dadurch ergeben, dass die elterliche Perspektive eine psychologische Ressource bei der Persönlichkeitsentwicklung Heranwachsender darstellen

könnte. Ingesamt exemplifiziert die vorliegende Dissertation eine umfangreiche Herangehensweise für die Erforschung der Persönlichkeit von Kindern und Jugendlichen.

List of empirical papers

Meier-Faust, E., & Watermann, R. (in revision). Parental perspective on adolescents' personality and prediction of academic achievement.

Meier-Faust, E. & Watermann, R. (in revision). Perceiver effects within families: Socioeconomic background and parental perspective on elementary school students' personality.

Meier-Faust, E., Schulze, A., Bergann, S., Daniel, A., & Martin, Y. (in preparation). Independent or interacting: Interplay of personality and socioeconomic background in predicting school achievement.

Two roads diverged in a wood, and I –

I took the less travelled by,

And that has made all the difference.

Robert Frost, The Road Not Taken

Contents

1 Introduction

Parents play an integral role in the development of their offspring from the first moments on. Parental perceptions of their children can have an impact on offspring's self-perceptions and behavior since parents can be seen as "expectancy socializers" (Eccles, 1983): parents communicate their perceptions which, in turn, can shape children's understanding of the world and themselves. While well-studied (Thompson, 2000) by developmental psychologists, little attention has been given to this notion in the field of personality psychology. Although recent conceptualizations of personality state explicitly that not only trait and identity, but also reputation are constitutive parts of it (McAbee & Connelly, 2016), the unique parental perspective on offspring's personality has been rarely investigated thus far.

During childhood and early adolescence, parents can be considered the most acquainted adult informants with regard to offspring's personality. Their reports are, accordingly, used in clinical evaluations and large-scale assessments of youth. While informant discrepancies with regard to children's problem behavior have numerously been addressed (e.g. Achenbach, McConaughy, & Howell, 1987), parental perceiver effects pertaining to the Big Five (Goldberg, 1993) remain largely unexplored. Since the five factor personality structure can be assumed to emerge (Caspi & Shiner, 2006) when children approach school age, parental perceptions of offspring's personality might also surface from this time on and become increasingly relevant in childhood and early adolescence.

The consideration of the context of human development (Bronfenbrenner, 1979) is another aspect that rarely has been taken into account in former research on youth's personality. Children and adolescents develop within the microsystem (Bronfenbrenner, 1979) that encompasses, among others, the family and the school. Specifically, familial socioeconomic background, signifying the societal standing of the family, is assumed to be meaningful for children's psycho-social outcomes (Conger & Donnellan, 2007). The school is, furthermore, a relevant contextual aspect since academic achievement can be viewed as

one main developmental goal for children (Pomerantz & Thompson, 2008). Although parental perceptions of their offspring emerge in this context as well, previous research has rarely considered its associations with the parental perspective. A recent meta-analysis reported small associations between parental socioeconomic status and temperament measures as well as self-reported Big Five (Ayoub, Gosling, Potter, Shanahan, & Roberts, 2018). Examinations of the unique parental perspective and its possible relations to different measures of socioeconomic background, however, have not been undertaken thus far. The relevance of the parental perspective for offspring's academic achievement, moreover, would be informative both with regard to the validity of parental reports, as well as the interconnectedness with the context.

The current dissertation focused on parents' perspective on their offspring's personality particularly considering its interplay with familial socioeconomic background and the prediction of academic achievement. This chapter presents the theoretical and empirical background regarding the Big Five personality structure in children and adolescents, followed by an overview of the current state of research with respect to parental perceiver effects, as well as an outline of the relevance of family and school as contextual aspects. After shortcomings in the current state of research are pointed out, a framework is proposed that combines notions from developmental and personality psychology as well as educational sciences from which three overarching research questions are derived. Chapters 2 to 4 present three publication-oriented empirical studies. Chapter 5 contains the general discussion of the results from these studies with particular emphasis on the possible implications for large-scale assessments and personality development. Lastly, limitations and future directions, as well as a conclusion are presented.

1.1 Identity: Personality in childhood and adolescence

1.1.1 Personality structure. Personality is defined in the current dissertation by the Five Factor Model (FFM, McCrae and Costa, 2008). The FFM entails

the tenet that personality *traits* do exist, i.e. that individuals can be described with regard to "relatively enduring patterns of thoughts, feelings, and actions" (McCrae & Costa, 2008, p. 160). The five personality dimensions referred to as the Big Five (Goldberg, 1993) were empirically derived using two different approaches. As delineated by McCrae and John (1992), the FFM emerged from the fusion of findings from the lexical approach with the personality questionnaire tradition. The former yielded basic personality dimensions by analyzing English adjectives describing persons and grouping them into clusters. McCrae and John (1992) define the five factors as follows. *Openness* as derived from trait adjectives represents intellect (Goldberg, 1990; John, 1990). McCrae and John (1992) point out that questionnaire studies typically find a broader factor additionally comprising aesthetic appreciation, need for variety as well as unconventional ideas. Taken together, it is reflected in a permeable consciousness and a need for diverse experiences (McCrae & Costa Jr, 1997). *Conscientiousness* contains aspects such as thoroughness, organization, diligence as well as achievement-orientation. *Extraversion* is the broadest factor encompassing aspects such as gregariousness, warmth, high energy, enthusiasm, and positive emotions. *Agreeableness* comprises altruism, trust, compliance, and can be seen as the opposite of hostility, spitefulness and jealousy. The definition of *Neuroticism*, finally, is the least controversial: a tendency to experience distress, nervousness, self-consciousness, and anxiety. These five domains are hierarchically superordinated to six facets each (Costa & McCrae, 1995) so that personality can be measured in a broader as well as a more narrow fashion. While there have been propositions of higher-order factors (Digman, 1997) or additional dimensions (Ashton & Lee, 2005), the Big Five remain a focal point of personality research. A common misunderstanding assumes that the FFM reduces personality to five dimensions, however it is actually a concise framework comprising a multitude of interindividual differences (Goldberg, 1993).

1.1.2 Emergence of the Big Five in Childhood and Early Adolescence.

While toddlers and preschool children are assumed to have a more limited range of traits

referred to as temperament (Shiner, 2006), the Big Five are thought to develop alongside during childhood. Older conceptions described temperament as a precursor of personality (Digman, 1994), but modern notions emphasize its status as rightful individual differences (De Pauw, 2017). Temperament and Big Five are assumed to share overlapping content such as the propensity to experience negative and positive emotions, but also to explain unique variance in outcomes (Herzhoff, Kushner, & Tackett, 2017). Thomas, Chess, Birch, Hertzig, and Korn (1963) were the first to conduct a comprehensive empirical examination of early temperament introducing the novel notion of an interaction between biological and environmental processes in children's development. Their nine-trait model for early childhood is, however, not used in contemporary research anymore. Instead one conceptualization of lower-order traits in infants and toddlers was proposed by Caspi and Shiner (2006): positive emotion/pleasure, fear/inhibition, irritability/anger/frustration, discomfort, attention/persistence, and activity level. With regard to the factor structure of higher-order traits, Rothbart and Derryberry (2002) found Surgency and Negative Affectivity in parent-reports on temperament for both infants and toddlers. The third factor contained aspects such as soothability, and cuddliness in infants. For toddlers, Effortful Control emerged as the third factor signifying the development of self-regulation during this period. In the preschool-age of 3 to 7 years, the factors Surgency, Negative Affectivity, and Effortful Control could be replicated (Rothbart, Ahadi, Hershey, & Fisher, 2001). When children approach school age, the full five factor structure begins to emerge (Caspi & Shiner, 2006).

Herzhoff et al. (2017) point out several differences in the Big Five factor structure of children compared to adults. For one, Openness is not included in temperament models and predominantly comprises intellect in childhood (De Fruyt, Mervielde, Hoekstra, & Rolland, 2000; Halverson et al., 2003) so that aesthetic appreciation is not represented in child personality questionnaires. Agreeableness, likewise, is not included in temperament models. In childhood, it comprises antagonistic aspects of Neuroticism resulting in a higher

correlation of the latter with Disagreeableness than found in adults. Adolescents' Agreeableness, on the other hand, contains aspects such as empathy and is therefore more akin to the trait in adults. As children's Agreeableness encompasses aspects of self-regulation, it correlates with the temperament dimension Effortful Control as does Conscientiousness (Tackett et al., 2012). Both traits incorporate a type of self-control of children: Conscientiousness with regard to task-execution and Agreeableness pertaining to interactions. Lastly, Soto and John (2014) found evidence for the sixth factor Activity Level in parental reports on children aged 6 and older. This trait constitutes a facet of Extraversion in adults' Big Five. The five factor structure was more clearly replicable for adolescents of 15 years and older in Soto and John (2014). To sum up, individual differences in preschool-age seem to more strongly encompass temperament dimensions. As children become older, the Big Five structure emerges more clearly and adolescence can be viewed as a period of solidification of the five factors in self-reports (Hill & Edmonds, 2017).

With regard to self-reports, questionnaire studies found the Big Five structure for children from age 9 and older using the NEO-PI-R (De Fruyt et al., 2000) and its short version the NEO-FFI (McCrae et al., 2002) that are commonly administered to adults, as well as a Big Five questionnaire specifically adapted for children (Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003). A vast number of empirical evidence suggests that adult personality reports on children and adolescents reflect the Big Five earlier. As summarized by Caspi and Shiner (2006), the Big Five structure has been found in factor analyses for children as young as 3 years old as well as adolescents: in parental reports (Asendorpf & Van Aken, 2003; Barbaranelli et al., 2003; Halverson et al., 2003; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Mervielde & De Fruyt, 2000; Parker & Stumpf, 1998; Robins, John, & Caspi, 1994) as well as teacher-reports (Asendorpf & Van Aken, 2003; Barbaranelli et al., 2003; Digman, 1994; Digman & Inouye, 1986; Digman & Shmelyov, 1996; Digman & Takemoto-Chock, 1981; Goldberg, 2001; Graziano & Ward, 1992; Grist, Socha, & McCord, 2012; Mervielde & De Fruyt, 2000; Resing, Bleichrodt, & Dekker, 1999).

1.1.3 Temporal Stability of the Big Five in Childhood and Early Adolescence.

With regard to temporal stability of personality traits, rank-order stability has been found to be modest until the toddler-years, increase markedly to a moderate level during preschool-age, and remain at that level until the age of 18 (Roberts & DelVecchio, 2000). Children's interindividual differences, accordingly, exhibit considerable stability as well as substantial change during childhood and early adolescence. Caspi and Shiner (2006) proposed several processes through which children's temperament and early personality could shape the development of later personality. As such, personality development is assumed to be influenced by learning processes and environmental elicitation at the very beginning of the lifespan. Social comparisons and environmental construal are proposed to be influential in early and middle childhood ensuing the development of cognitive abilities. Lastly, environmental selection and manipulation are thought to be relevant influences on personality development at the beginning of adolescence when self-regulatory abilities are developed enough. Denissen, van Aken, Penke, and Wood (2013) proposed that self-regulation might be the driving force of age-related changes in personality development. The authors assume shifts in reference values, towards a more responsible and socially desirable behavior, to motivate individuals to develop, practice and lastly apply new regulatory strategies. Young adolescents are assumed to lack resources to fulfill new demands, for example parents expecting a more responsible behavior, but then to learn from their experiences and develop towards complying with new societal reference values in later adolescence. Additionally, genetic influences seem to become more relevant since several twin studies could show that trait variance increased from early childhood until adolescence and then plateaued (Kandler, Waaktaar, Mõttus, Riemann, & Torgersen, 2019; Mõttus et al., 2019; Mõttus, Soto, Slobodskaya, & Back, 2017) both for self- and parent-ratings. This rise was attributed to an heightened magnitude of non-additive genetic influences (Mõttus et al., 2019) while environmental variance did not change substantially. Thus, genetically driven differences magnified based on new genetic

components instead of an amplification of initial differences which is thought to reflect genotype x environment interactions (Kandler et al., 2019), for example when genetically similar individuals are disproportionately likely to experience similar environments (Mõttus et al., 2019). Kandler et al. (2019) emphasize the importance of environmental opportunities for the development of genetic predispositions. The authors assume that families provide shared experiences for siblings and expect interactions between these experiences and genetic tendencies to enhance the similarity of monozygotic twins compared to dizygotic ones. This would arise from the differential sensitivity of genetic dispositions to identical environmental opportunities.

Pertaining to mean-level changes, Herzhoff et al. (2017) summarized that Conscientiousness and facets of Openness show decreases from childhood to adolescence (Denissen et al., 2013; Soto, John, Gosling, & Potter, 2011; Soto & Tackett, 2015) supporting the disruption hypothesis stating that the transition from childhood to adolescence is characterized by dips in maturity. Parent- and self-reported Extraversion and Agreeableness have been found to decrease as well in that period in some studies (Soto et al., 2011; Soto & Tackett, 2015; Van den Akker, Deković, Asscher, & Prinzie, 2014), but not in a meta-analysis on the age between 10 and 20 (Denissen et al., 2013). Regarding younger children, Van den Akker et al. (2014) found increases in Neuroticism, Agreeableness, and Conscientiousness from middle to late childhood. De Fruyt et al. (2006), on the other hand, found parent-reports on 6- to 13-year olds to remain stable. As for adolescence, a meta-analysis found moderate decreases in Neuroticism, but increases on a facet of Extraversion (social dominance), and only marginal increases on Openness (Roberts, Walton, & Viechtbauer, 2006). Taken together, empirical evidence on developmental patterns during childhood and adolescence is somewhat inconsistent which might be related to the mode of assessment (Göllner et al., 2017) as studies use either self- or adult-reports, rarely combining both.

1.2 Reputation: Parental perspective on offspring's personality

> No person can understand any other person completely, for it is impossible for one human being to share directly the motives, thoughts, and feelings of another.
>
> *Allport (1937, p. 499)*

1.2.1 Personality assessment in childhood and adolescence. Assessment of personality pertaining to children and adolescents is a matter of ongoing discussion in this relatively new area of study. As delineated above, the Big Five factor structure can be reliably recovered in adult informant ratings markedly earlier than in children's self-reports. Concerns regarding the validity of self-reports of young individuals have been raised quoting cognitive development and lack of validated measures for children (Tackett, Herzhoff, Kushner, & Rule, 2016), as well as cognitive and linguistic abilities and identity development regarding adolescents (Hill & Edmonds, 2017). Soto, John, Gosling, and Potter (2008) also reported evidence on pronounced individual differences in acquiescent responding in late childhood and early adolescence that had negative effects on the coherence and differentiation of the Big Five factors. At the same time, informant ratings such as parental reports might be affected by a positivity bias (Tackett, 2011) or be limited due to role specificity (Rothbart & Bates, 2006). Although there have even been calls in favor of the primacy of others' judgments in personality research (Hofstee, 1994), one methodological approach renders the decision for either of the assessments moot - the multitrait-multimethod framework.

1.2.2 MTMM models in personality psychology. In the vein of the conviction that "...personality research depends entirely on the soundness of personality description and measurement" (Cattell, 1943, p. 560) personality researchers have long been in search of the optimal trait assessment. Campbell and Fiske (1959) contributed to a major advancement in that regard by introducing the multitrait-multimethod (MTMM)

matrix. It encompasses the measurement of several traits with several methods in order to disentangle the relative proportions of trait and method variance. While the latter was initially viewed as undesirable or a disturbance, researchers came to appreciate it as a distinctive topic of study that is worth interpretation (Cronbach, 1995). Generally, the contemporaneous view of self- and informant ratings assumes that "...both afford unique, yet flawed, information about a person" (Roberts, Harms, Smith, Wood, & Webb, 2006, p. 324). This is the very reason why it is advantageous to study both alongside each other, for example as conceptualized in the neo-socioanalytic model of personality (Roberts & Wood, 2006). This model proposes a distinction between identity and reputation as units of assessment. *Identity* refers to individuals' self-perceptions of their personality and entails the specific content as well as meta-cognitive perceptions of the self-perceptions (Roberts, Harms, et al., 2006). An individual might describe themself as neurotic and also have a meta-cognitive perception about whether this characteristic is changeable or stable. *Reputation* refers to others' perspectives on an individual's personality. Reputations can have significant real life consequences as they influence others' decisions about relationships, careers or academic evaluations (Roberts, Harms, et al., 2006).

More recently, McAbee and Connelly (2016) proposed the Trait-Reputation-Identity (TRI) Model which introduces the trait factor additionally to the identity and reputation factors. The trait captures the common variance of identity and reputation representing the consensus of different ratings. McAbee and Connelly (2016) argue that the trait factor is suited best for examinations of associations of personality with criterions. The authors, furthermore, point out that self-reports can be subject to self-perception errors such as self-enhancement as well as deliberately inaccurate self-descriptions used to achieve certain goals. These specific self-distortions can be captured in the identity factor. With regard to children and adolescents, it could be assumed that self-perceptions are developing and are less clear and not as consolidated compared to adults. Particularly meta-cognitive perceptions might be strongly dependent

on the particular developmental stage of cognitive abilities. Thus, childhood and adolescence can be viewed as exceptionally relevant life stages for the study of self-views when compared to reputation with others.

The comprehensive meta-analysis by Connelly and Ones (2010) provided an empirical overview with respect to interrater agreement as well as moderators of agreement for individuals of at least 14 years of age. When different other-raters were examined, Extraversion and Conscientiousness yielded higher interrater reliability than the other Big Five dimensions, but across all types of raters reliabilities were modest and ranged from $\overline{r}_{rr} = .39$ to $\overline{r}_{rr} = .43$ (higher when controlled for test-retest reliability: $39. < \rho_{rr} < .51$). Family and friends generally showed the strongest interrater reliabilities of $.40 < \rho_{rr} < .55$ compared to less acquainted informants, so that it could be concluded that increased frequency of interactions and higher interpersonal intimacy are associated with more reliable ratings. With respect to self–other agreement, correlations corrected for test-retest reliability were again highest for Extraversion ($\rho_{o=1} = .51$) and Conscientiousness ($\rho_{o=1} = .50$), followed by Openness ($\rho_{o=1} = .43$) and Emotional Stability ($\rho_{o=1} = .43$) and lowest for Agreeableness ($\rho_{o=1} = .39$). When types of raters were compared, family members showed the highest correlation with self-reports, followed by friends, cohabitants, work colleagues and incidental acquaintances and lastly strangers. More acquainted raters outperformed other informants especially regarding Emotional Stability and Openness, while differences were smallest for Extraversion. Comparing different types of family members, spouses and siblings showed higher correlations with self-reports than parents. Parent-self correlations were highest for Conscientiousness, Openness, and Extraversion, followed by Emotional Stability and Agreeableness. Connelly and Ones (2010) argue that parents might describe their children more favorably than other family members by underestimating less desirable characteristics, or might recall impressions formed during childhood, disregarding developmental changes. As targets were at least 14 years of age and results were averaged across the lifespan, it remains unclear how parental reports

relate to self- and other-reports in childhood and at the beginning of adolescence.

1.2.3 Parental perceiver effects. Considering the empirical evidence on the differences in agreement between self- and other-reports, it seems of paramount importance to gain a better understanding of how informants arrive at their judgments or in other words how they perceive the individual in question. The study of person perception was characterized by criticism regarding the calculation of the accuracy of informant ratings (Cronbach, 1955) during the first wave, and confidence in individuals ability of accurate judgments during the second wave starting in the 1980s. As summarized by Neyer (2006), three theoretical branches arose during that second wave of accuracy research - the *pragmatic* approach, the *constructivist* approach, and the *realistic* approach. The latter assumes that personality traits are indeed real and can be observed and that observers can reach a more or less accurate judgment. Funder's (1995) Realistic Accuracy Model (RAM) represents the realistic approach. In the RAM, the process of personality judgment is divided into four steps: relevance and availability of behavioral cues as well as detection and utilization of these cues for the formation of a judgment. All four elements are seen as necessary for an accurate judgment. Hypotheses about the quality of ratings, improvement of assessment as well as moderator variables of accuracy can be derived from the RAM. Funder and West (1993) also derived criteria for the evaluation of other-rating accuracy: high agreement between different other-raters (interrater reliability) referred to as consensus, high self-other agreement, as well as criterion-validity with regard to relevant behaviors and outcomes. One prevailing finding is that accuracy of ratings increases with acquaintanceship (e.g. Funder & Colvin, 1988; Funder, Kolar, & Blackman, 1995; Letzring, Wells, & Funder, 2006; Paunonen, 1989) which can be explained by the increased amount of information that becomes available for close others.

Vazire and colleagues (Vazire, 2006, 2010; Vazire & Carlson, 2011; Vazire & Mehl, 2008) shifted the focus towards informants' vantaged access to trait information depending on the properties of the particular trait. Specifically, the Self-Other Knowledge Asymmetry

(SOKA) Model (Vazire, 2010) conceptualized an informational advantage regarding internal traits for self-descriptions, but a benefit for other-raters when traits are external and well observable. Moreover, trait evaluativeness is assumed to be associated with more distorted self-reports and more accurate other-ratings. As discussed, Connelly and Ones (2010) findings indeed showed higher agreement for traits high in observability. The relative advantage of acquainted raters regarding Emotional Stability and Openness is easily explainable with regard to increased information on internal and evaluative traits which are difficult to judge for the less acquainted.

In childhood and early adolescence, parents can be assumed to be the most acquainted adult informants. Several arguments can be advanced as to why the parental perspective on offspring's personality is particularly relevant. Firstly, parents can provide valuable information on children's behavior as they are able to observe their offspring on numerous occasions and also have access to infrequently occurring behavior that might be meaningful (Rothbart & Bates, 2006). They perceive children's development as well and can compare current characteristics with previous ones. Empirical evidence showed that parents perceive partly different developmental patterns of the Big Five than reported by adolescents themselves (Branje, Van Lieshout, & Gerris, 2007; Göllner et al., 2017; Luan, Hutteman, Denissen, Asendorpf, & van Aken, 2017). Secondly, the unique parental perspective on offspring's Big Five in childhood and early adolescence has rarely been investigated until now. Parental agreement has been found to be higher for more observable externalizing problems than for internalizing problems (Achenbach et al., 1987; De Los Reyes & Kazdin, 2006) and there is also evidence for the applicability of the SOKA model regarding self- and parental ratings of adolescents Big Five (Göllner et al., 2017; Luan et al., 2017). Specific influences on the unique parental perspective have, however, not been investigated within an MTMM framework. Thirdly, parents make the majority of important decisions pertaining to the life of their offspring well into adolescence. Their perception of them might play a crucial role in those decisions and therefore needs to be

better understood. Fourth, a possible positivity bias in parental reports (Tackett, 2011) has been proposed and could be explained through emotional involvement (Vazire, 2010) of parents that might lead to particularly positive reports on offspring. However, investigations specifically targeting parents' possible overestimation and predictors thereof are currently missing.

The examination of influences on specific perspectives on an individual's personality has been advanced through MTMM models designed to measure method effects as latent factors (Eid, Geiser, & Koch, 2016). Specifically, method effects can be represented by contrasting different perspectives against each other and using one perspective as reference. Method effects then constitute deviations of a specific perspective from a value expected on the basis of the reference method. This modeling approach is best suited to demonstrate possible biases in specific perspectives since these deviations can be understood as over- or underestimations in the comparison of one perspective to the reference method. While it can, consequently, be desirable when it represents theoretical assumptions most accurately, it has rarely been applied to personality assessments of children and adolescents since model convergence can pose a problem and the selection of a reference method is not straightforward in the absence of self-reports (Tackett, Lang, Markon, & Herzhoff, 2019).

1.3 Context: Family and school

1.3.1 Familial SES and offspring's socioemotional development. One pertinent question in the study of individual differences is the origin of such characteristics in childhood. As proposed by Bronfenbrenner (1979), human development can not be separated from its context and is carried out through interactions of it and the individual. The family is understood as the microsystem within which a child develops their biological and psychological characteristics. Developmental outcomes can, thus, be dependent on familial characteristics of which the socioeconomic background (SEB) represents one of the

most basic descriptors. Associations between children's psycho-social characteristics and familial socioeconomic status (SES) have been explained based on different theoretical models. Conger and Donnellan (2007) delineate the two dominant perspectives on the influence of socioeconomic context on children's development in their review. The Social Causation Perspective proposes that socioeconomic differences within the family cause differences in psycho-social, emotional, and cognitive functioning of children. Two theoretical models are illustrations of the Social Causation Perspective. First, the Family Stress Model (Conger & Conger, 2002) focuses on the effects of financial hardship on family functioning and psychological adjustment. Second, the Family Investment Model (Bradley & Corwyn, 2002) assumes that higher SES is associated with better access to resources and subsequently, higher parental investment in children's development (see also Jæger and Breen, 2016). An alternative to the Social Causation Perspective, the Social Selection Perspective postulates that effects of SES and children's outcomes are caused by a third variable - advantageous parental characteristics that help parents attain a higher SES in the first place. Conger and Donnellan (2007) propose a combination of the two aforementioned perspectives in the Interactionist Model where parental characteristics, SES, and parental investments interact in influencing children's outcomes.

1.3.2 Socioeconomic background and perceiver effects. While developmental psychology has acknowledged the importance of contextual variables for the understanding of individual differences, personality psychology has rarely focused on the contextual embeddedness of persons. Even though comprehensive personality frameworks such as the neo-socioanalytic model of personality (Roberts & Wood, 2006) incorporate distal causes in the form of genes, physiological mechanisms, and society/culture, the proximal context remains neglected. Particularly with regard to children and adolescents, it seems of paramount importance to consider the microsystem (Bronfenbrenner, 1979) when describing interindividual differences. Parental reports on offspring's personality have specifically been rarely examined with respect to contextual factors. While possible

influences on informant discrepancies pertaining to children's psychopathology (De Los Reyes & Kazdin, 2005) have been studied for decades, personality has not been considered in that regard until very recently. In particular, there is first evidence on associations between parental SES and measures of the Big Five and well as temperament (Ayoub et al., 2018; Strickhouser & Sutin, 2020). The MTMM framework, however, has not been applied to examine influences of contextual aspects on different perspectives on children's personality as of yet.

1.3.3 Academic achievement in school. As discussed above, one criterion for the accuracy of ratings is the prediction of relevant outcomes (Funder & West, 1993). In order to gauge the accuracy of the parental perspective, therefore, its relevance with regard to academic achievement was examined in the current dissertation. Academic achievement is one of the most relevant developmental goals during childhood and adolescence. Additionally, the school is one integral component of the microsystem (Bronfenbrenner, 1979) of individual development. Personality has been previously shown to predict achievement throughout the lifespan (Poropat, 2009, 2014). Effects of the unique parental perspectives, however, have been rarely investigated.

Educational research has focused extensively on background related differences in academic achievement. As such, background effects are examined on a granular level going beyond SES that is commonly measured by parental education, income, as well as occupation (House, 2002). Baumert, Watermann, and Schümer (2003) introduced the differentiation between structural and process-based features of the familial background to better explain disparity effects in academic outcomes. SES is a measure of structural aspects of the familial context. Measures of cultural and communication practices within the family are narrower representations of background related processes. Baumert et al. (2003) propose that process-based features mediate effects of SES on educational attainment and at the same time have incremental effects on it. Going further, psychological characteristics of the child are introduced as mediators of SEB effects on

educational attainment and academic achievement (see also Watermann & Baumert, 2006). Personality could be one relevant characteristic relating to SEB and academic achievement. As proposed by Damian, Su, Shanahan, Trautwein, and Roberts (2015), effects of personality and SEB might even interact in predicting achievement, for example through compensational processes. The role of the unique parental perspective on offspring's personality regarding associations between SEB and academic achievement is unknown as of yet.

1.4 The current dissertation

1.4.1 Empirical shortcomings. Although children's personality was more strongly explored in the last decades, several shortcomings that require empirical investigation can be identified in the current literature.

First, numerous researchers have pointed out that studies on the personality of children and adolescents ideally should employ a multitrait-multimethod design (Donnellan, Trzesniewski, & Robins, 2006; Herzhoff et al., 2017; Tackett, 2011). Unique perspectives on youth can best be represented when different personality reports are contrasted against each other. Existing research often disregards the necessity to control common variance in personality reports resulting in less precise effect estimates. Tackett et al. (2019) specifically endorse the use of Correlated Trait–Correlated Method (CTCM) models for personality data on children due to the increased accuracy and precision with respect to estimation of effect sizes.

Second, parental perceiver effects with regard to offspring's personality are not understood well yet. Examinations outside of temperament and children's psychopathology are scarce and lack methodological sophistication. CT-C(M-1) models (Eid, 2000; Eid et al., 2003) offer the possibility to examine the influence of predictors on the unique parental perspective under control for trait effects. Until now, no investigation has focused on method effects within CT-C(M-1) models of parental personality reports. Moreover,

familial socioeconomic background has not yet been considered as a possible influence on the parental perspective.

Third, large-scale examinations of multitrait-multimethod data on children's Big Five are missing in current research. For one, the construct of the Big Five has not been extensively examined regarding childhood and early adolescence as most studies pertain to temperament or behavioral problems. Moreover, large-scale data offers the possibility of latent modeling of personality constructs as well as interaction effects, but representative and large samples are rarely used in existing empirical studies on children's personality. Lastly, a multitrait-multimethod design combined with large-scale assessments is scarcely encountered as well.

Fourth, the interplay of personality, socioeconomic background and academic achievement in childhood and adolescence has not been studied in depth until now. Possible interaction effects (Damian et al., 2015) have not been investigated with regard to school achievement as well as parental personality reports. Additionally, structural equation modeling has rarely been employed to examine the interplay in terms of latent interactions (Klein & Moosbrugger, 2000).

1.4.2 Integration and overview. Considering these shortcomings in the current state of research, the present dissertation aimed at corroborating and augmenting empirical knowledge with regard to the parental perspective on offspring's personality. It did so by integrating notions from personality and developmental psychology, as well as educational science. Specifically, I propose the Identity-Reputation-Context framework depicted in Figure 1.1 that guided the outline of this dissertation. Drawing on Bronfenbrenner's (1979) ecological model of human development as well as Roberts and Wood's (2006) neo-socioanalytic model of personality, I combined concepts from developmental and personality psychology to depict layers of individual differences more accurately. In particular, the *identity* component contains basic individual differences operationalized as personality and assessed with self-reports. As in Bronfenbrenner (1979),

the individual with their particular characteristics is at the center. This layer is encircled by the *reputation*. Personality reports by others contain their specific perception of the person in question and therefore represent the impression that the world has of an individual (Roberts & Wood, 2006). Individuals can not be fully understood if their representation in others is not considered as that is what others base their interactions with them on. In the current dissertation, parental and teacher-reports on personality were used to operationalize this layer, as these are the most important adult interaction partners during childhood and adolescence. Lastly, I propose embedding the *identity* as well as the specific *reputation* within a *context*, represented here by the socioeconomic background as a basic characteristic of the family, as well as academic achievement as one of the main developmental outcomes pertaining to the school. Self-perceptions, as well as other-perceptions, do not arise in a vacuum, but within the system that the individual develops in. The three layers, consequently, are assumed to interact and influence each other. The three studies that are part of this dissertation each examined a different aspect of this interplay.

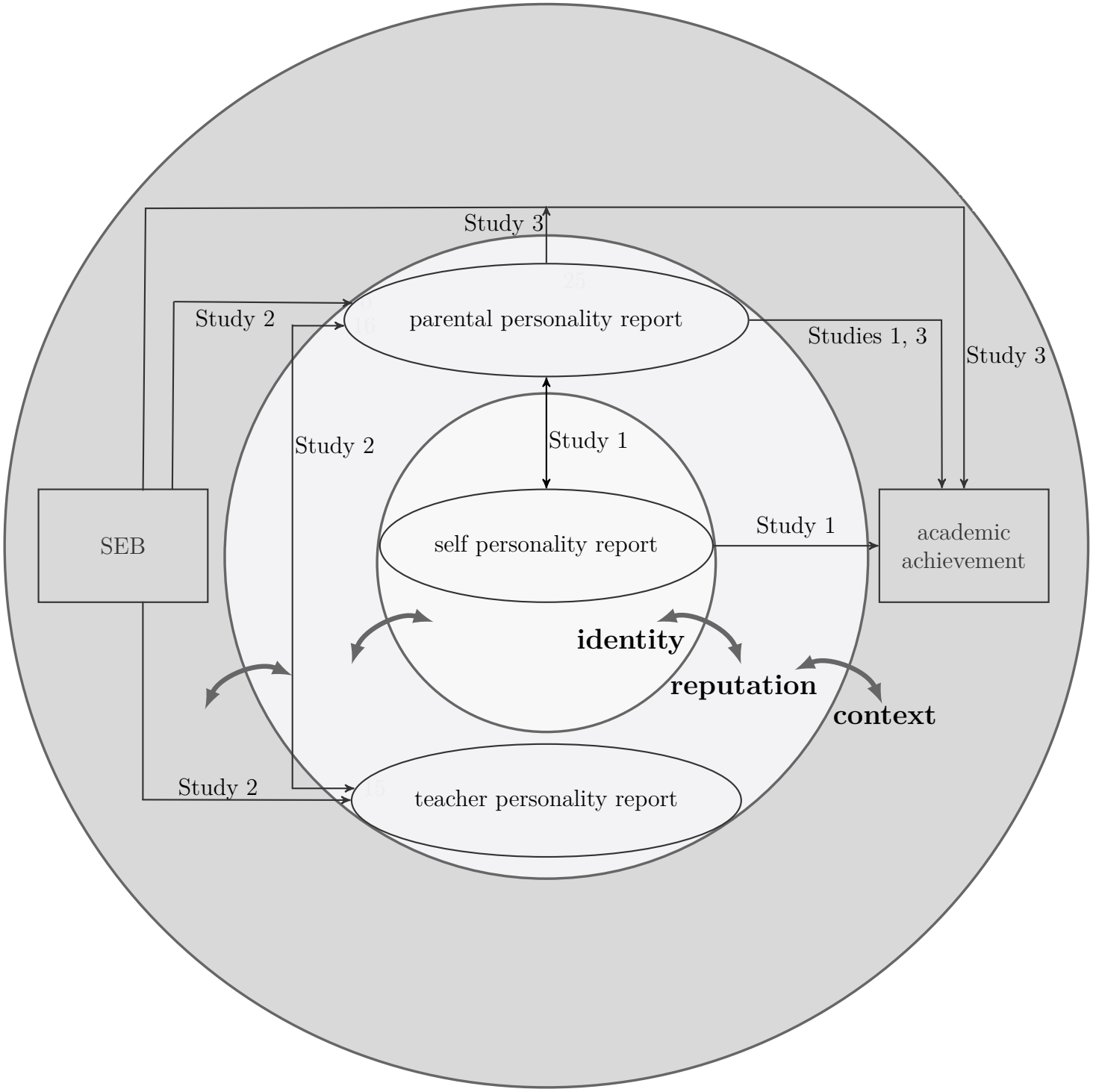

Figure 1.1. Identity-Reputation-Context framework and overview of three studies included in the dissertation. SEB = familial socioeconomic background. Academic achievement = offspring's academic achievement.

These three studies are included in Figure 1.1 as well. Parental reports on offspring personality were compared to adolescents' self-reports (Study 1) as well as teacher-reports on elementary school students (Study 2). Familial socioeconomic background was investigated as a predictor of parent- and teacher reports of elementary school students personality (Study 2). Adolescents' academic achievement was analyzed as an outcome variable and examined regarding associations with the parental reports (Studies 1, 3) and self-reports on personality (Study 1), as well as with familial socioeconomic background (Study 3). The parental personality report was, moreover, examined as a moderator of the association between familial socioeconomic background and adolescents' academic achievement (Study 3). Taken together, the present dissertation investigated the following overarching research questions with regard to the parental perspective on offspring's personality:

1) Do parental reports exhibit accuracy in terms of agreement with self-reports as well as teacher-reports?

2) What is the nature of the interplay between familial socioeconomic background and the parental perspective on offspring's personality?

3) Which role does the parental perspective on offspring's personality play with regard to children's academic achievement?

2 Paper 1: Parents' unique perspective and its validity

Parental perspective on adolescents' personality and prediction of academic achievement

Emilija Meier-Faust and Rainer Watermann

The Big Five have been shown to incrementally predict academic achievement even after controlling for intelligence and self-concept. Little is known, however, about the incremental validity of different perspectives on personality. To fill this gap, the present study examined self- and parental reports on the Big Five of adolescents (N = 5,236) using latent multitrait-multimethod models regarding the lower bound of congruence. Results revealed substantial deviations between perspectives on Openness, Agreeableness, and Neuroticism as well as higher agreement of ratings of Conscientiousness and Extraversion. Furthermore, the parental perspective on Openness was a positive predictor of level and change in grades as well as competences, over and above trait effects. Parental reports on Extraversion, on the other hand, negatively predicted level and change in grades and competences above trait effects. These findings illustrate the importance of multi-rater data on adolescent personality and demonstrate the use of analyzing the parental perspective in depth. Going further, large-scale studies can benefit from incorporating self- and parent questionnaires on the Big Five as information sources to help elucidate interindividual differences in academic achievement.

2.1 Introduction

Personality is one of the most prominent socio-emotional skills predicting academic achievement[1] (e.g. Noftle & Robins, 2007; Poropat, 2009). With respect to the Big Five (Goldberg, 1990), Conscientiousness and Openness were found to be the strongest predictors of academic achievement (Poropat, 2009, 2014). Previous research, however, focused largely on either self-, or other-reports of personality. Since different perspectives on personality are characterized by asymmetric access to trait-relevant information (Vazire, 2010), investigating the incremental validity of different perspectives could yield additional insights into the personality–performance association. Discrepancies between self- and other ratings tend to be most pronounced for traits low in observability, such as Openness, and high in evaluativeness, such as Agreeableness (Connelly & Ones, 2010). As a result, differences in predictive validity of those traits could be expected. Regarding adolescents' personality, parents are considered good raters since they are assumed to be able and motivated to provide accurate ratings (Tackett et al., 2016). They are highly familiar with their children and offer an adult perspective on adolescents' behavior. The incremental validity of parental reports on adolescents' Big Five over and above self-reports with regard to academic achievement has not been previously studied. The current study aims at filling this gap by employing multitrait-multimethod (MTMM) models on personality reports on seventh graders. These models offer the possibility to separate variance components of different perspectives and further use them as predictors for academic achievement. We used large-scale data from National Educational Panel Study (NEPS, Blossfeld, Roßbach, and von Maurice, 2011) to assess, firstly, the lower bound of the congruence of self- and parental reports on the Big Five of seventh graders. Secondly, we examined the predictive validity of the parental perspective over and above trait, regarding level of and change in grades in German and mathematics as well as reading and mathematical competence.

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[1] We use the term *academic achievement* as an umbrella term that encompasses both school grades and academic competences.

2.1.1 Personality and Academic Achievement. Personality at the age of 10 has been shown to predict academic attainment and work competence two decades later (Shiner, Masten, & Roberts, 2003) demonstrating the early emergence of relevant individual differences. Mechanisms which connect personality and successful learning were reviewed by De Raad and Schouwenburg (1996). The authors consider Conscientiousness the "main psychological resource" (De Raad & Schouwenburg, 1996, p. 325) with regard to learning since it comprises facets of achievement striving and self-discipline (Costa & McCrae, 1995). Individuals high in Openness are assumed to seek out intellectual challenges (Mussel, 2013) as well as learning opportunities (Ziegler, Danay, Heene, Asendorpf, & Bühner, 2012). Empirically, Openness has been shown to correlate with fluid intelligence (Ashton, Lee, Vernon, & Jang, 2000) as well as a deep-learning approach (Swanberg & Martinsen, 2010). Surface-learning, on the other hand, was found to correlate with higher Neuroticism (Swanberg & Martinsen, 2010) and higher Extraversion (Zhang & Ziegler, 2016). High Neuroticism could be additionally detrimental to academic achievement since it contains facets of anxiety and low self-confidence (Costa & McCrae, 1995). Effects of Extraversion are assumed to differ by age as young extraverts are presumed to have a positive attitude towards learning but older students tend towards being more interested in non-academic activities (De Raad & Schouwenburg, 1996). Agreeableness is expected to have a positive effect on academic achievement because it can foster a cooperative classroom behavior (De Raad & Schouwenburg, 1996).

Meta-analyses confirmed moderate positive effects of Conscientiousness and Openness and a small effect of Agreeableness on academic achievement in adults (Poropat, 2009) as well as in primary education (Poropat, 2014). Both Neuroticism (Laidra, Pullmann, & Alik, 2007) and Extraversion (O'Connor & Paunonen, 2007) have been shown to negatively predict academic achievement, but these effects are less consistent across studies compared to the aforementioned. Longitudinal studies on effects of personality on change in achievement are, as of yet, scarce. One exception is the study by Spengler,

Brunner, Martin, and Lüdtke (2016), reporting on the incremental predictive validity of personality over intelligence and academic self-concept, with associations being stronger for the level of rather than the change in school grades. Regarding data from the NEPS, Lechner, Danner, and Rammstedt (2017) have shown that for ninth graders, personality explained more incremental variance in grades than in competence measures under control for intelligence. Most recently, Israel, Lüdtke, and Wagner (2019) used the same data waves as in the current study and could demonstrate that self-reported Conscientiousness and Openness were strong predictors of grades as well as competence measures, but all Big Five dimensions were related to achievement cross-sectionally. The authors furthermore examined effects of personality on change in achievement measures revealing that only the positive effect of Conscientiousness on grades and the negative effect of Extraversion on math grade and spelling competence remained relevant. We draw on this examination and present an important extension by introducing an additional perspective on adolescents' personality.

2.1.2 Different Perspectives on Personality. Although the personality–performance association has been extensively examined, most studies focused on one information source for personality ratings. Since different ratings have been shown to predict different outcomes in various settings, Vazire (2010) concluded that each perspective might have unique informational value. John and Robins (1993) identified two main determinants of the congruence of different perspectives - trait *observability* and *evaluativeness*. The Self-Other Knowledge Asymmetry (SOKA) Model (Vazire, 2010) is an extension of John and Robins's (1993) notions conceptualizing informational and motivational differences in the perception of traits. Highly observable traits such as Extraversion are linked to clearly visible behavioral cues, whereas traits low in observability like Neuroticism predominantly comprise of thoughts and feelings. Observability of traits results in a knowledge asymmetry since individuals have extensive access to their own thoughts and feelings, but others have superior access to observable

behavior. Highly evaluative traits can be classified as either favorable or unfavorable. Whereas Neuroticism and Extraversion are not considered evaluative, Openness can be categorized as being high in evaluativeness and at the same time low in observability. Trait evaluativeness leads to an asymmetry as ratings by others are assumed to be less distorted whereas self-perceptions are affected by ego-protection motives. This may lead to an exaggeration or understatement of evaluative traits (John & Robins, 1993). As for the other Big Five traits, Conscientiousness can be categorized as a behavior-centered and is therefore a highly observable trait. Agreeableness is also easily observable since it is linked to specific social behavior, but at the same time it is highly evaluative. A recent extension of the SOKA Model (Vazire, 2010) was provided by McAbee and Connelly (2016) with the Trait-Reputation-Identity (TRI) Model. The authors propose that personality comprises not only traits, but also individual differences in people's *identity* - how they describe themselves - as well as their *reputation* - how others describe them. McAbee and Connelly (2016) point out the importance of their model for explaining associations of personality with external variables. Specifically, differential associations might be due to raters being superior to the self in describing the trait. Another possible mechanism might be that others provide unique information additional to the trait. Lastly, identity might be differentially associated with external variables compared to the trait because people have a distinctively different opinion of themselves than others.

Not only do traits differ in how they are perceived, but perspectives on personality also differ in their interchangeability. Interchangeable perspectives share the same characteristics, whereas structurally different perspectives vary substantially (Eid et al., 2016). Contrasting self-reports to parental reports on personality is a classic example of structurally different perspectives. Parents provide meaningful information, are highly familiar with their offspring and are considered to be motivated to give accurate descriptions (Tackett et al., 2016). It is, however, not always possible to use identical items for parents' and their children's personality reports due to the age of respondents or

practical reasons within large-scale assessments. Research designs with different measurement instruments on the same construct provide an opportunity to examine the minimal agreement between perspectives.

In a meta-analysis (Connelly & Ones, 2010) on individuals of at least 14 years of age, agreement between self-reports and parent reports was highest for Conscientiousness, followed by Openness and Extraversion. It was lower for Neuroticism and Agreeableness. One longitudinal study (Luan et al., 2017) found evidence for the applicability of the SOKA model to adolescents as self-other agreement between adolescents, parents, and siblings was higher for behavioral-oriented traits in comparison to less visible traits, both regarding personality level and development of 12 to 29 year olds. In contrast to Connelly and Ones (2010), Luan et al. (2017) found significant self-other agreement for Agreeableness at age 12 and 17, but not at age 29. Focusing specifically on early adolescence, Göllner et al. (2017) found higher agreement between parents and adolescents regarding Extraversion, Conscientiousness and Openness, but lower agreement with respect to Agreeableness and Neuroticism. In summary, empirical evidence points to substantial differences between self- and parental reports in adolescence. Furthermore, findings from previous studies indicate that young adolescence may be characterized by slightly different perceptional processes than adulthood. Further investigations regarding the applicability of the SOKA model to young individuals are therefore needed. Additionally, adolescents' reputation (McAbee & Connelly, 2016) with their parents might be relevant as a predictor of one of the pivotal outcome variables in adolescence - academic achievement.

2.1.3 Predictive Validity of Parental Perspective. As expected in theory, and empirically shown, parents have a unique perspective on adolescents' personality and can constitute a substantial information source. Firstly, parents are considered to be the most important adult interaction partners of adolescents (Luan et al., 2017) thereby having access to ample trait-relevant information. Parents can, secondly, be assumed to meet the criteria of good raters as postulated by the realistic accuracy model (Funder, 1995), since

they are a) capable of perceiving relevant personality cues, b) are able to use those cues to form a judgment, and c) are motivated to make an accurate judgment. According to the SOKA model, parents should have more information on behavioral cues for behavior-centered traits, as well as a less distorted impression of evaluative traits than adolescents themselves. Specifically, behavioral information could be relevant with respect to Conscientiousness which is considered the most relevant predictor of achievement. In addition, Openness is highly evaluative and low in observability and has been shown to predict academic achievement. As pointed out by Tackett (2011), the parental role might be associated with the salience of children's characteristics relevant for parenting as being conscientious, agreeable, extraverted, and inquisitive. Although parents might become less important as adolescents become older with peers taking over the role of closest companions, parent ratings are more commonly included in large scale assessments while peer ratings typically are not. The parental perspective needs to be investigated in different age groups of school children to gain more insight into processes of personality perception during different developmental stages. It is of particular interest as to whether the parental perspective has incremental validity with regard to academic achievement, even in the tumultuous period of puberty. Moreover, the effect of the parental perspective on change in achievement might provide valuable insights. For one, longitudinal examinations of the personality and achievement are currently missing, as stated above. Secondly, cross-sectional effects of parental reports on achievement are less clearly interpretable since parents might rate offspring's personality in a particular way because of a good school performance. When stability in achievement is controlled for, effects of the parental perspective on academic achievement can be interpreted in a more precisely.

Poropat (2014) conducted a meta-analysis focusing on primary education (Grade 1–7) with adult-rated personality as a predictor of school achievement and compared the results to effects of self-rated personality in primary education included in his previous meta-analysis (Poropat, 2009). In both studies, Conscientiousness and Openness were

found to be the strongest predictors while the other traits showed only small effects. Moreover, Agreeableness and Extraversion showed stronger positive effects when rated by the self, but self-rated Conscientiousness and Openness were weaker predictors than ratings by adults. Differences in effects, however, do not pertain to the same individuals, but rather to a comparison of different studies. Studies on the incremental validity of perspectives are scarce. Ziegler, Danay, Schölmerich, and Bühner (2010) demonstrated the incremental validity of other-ratings regarding achievement of undergraduate university students, additionally examining facet level differences. Specifically, other-rated achievement striving was a positive predictor, but other-rated warmth and excitement seeking negatively predicted exam results, after controlling for fluid intelligence, gender and self-reports. In a study on peer-reports on high school students (Bratko, Chamorro-Premuzic, & Saks, 2006), peer-ratings had incremental predictive validity over self-reports on Conscientiousness and Autonomy. Although ratings by others indeed seem to provide additional information over and above self-reports, little is known about the effects of the perspective of parents in early adolescence. Specifically, the incremental validity of parent-rated adolescent personality with regard to academic achievement has not been examined so far. Additionally, there is a lack of empirical evidence on the effects of parental ratings on change in achievement when previous achievement is controlled for.

2.1.4 The Current Study. The present study had two objectives. Firstly, we aimed at increasing empirical knowledge about the parental perspective on adolescents' personality. In order to examine the minimal agreement between self- and parental ratings, we used MTMM models that are applicable when different personality questionnaires were administered. Secondly, we addressed the predictive validity of the parental perspective with regard to academic achievement. For that, we analyzed the incremental validity of the parental perspective above trait with regard to academic achievement. We examined the level of academic achievement as well as change in achievement. We used grades in German and mathematics as well as reading and mathematical competence as outcome variables.

Taken together, we examined the following research questions. These research questions were not preregistered.

> 1) What is the lower bound of congruence of self- and parental ratings on adolescents' Big Five? We expect differences between traits in line with the SOKA model. Conscientiousness and Extraversion should be rated similarly. By contrast, we expect stronger discrepancies between ratings for Agreeableness, but also for Openness and Neuroticism.
>
> 2) Does the parental report on adolescents' personality have incremental predictive validity regarding academic achievement over and above the trait? In line with previous empirical evidence, we expect incremental predictive validity of parent-rated Conscientiousness and Openness. We furthermore expect that effects of Agreeableness and Extraversion will primarily be due to the trait.

2.2 Methods

2.2.1 Sample. Data from Starting Cohort 3 of the National Educational Panel Study (NEPS) were used in the current study. The NEPS is a Germany-wide longitudinal study with a multi-cohort sequence design aimed at research on educational processes and developmental trajectories of competences (for details see Blossfeld et al., 2011). Data from the NEPS are not publicly accessible, but available after completion of a NEPS-data usage agreement. Documentation of the procedures and measures used in Cohort 3 is openly available on the NEPS website: https://www.neps-data.de/Data-Center/Data-and-Documentation/Start-Cohort-Grade-5/Documentation. A list of all publications using NEPS data is available on the website as well: https://www.neps-data.de/Project-Overview/Publications. NEPS data are collected every school year, for Starting Cohort 3 starting in Grade 5. A total of N = 7,280 students and N = 4,638 parents participated in measurement wave 3, Grade 7, of Starting Cohort 3. Our sample (N = 5,236) consists of students for whom at least one of the personality

reports as well as at least one of the outcome measures was available. Personality measurements were administered in wave 3 when the students attended Grade 7 in the school year 2012/13. They were on average $M = 13.53$ ($SD = 0.65$) years old and 49.7 % were girls. The students attended the following secondary school types in ascending order of academic demands (from vocational to highly academic): $N = 532$ attended a *Hauptschule*, $N = 582$ a mixed tracks school, $N = 1{,}211$ a *Realschule*, $N = 353$ the *integrierte Gesamtschule* and $N = 2{,}558$ a *Gymnasium*. This means that 48.9 % of students attended a highly academic and competitive school type.

2.2.2 Measures.

Personality Self-Reports. Students completed the short version of the Big Five Inventory in German - BFI-10 (Rammstedt & John, 2007) in Grade 7. The BFI-10 contains 11 items, three for Agreeableness and two for each of the other Big Five factors. One item per factor is formulated reversely. A 5-point fully labeled scale is administered (1 = does not apply to 5 = fully applies). The reliability of the Neuroticism scale was lowest with $\omega = .34$, followed Agreeableness with $\omega = .36$, Openness with $\omega = .42$, Conscientiousness with $\omega = .55$, and Extraversion with $\omega = .56$. We employed latent variable modeling to account for measurement error in the scales.

Parent Ratings of Personality. Parents filled out the short version of the Fünf-Faktoren-Fragebogen für Kinder [*Five Factor Questionnaire for Children*] (FFFK-K, Weinert et al., 2007) regarding their child's personality in Grade 7. Parental reports were predominantly given by mothers in 53.46 % of the cases ($N = 2{,}800$) and by fathers only in 9.78 % of the cases ($N = 512$). In 36.29 % of the cases ($N = 1{,}900$) the relationship was not reported and 0.47 % of the respondents ($N = 24$) were non-biological legal guardians. The FFFK-K consists of 10 items, two per Big Five factor, and uses a 10-point scale (0 to 10). The items are constructed as semantic differentials (i.e. for Extraversion the child is rated from 0 "is silent" to 10 "is talkative"). The reliability of the Agreeableness scale was lowest ($\omega = .53$), followed by Neuroticism ($\omega = .59$). Openness ($\omega = .66$), Conscientiousness ($\omega =$

.69) as well as Extraversion ($\omega = .71$) showed an acceptable reliability. We employed latent variable modeling to account for measurement error in the scales.

Facet differences between self- and parent ratings. Ratings of personality were conducted with two different questionnaires as outlined above. For some traits, the facets tapped by the two questionnaires were not equivalent. Regarding Openness, the BFI-10 assesses *aesthetics* and *fantasy*, whereas the FFFK-K measures *actions* and *ideas*. For Conscientiousness, the BFI-10 measures *achievement striving* and *self-discipline*, the FFFK-K however *order* and *dutifulness*. With respect to Agreeableness, the BFI-10 assesses *trust* and *altruism*, and the FFFK-K measures *compliance* and *altruism*. Extraversion is represented in both questionnaires by *gregariousness* and *warmth*. In the same vein, Neuroticism consists of *anxiety* and *vulnerability* in both questionnaires.

School grades. Self-reported grades in German and in mathematics in Grade 7 (school year 2012/2013) as well as Grade 9 (school year 2014/2015) were used as dependent variables. The average grade in German was $M = 2.60$ ($SD = 0.69$) in Grade 7 and $M = 2.68$ ($SD = 0.67$) in Grade 9 which lie between B and C in the American grade system. For mathematics, the average of $M = 2.66$ ($SD = 0.92$) in Grade 7 and $M = 2.86$ ($SD = 1.01$) in Grade 9 was slightly lower. In the German grading system, 1.00 is equivalent to A, the best grade, and 5.00 to F, the worst possible grade. To make results more interpretable, grades where recoded for further analyses such that higher values represent better performance. The two reports of grades correlated at $r = .44$ for both German and mathematics.

Competences. As previous empirical findings suggest differences in personality–performance associations depending upon the criterion variables used (Lechner et al., 2017), objectively measured competence, i.e. standardized measures of reading as well as mathematical competence, were additionally used as dependent variables.

Reading competence was measured with five texts and 30 or 32 items, depending on test difficulty, representing five text functions. Competence measures are given as

weighted likelihood estimates. The sample mean for reading competence in Grade 7 was $M = 0.76$ ($SD = 1.81$) and $M = 0.03$ ($SD = 1.22$) in Grade 9. Reading competence in both Grades correlated significantly with school grades in German at medium strength with correlation coefficients ranging from $r = .35$ to $r = .37$. Consequently, curriculum relevant competences were measured. Reading competence in Grade 7 and in Grade 9 correlated at $r = .53$.

Mathematical competence was assessed with 24 items. Items were evenly distributed across the four content areas *quantity*, *space and form*, *change and relation*, and *data and chance*. The sample mean of weighted likelihood estimates in Grade 7 was $M = 0.80$ ($SD = 1.47$) and $M = 0.03$ ($SD = 1.41$) in Grade 9. Correlations between mathematical competence and school grade in mathematics ranged between $r = .34$ and $r = .43$ both in Grade 7 and Grade 9. The competence assessment was highly linked with curricular mathematical contents. Mathematical competence in Grade 7 and Grade 9 correlated at $r = .73$.

Gender. Due to previously reported gender differences in academic performance (Spinath, Freudenthaler, & Neubauer, 2010), the gender of adolescents was used as a control variable.

Fluid intelligence measures. In supplemental analyses, fluid intelligence was used as a control variable by including assessments of processing speed and reasoning. The intelligence measurement (for details see Haberkorn and Pohl, 2013) was conducted in Grade 5 (school year 2010/11), but not in Grade 7. Reasoning was assessed with a figural reasoning matrices test consisting of three sets of four items each. The mean for the reasoning sum score in the sample ($N = 3287$) was $M = 6.98$ ($SD = 2.60$). Processing speed was measured with the Picture Symbol Test with three sets of 31 items each. The sample mean ($N = 4391$) of the sum scores for processing speed was $M = 44.02$ ($SD = 13.41$).

2.2.3 Statistical Analysis.

Design challenges and consequences. As delineated in the measures section, the NEPS design included two different questionnaires for self- and parent-reports on the Big Five. Openness, Conscientiousness, and Agreeableness were represented by different facets in these two questionnaires. Consequently, only the lower bound of consistency of the two ratings could be assessed for these Big Five dimensions. In other words, the values represent the minimal agreement of adolescents and parents when constructs are rated using different facets. This constitutes a non-traditional MTMM design that could, however, be encountered in other large-scale assessments that do not always provide identical personality measurements across respondents. The current study investigated the possibilities offered by the specific NEPS design. With regard to the prediction of academic achievement by the parental perspective, incremental effects of the mentioned dimensions could be attributable both to facet and to perspective. This could be informative with regard to the personality–achievement association indicating the relevance of different facets of the three Big Five dimensions that were found to be the strongest predictors of achievement in previous studies.

Basic model. Since we wanted to compare two perspectives on the same construct, namely the Big Five, we applied a multi trait-multi method (MTMM) CFA model. In the current study, the five Big Five dimensions were each measured with two structurally different methods - a self-report as well as a parental report. Since different personality questionnaires were used and we wanted to analyze effects the incremental validity of parental reports under control for trait, we employed the correlated trait-correlated method minus 1, CT-C(M-1), model (Eid, 2000; Eid et al., 2003). In the CT-C(M-1), one method serves as *reference method* which means that it is not modeled separately and the other methods are contrasted against it. We used the self-report as the *reference method* and contrasted the parental reports against it. The self-report is therefore not represented as a separate factor, but it is defining the trait factors (Geiser, Eid, & Nussbeck, 2008). Figure 2.1 illustrates our CT-C(M-1) model. Each item is represented by

Y_{ijk} with i = indicator, j = trait, k = perspective (1 = reference method, 2 = parent perspective). There are 21 items in total - Y_{111} to Y_{252} - four per Big Five dimension, and two each from the self-report from the parent-report respectively, but five items for Agreeableness with three self-report items. Moreover, there are two latent factors per Big Five dimension - a trait factor T_{jk} (j = trait, k = perspective with 1 = reference method) and a parental perspective factor P_{jk} (j = trait, k = perspective with 2 = parent perspective). Each trait factor T_{jk} represents the common variance of the four items that corresponds to the *reference method*, here the self-report. All items of a specific Big Five dimension load on the respective trait factor, T_{11} to T_{51}. The parental perspective factors P_{jk} represent the systematic variance of the parent items over and above variance explained by the trait factors (Geiser et al., 2008). Each pair of items from the parental report also loads on the respective parental perspective factor, P_{12} to P_{52}. Trait factors and parental factors belonging to the same Big Five dimension are not allowed to correlate because the parental perspective factors P_{jk} are *residual factors* (Geiser et al., 2008) regarding the trait factors T_{jk}. For Openness, the following components are part of the model in Figure 2.1: T_{11} is the Openness trait factor with all four Openness items Y_{111}, Y_{211}, Y_{112}, and Y_{212} loading on it. Within our CT-C(M-1) model, the term *trait* refers to the common variance in the facets of self-report and parent-report. P_{12} is the specific parental perspective on Openness. Only the two parent-report Openness items Y_{112}, and Y_{212} load on P_{12}. This parental perspective factor therefore represents the systematic variance in both items that is not explained by the *reference method*. Four error variables E_{111} to E_{212} represent residual variance for each of the four items that is neither captured in T_{11}, nor in P_{12}. Using the model results, two true-score variance components were computed for each of the 21 items and aggregated over the Big Five dimensions following the equations provided in Eid et al. (2003): the *consistency* equals the proportion of variance in the parental report that is explained by the self-report; the *method specificity* represents the proportion of variance in the parental report that is not determined by the

self-report. The square root of the *consistency* equals the latent correlation between self-report and parent-report for each Big Five dimension.

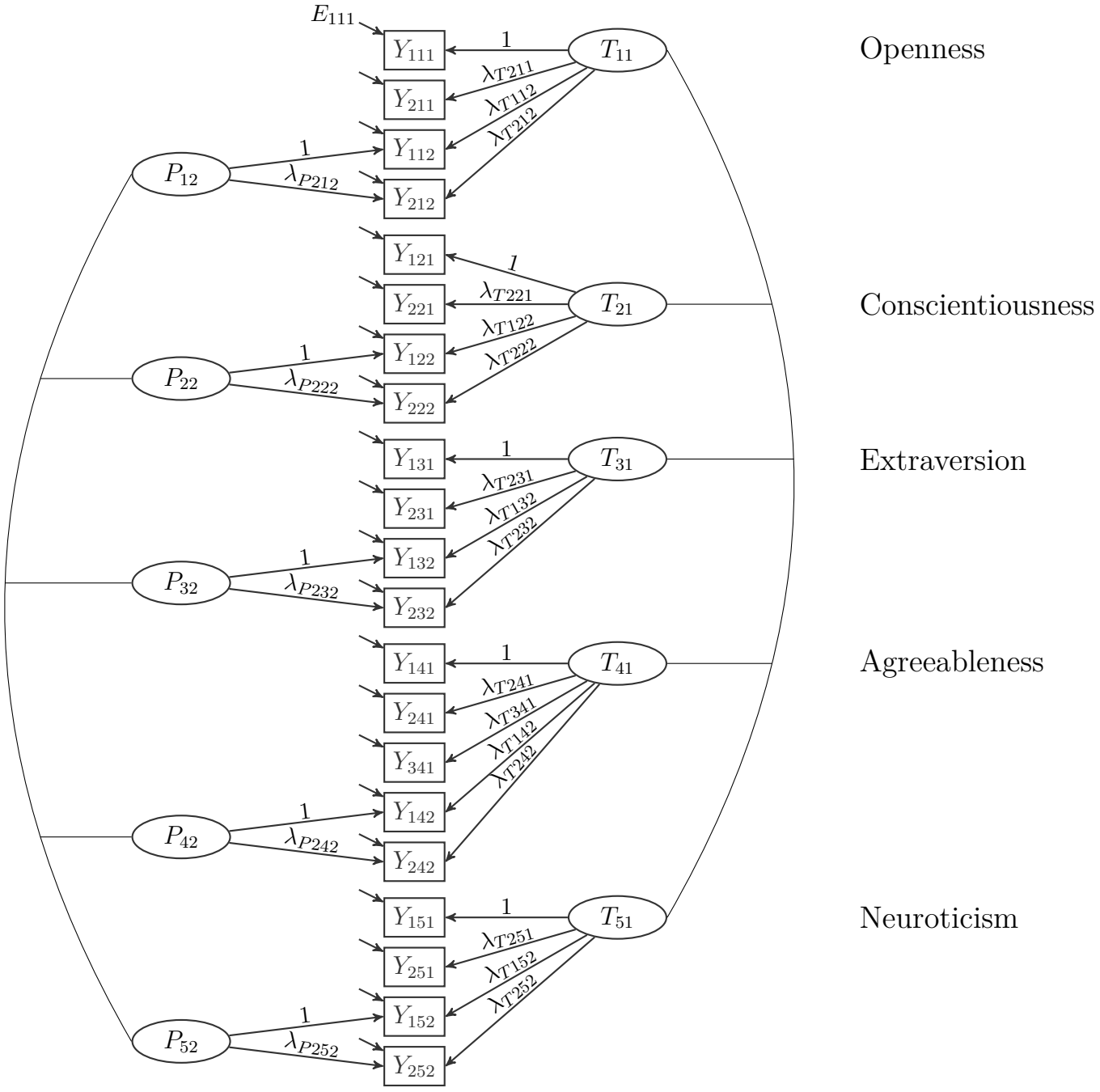

Figure 2.1. Multiple-indicator correlated trait method minus one model [CT-C(M-1)] for the Big Five (N = 5,236). Y_{ijk} = observed variable; i = indicator; j = trait; k = perspective (1 = reference method, 2 = parent perspective); T_{jk} = latent trait variable; P_{jk} = trait specific parental perspective; E_{ijk} = error variable; $\lambda_{Pijk}, \lambda_{Tijk}$ = factor loadings.

Extended model. In the next step, we used the parental perspective factors as well as the trait factors as independent variables to predict the outcome variables grades and competences (see Figure 2.2). For one, we computed effects on level of grades and competences by using the achievement measures from Grade 7 as dependent variables. This cross-sectional approach can entail an endogeneity bias (Duncan, Magnuson, & Ludwig, 2004): effects of explanatory variables can be distorted if those variables are influenced by actions of the individuals who are studied. One possible remedy is the use of longitudinal data to assess the change rather than the level of outcome variables. To that end, we used grades and competences measured in Grade 9, two years after the personality assessment, under control for prior achievement as dependent variables. We thereby analyzed effects of the parental perspective on change in school achievement. We also controlled for gender since it correlated significantly with school grades as well as competences, except grades in mathematics in Grade 9 as seen in Table 2.1.

All models were estimated using Mplus 7.3 (Muthén & Muthén, 1998–2015). We evaluated model fit based on the following fit statistics: the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). We followed Hu and Bentler's (1999) guidelines for an acceptable model fit with CFI and TLI of at least .95, RMSEA of no more than .06, and SRMR of .08 or lower. Missing data was accounted for by employing the Full Information Maximum Likelihood (FIML) estimation. Simulation studies showed that FIML is superior to response pattern imputation and yields unbiased results (Enders & Bandalos, 2001). As students within one class may be more similar to each other than across classes, class ID was used as cluster variable so that standard errors are adjusted for clustering. Additionally, the MLR estimator for maximum likelihood estimation with robust standard errors was employed in order to account for possible nonnormality of the measures.

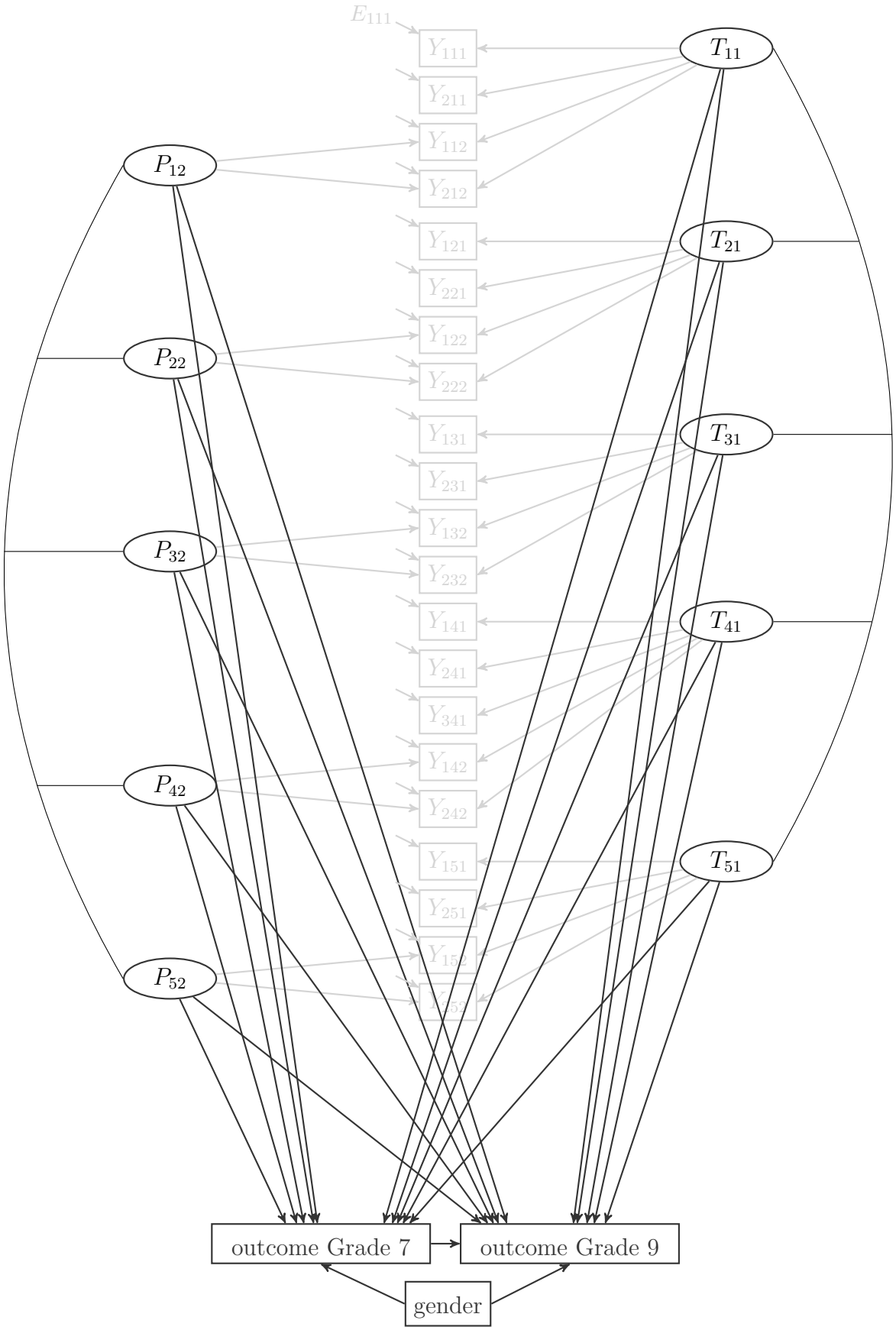

Figure 2.2. Extended CT-C(M-1) model with all trait factors and all parental perspective factors predicting an outcome at the same time.

Table 2.1
Bivariate correlations between study variables in a sample of German seventh graders, N = 5,236

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
O (self-report) (1)	1.00	.17**	.05	.29**	.04	.05	.08*	.04	-.02	-.02	.34**	.13**	.13**	-.00	-.01	.12*	.11*	.04	.03
C (self-report) (2)		1.00	-.08*	.61**	-.03	.22**	.45**	-.01	.14**	-.04	.19**	.28**	.26**	.21**	.23**	.09**	.08**	.03	.05*
E (self-report) (3)			1.00	-.67**	-.41**	.08**	-.14**	.62**	-.10*	-.42**	.03	.07*	.07*	-.03	-.10**	.06*	-.07*	-.05*	-.08*
A (self-report) (4)				1.00	-.27**	.07	.23**	.04	.14**	-.01	.31**	.17**	.16**	.07*	.06*	.07**	.05	-.01	-.04
N (self-report) (5)					1.00	-.22**	-.04	-.16**	-.05	.30**	.26**	-.08*	-.03	-.15**	-.06*	-.07*	-.08*	-.17**	-.13**
O (parent-report) (6)						1.00	.63**	.36**	.30**	-.55**	-.03	.33**	.34**	.41**	.34**	.42**	.37**	.41**	.42**
C (parent-report) (7)							1.00	.05	.40**	-.31**	.22**	.35**	.36**	.32**	.29**	.27**	.27**	.23**	.27**
E (parent-report) (8)								1.00	.03	-.70**	.08**	.04	.05*	-.02	-.07*	-.10**	-.11**	-.12**	-.15**
A (parent-report) (9)									1.00	-.11**	-.07**	.06*	.07*	.12**	.10**	.06*	.03	.03	.06*
N (parent-report) (10)										1.00	-.02	-.12**	-.13**	-.10**	-.09**	-.05*	-.04	-.07*	-.05*
gender (11)											1.00	.19**	.24**	-.09**	-.01	.09**	.09**	-.14**	-.13**
grade German G7 (12)												1.00	.55**	.47**	.31**	.37**	.35**	.28**	.29**
grade German G9 (13)													1.00	.33**	.42**	.35**	.35**	.26**	.29**
grade math G7 (14)														1.00	.53**	.28**	.25**	.40**	.43**
grade math G9 (15)															1.00	.21**	.24**	.34**	.40**
reading comp. G7 (16)																1.00	.62**	.61**	.57**
reading comp. G9 (17)																	1.00	.53**	.60**
math comp. G7 (18)																		1.00	.73**
math comp. G9 (19)																			1.00

Note. $*p < .05$, $**p < .001$. comp. = competence. Measurement points abbreviated: G7 = Grade 7, G9 = Grade 9. Gender is coded with 1 = boys, 2 = girls. Personality measurements were conducted in Grade 7. O = Openness, C = Conscientiousness, E = Extraversion, A = Agreeableness, N = Neuroticism. Personality dimensions were modeled as latent factors.

2.3 Results

2.3.1 Goodness of Fit. Fit statistics are presented in Table 2.2. All models fit the data well with minor problems in the TLI. The Mplus codes are provided in Appendix A.

Table 2.2
Fit statistics for the basic and extended models (N = 5,236)

Model	χ^2	*df*	*p*	CFI	TLI	RMSEA	SRMR
Basic CT-C(M-1)							
No additional variables	525.74	115	$< .001$	.96	.93	[.024, .028]	.03
school grades as dependent variables							
German	853.24	147	$< .001$	.95	.91	[.028, .032]	.03
mathematics	757.09	147	$< .001$	.96	.92	[.026, .030]	.03
competences as dependent variables							
reading	1114.90	147	$< .001$	.94	.88	[.034, .037]	.03
mathematics	968.27	147	$< .001$	.95	.91	[.031, .035]	.03

Comparison of personality reports. The results of the CT-C(M-1) model contrasting parental reports against self-reported Big Five are presented in Table 2.3. Consistency ranged between .03 and .50. This means that between 3 % and 50 % of the variance in parental ratings were explained by adolescents' self-reports. As we expected, the Big Five dimensions differed markedly concerning consistency. Consistency was lowest for Openness (.03), followed by Agreeableness (.10). 97 % of parent ratings in Openness and 90 % of parental ratings in Agreeableness were due to a specific parental perspective as well as facet differences. Consistency was highest for Extraversion (.50) and Conscientiousness (.41). Finally, regarding Neuroticism 22 % of parental ratings were explained by self-reports.

Table 2.3
Comparison of parent reported Big Five with self-report of adolescents in CT-C(M-1) Model, N = 5,236

Perspective	Consistency	Specificity	Latent correlation of perspectives
Openness			
Parents	.03	.97	.17
Conscientiousness			
Parents	.41	.59	.64
Extraversion			
Parents	.50	.50	.71
Agreeableness			
Parents	.10	.90	.32
Neuroticism			
Parents	.22	.78	.47

Note. Consistency refers to the overlap of self- and parent reports.
Latent correlation between self- and parent report calculated as $\sqrt{consistency}$.

Table 2.4
Correlations between trait factors of the Big Five, N = 5,236

	(1)	(2)	(3)	(4)	(5)
Openness (1)	1.00				
Conscientiousness (2)	.17**	1.00			
Extraversion (3)	.08*	-.07*	1.00		
Agreeableness (4)	.60**	.61**	-.17**	1.00	
Neuroticism (5)	.05	-.02	-.35**	.01	1.00

Note. $^{*}p < .05$, $^{**}p < .001$. Results from a CT-C(M-1) Model.

Table 2.5
Correlations between parent factors of the Big Five, N = 5,236

	(1)	(2)	(3)	(4)	(5)
Openness (1)	1.00				
Conscientiousness (2)	.55**	1.00			
Extraversion (3)	.38**	.14**	1.00		
Agreeableness (4)	.34**	.37**	.10*	1.00	
Neuroticism (5)	-.51**	-.30**	-.59**	-.10**	1.00

Note. $^{*}p < .05$, $^{**}p < .001$. Results from a CT-C(M-1) Model.

2.3.2 Prediction of School Performance. The predictive validity of the parental perspective was assessed using school grades in German and mathematics as dependent variables. Regarding level of school performance in 7th Grade (Table 2.6, top part), trait Conscientiousness was the best predictor of German grades ($\beta = .42$, $p < .001$) and also significantly predicted mathematics grades ($\beta = .14$, $p = .001$). Parental perspective on Openness was the strongest predictor of mathematics grades ($\beta = .45$, $p < .001$) and also predicted German grades ($\beta = .17$, $p = .013$) . Trait Agreeableness ($\beta =$ -.38, $p = .041$) and trait Neuroticism ($\beta =$ -.21, $p = .039$) negatively predicted German grades. Parents' perspective on Neuroticism was, by contrast, a positive predictor of German grades ($\beta = .13$, $p = .010$). Parental perspective on Extraversion negatively predicted mathematics grades ($\beta =$ -.12, $p = .029$).

When looking at change in school performance (Table 2.6, bottom part), the parental perspective on Openness was a positive predictor of change in German grades ($\beta = .16$, $p < .001$) as well as in mathematics grades ($\beta = .20$, $p < .001$). Regarding Conscientiousness, only the trait factor was a significant positive predictor of change in German ($\beta = .12$, $p < .001$). Parents' perspective on Extraversion negatively predicted

change in mathematics grades (β = -.17, $p < .001$). Comparing these effects to those on level of school performance, the coefficients were mostly mirrored, but smaller, except for parental perspective on Extraversion. Moreover, the effects of trait Agreeableness and trait Neuroticism lost significance when looking at change rather than level of grades in German.

We ran the same models with additional control for fluid intelligence (Table A.3 in Appendix A). German and mathematics grades showed differential correlations with reasoning and perceptual speed scores, and a control variable was only included if it significantly correlated with the dependent variable. Namely, reasoning was used as control variable regarding German grades, and perceptual speed was used for mathematics grades. The effects of parental perspective on Openness and Extraversion as well as trait Conscientiousness remained stable even under control for fluid intelligence. Due to model parsimony and a substantial reduction in sample size, we did not include these results as our main models.

All in all, parental reports of Openness predicted level as well as change in school performance above self-report as expected. With respect to Conscientiousness, however, only the trait factor predicted level and change in performance significantly. The parental perspective on Extraversion was a negative predictor of level as well as change in mathematics grades, but not German grades.

Table 2.6
Standardized effects of personality perspectives on school performance, N = 5,236

Performance in the same year: **school grades in 7th Grade**				
	German		mathematics	
Perspective	trait	parents	trait	parents
Openness	.16* [.05,.26]	.17* [.04,.30]	-.01 [-.06,.04]	.45**[.36,.54]
Conscient.	.42**[.24,.60]	.14* [.05,.22]	.14* [.05,.22]	.04 [-.03,.11]
Extraversion	-.17 [-.40,.06]	.16 [-.05,.38]	-.08 [-.19,.03]	-.12* [-.22,-.02]
Agreeableness	-.38* [-.74,-.02]	-.07* [-.13,-.02]	-.03 [-.19,.12]	-.02 [-.06,.01]
Neuroticism	-.21* [-.41,-.01]	.13* [.03,.23]	-.07 [-.17,.02]	.09* [.02,.15]
Change from previous performance: **school grades in 9th Grade**				
	German		mathematics	
Perspective	trait	parents	trait	parents
Openness	.02 [-.02,.05]	.16**[.09,.23]	-.03 [-.07,.01]	.20**[.13,.28]
Conscient.	.12**[.06,.19]	.02 [-.03,.08]	.07* [.01,.13]	-.01 [-.07,.05]
Extraversion	-.05 [-.14,.03]	-.01 [-.09,.07]	-.09 [-.17,.00]	-.17**[-.24,-.10]
Agreeableness	-.10 [-.23,.02]	-.00 [-.04,.03]	.03 [-.08,.14]	-.01 [-.05,.02]
Neuroticism	-.05 [-.14,.03]	.01 [-.05,.07]	.04 [-.04,.11]	-.08* [-.14,-.02]

Note. $^{*}p < .05$, $^{**}p < .001$. Conscient. = Conscientiousness. 95%-confidence intervals in squared brackets. Personality measured in 7th Grade. Controlled for gender. Performance in 9th Grade controlled for previous performance.

2.3.3 Prediction of Competencies. Effects of traits and parental perspectives on competence scores are presented in Table 2.7. Looking at level of competences (Table 7, top part), the parental perspective on Openness was the strongest positive predictor of reading competence (β = .47, $p < .001$) as well as mathematical competence (β = .54, $p < .001$) , but trait Openness also predicted reading competence (β = .21, p = .001) and to a smaller degree mathematical competence (β = .09, p = .014). Conscientiousness did not have significant effects on level of competences. Trait Extraversion was a negative predictor of reading competence (β = -.32, p = .003) and mathematical competence (β = -.23, p = .001). Parental perspective on Extraversion negatively predicted mathematical competence (β = -.19, p = .002). The parental perspective on Neuroticism was a positive predictor of reading competence (β = .12, p = .007) and mathematical competence (β = .07, p = .044).Trait Neuroticism, by contrast, showed a negative effect on level of mathematical competence (β = -.17, p = .004).

Regarding change in competences (Table 2.7, bottom part), the parental perspective on adolescents' Openness was the strongest predictor of both change in reading competence (β = .21, $p < .001$) and mathematical competence (β = .22, $p < .001$). Parental perspective on Extraversion was negatively associated with change in mathematical competence (β = -.12, $p <= .001$). Regression coefficients regarding change in competences were smaller than for level of competences. The effects of trait factors lost significance when regressed on change in competences.

Again, we ran the models under control for fluid intelligence (Table A.4 in Appendix A). Reasoning was used as a control variable for reading competence and perceptual speed for mathematical competence. The effects of parental perspective on Openness, Extraversion, and Neuroticism remained stable even under control for fluid intelligence.

In sum, parental reports of Openness predicted level and change in competences above self-report. Furthermore, parental perspective on Extraversion was a negative

predictor of level and change in mathematical competences, whereas trait Extraversion was more strongly associated with level of competences.

Table 2.7
Standardized effects of personality perspectives on competences, N = 5,236

Competence in the same year: **competences in 7th Grade**				
	reading competence		mathematical competence	
Perspective	trait	parents	trait	parents
Openness	.21* [.09,.34]	.47**[.35,.60]	.09* [.02,.16]	.54** [.45,.63]
Conscient.	.09 [-.09,.27]	.03 [-.04,.10]	-.06 [-.17,.05]	.01 [-.05,.07]
Extraversion	-.32* [-.54,-.11]	-.03 [-.22,.16]	-.23* [-.36,-.10]	-.19* [-.32,-.07]
Agreeableness	-.31 [-.65,.03]	-.06* [-.11,-.01]	-.12 [-.32,.08]	-.09**[-.13,-.04]
Neuroticism	-.17 [-.35,.01]	.12* [.03,.21]	-.17* [-.28,-.05]	.07* [.00,.14]
Change from previous competence: **competences in 9th Grade**				
	reading competence		mathematical competence	
Perspective	trait	parents	trait	parents
Openness	.05 [-.00,.11]	.21**[.12,.29]	.01 [-.02,.04]	.22**[.16,.27]
Conscient.	-.00 [-.07,.07]	.05 [-.00,.10]	.00 [-.05,.05]	.04*[.00,.08]
Extraversion	-.09 [-.18,.00]	-.07 [-.14,.01]	-.06 [-.13,.01]	-.12**[-.17,-.06]
Agreeableness	-.07 [-.19,.06]	-.05*[-.08,-.02]	-.02 [-.11,.08]	-.02 [-.04,.01]
Neuroticism	-.07 [-.15,.01]	.06* [.00,.12]	.01 [-.05,.07]	.03 [-.02,.07]

Note. $^{*}p < .05$, $^{**}p < .001$. Conscient. = Conscientiousness. 95%-confidence intervals in squared brackets. Personality measured in 7th Grade. Controlled for gender. Competence in 9th Grade controlled for previous competence.

2.4 Discussion

Using a large representative sample of German students, the study at hand examined parents' perspective on adolescents' personality as well as its predictive validity regarding school achievement. Results showed that the lower bound of congruence of self- and parental reports was higher for Extraversion and Conscientiousness and low to medium for Openness, Agreeableness, and Neuroticism. Parental perspective on Openness was the strongest positive predictor of level as well as change in grades and competences, over and above trait effects. Regarding Conscientiousness, only the trait predicted level and change in grades, but was not associated with competence measures. The parental perspective on Extraversion negatively predicted level of and change in mathematics grades as well as mathematical competence. Trait Extraversion was negatively associated only with level of competences. The trait factors Agreeableness and Neuroticism showed negative effects on level of German grades. These findings are discussed in terms of implications and limitations in the following.

2.4.1 Parents' perspective on adolescents. Our first research question referred to the congruence of self- and parental reports on the Big Five. Due to the research design in the NEPS, items in the self- and parent-reports were not identical. As a result, our findings show the lower bound of congruence because differences in perspectives and facets could not be separated. However, all our expectations regarding differences in congruence of ratings were met.

We were able to confirm our prediction that ratings on Openness and Agreeableness would manifest substantial disagreement. Since both traits were assessed with different facets in the BFI-10 and the FFFK-K, effects of perspectives and facets are not separable in our study. Our results are nevertheless relevant from a developmental viewpoint. For one, Openness is considered to be initially intellect-based (Herzhoff et al., 2017) with artistic interest developing gradually, but its developmental trajectories are not conclusively resolved in current research (De Pauw, 2017). In our study, adolescents'

reports on the facet *aesthetics* showed a small correlation with parent-reported intellect which is evidence of valid artistic interest in seventh graders. Longitudinal examinations are required in order to trace the development of the Openness components in adolescence as reported by the self and others. One possible stimulus for adolescents' artistic interest could be cultural activity which has until now only been linked to increases in self-reports on an intellect-based Openness measure (Schwaba, Luhmann, Denissen, Chung, & Bleidorn, 2018). Secondly, Disagreeableness in childhood is assumed to be similar to Neuroticism but adult-like Agreeableness is not construed as the opposite of Neuroticism (Herzhoff et al., 2017). The parental items in our study resembled childhood Agreeableness, the self-report, on the other hand, represented adult-like traits. Since the congruence of these two perspectives was low, the question might arise which construct is more valid in an adolescent sample. One general implication might be that perspectives on adolescents' personality differ not only because of trait characteristics, but also on account of developmental stages which should be taken into account when choosing measurement instruments in future research.

Self- and parental reports on Neuroticism shared 22% of variance which is in line with our expectation of considerable discrepancies in ratings. Namely, only the parental perspective on Neuroticism showed intercorrelations (Table 2.5) that are in line with meta-analytic results regarding associations between the Big Five factors in adults (Van der Linden, te Nijenhuis, & Bakker, 2010). This difference in factor intercorrelations may be related to the notion that the crystallization of the Big Five structure in self-reports takes place during adolescence (Hill & Edmonds, 2017) and was possibly not completed in our sample of young adolescents. Despite that difference, agreement between adolescents and parents was higher for Neuroticism than for the two evaluative traits Openness and Agreeableness. Our results are limited to a certain extent by the study design since facets in the BFI-10 and the FFFK-K were identical for Neuroticism, but differed for Openness and Agreeableness. Nevertheless, our finding is in line with John and Robins's (1993)

assumption that evaluativeness particularly affects self–other agreement and contrary to the authors' limitation that emotional involvement of raters might introduce a positivity bias that could distort ratings of evaluative traits similarly to ego protection motives.

Congruence of self- and parental ratings of Extraversion and Conscientiousness was high, as expected. This indicates that behavioral cues of those traits were perceived similarly by both parents and adolescents. Still, about half of the variance in parental reports was not explained by the trait. This is in line with a purported ceiling for congruence in child personality ratings at the level of .50 to .60 (Tackett, 2011). Future studies should examine which factors influence the unique parental perspective on adolescents. Siblings living in the same household, for instance, might affect parental ratings. There is evidence that parents use traits of siblings as reference frame when rating their children's temperament (Saudino, Wertz, Gagne, & Chawla, 2004) which can result in contrast effects in so far that differences between siblings are exaggerated. Whether this also applies to personality ratings of older children, is an open research question. Same-sex siblings may be especially relevant since parental expectations for boys and girls can differ, but siblings of the same gender can be compared directly.

2.4.2 Predictive validity of parental perspective. With regard to our second research question, parent-rated Openness was the strongest predictor of level and change in school grades as well as in competences above trait. As parental items tap the intellect facet, strong relations to achievement measures are evidence for predictive validity. Despite its low observability and high evaluativeness, parents provided highly valid ratings of adolescents' Openness. While trait Openness showed only a very small association with change in reading competence, the parental perspective was associated with level and change in all achievement measures. Previous cross-sectional studies solely found effects of Openness on German grades and competences (Brandt, Lechner, Tetzner, & Rammstedt, 2020; Spengler, Lüdtke, Martin, & Brunner, 2013) which lead Spengler et al. (2013) to conclude that Openness represents rather a verbal than a mathematical orientation. One of

the few longitudinal examinations (Spengler et al., 2016) detected only small effects of personality on grades when previous performance was controlled for. Our results expand on previous knowledge as we show that parent-rated intellect can a) additionally predict mathematical achievement and b) is significantly associated with change in all achievement measures. Since the effects in our study remained stable even we controlled for fluid intelligence, parents' perspective on Openness independently contributed to the prediction of academic achievement. Further investigations could examine the influence of adolescents' academic success on their parents' view of their Openness as there is empirical evidence for reciprocal effects between GPA and self-reported Openness of adolescents (Negru-Subtirica, Pop, Crocetti, & Meeus, 2020). A subsequent research question may be whether parents' view has some effect on adolescents' self-description. Parents help their children with interpreting reality and provide feedback on how they perceive children's abilities and effort (Frome & Eccles, 1998). By doing so, parents' perception of their children's competences can have an effect on children's own perception thereby acting as self-fulfilling prophecy (Pomerantz & Thompson, 2008). This mechanism may also help explain the effect of parental perspective on Openness on change in adolescents' academic achievement that we found in our study.

Contrary to our expectations, only trait Conscientiousness predicted level and change in grades, and the parental perspective showed only small incremental validity regarding level and change in German grades. However, only the self-report measured achievement striving which has been previously found to be a particularly relevant facet for the prediction of academic success when rated by others (Ziegler et al., 2010). Compared to meta-analytic evidence (Poropat, 2009, 2014), effects of Conscientiousness on level of grades were similar, but change in grades was only weakly predicted. Competences, by contrast, were not significantly predicted by Conscientiousness which is in line with previous findings (Noftle & Robins, 2007; Spengler et al., 2013). One possible explanation might be that diligent behavior is more relevant for achieving better grades than

performance in objective competence tests. It may also be that teachers take conscientious behavior, and not only performance, into consideration when grading students (Spengler et al., 2013). We were expecting incremental validity of parental ratings on Conscientiousness since we assumed parents to have additional knowledge of trait-relevant behavior. However, the self-description of adolescents may be more valid regarding grades since adolescents can compare themselves to classmates whereas parents have to base their ratings of Conscientiousness on comparisons to siblings and other young individuals. This notion of differences in reference group has been suggested with regard to discrepancies in the ratings of developmental trajectories of adolescents' personality (Göllner et al., 2017).

Extraversion was a negative predictor of academic achievement: the parental perspective predicted change in mathematics grades as well as level and change in mathematical competence, trait was significantly associated with level of reading competence and mathematical competence. Although congruence of self- and parent-reports of Extraversion was high, parental ratings showed incremental validity, which could indicate that parents still have a unique perspective even when their report highly corresponds with adolescents' self-rating. The negative association between Extraversion and achievement has been previously reported (O'Connor & Paunonen, 2007) and could result from the focus on gregariousness which might distract adolescents from school tasks, as well as its associations with surface-learning (Zhang & Ziegler, 2016). Additionally, the negative association between the parental perspective and change in achievement arises the question whether parents treat their children differently when they consider them to be talkative and outgoing. Parental expectations may act as a negative self-fulfilling prophecy with adolescents putting in less effort because of the feedback they receive from their parents. There is evidence that increases in Extraversion from childhood to adolescence are associated with increases in adverse maternal parenting, namely overreactivity (Van den Akker et al., 2014). Change in parenting behavior, particularly adverse parenting styles, may affect adolescents' academic performance negatively.

Finally, trait Agreeableness showed the strongest effects on level of German grades, but parental perspective on Agreeableness also negatively predicted level of German grades and of both competence measures as well as change in reading competence. These effects were small but incremental to trait Agreeableness and therefore in line with our expectations. Contrary to theoretical assumptions, Agreeableness was negatively associated with level of German grades, but not mathematics grades. This negative effect on grades has been previously reported (Spengler et al., 2013). As girls described themselves as more agreeable and reported better German grades in our study, the effects of trait Agreeableness should be further analyzed separately for boys and girls. Lastly, an interesting pattern emerged for Neuroticism: trait Neuroticism was negatively related to level of German grades as well as mathematical competence, but the parental perspective showed an incremental positive effect on achievement measures. This might result from the fact that Neuroticism is low in observability and parents therefore have difficulties assessing adolescents' anxiety accurately. It might also indicate that the construct parents report on is different from what adolescents themselves see as Neuroticism and therefore it relates differently to outcome variables. The cross-sectional associations could also result from a converse effect: parents might perceive academically successful adolescents as more neurotic. Higher pressure to succeed and resulting stress might make high performing students seem anxious to parents. Longitudinally, the parental perspective on Neuroticism showed a small positive effect of reading competence, but a negative effect on mathematics grade, so that the impact on change in achievement remains inconclusive in our study and requires replication.

2.4.3 Implications of the Results. The strength of our study is the use of the CT-C(M-1) model that allowed us to contrast the parental perspective against adolescents' self-report even though different items were used. Our findings show the merit of decomposing perspectives on adolescents' Big Five. For one, differences in congruence demonstrate the applicability of the SOKA model to adolescents' personality. Secondly,

differences in predictive validity illustrate the informational value of each perspective. One implication for future research, therefore, may be to incorporate several perspectives to obtain ample descriptions of adolescents. Our study demonstrated the usefulness of incorporating different facets of the Big Five when analyzing differences in academic achievement. Since we used different measures of academic achievement, the complexity of the personality–performance association was illustrated. Large-scale studies can benefit from assessing different perspectives and facets of the Big Five as they enlarge the scope of predictive validity. Since perspectives on personality explain substantial variance of interindividual differences in school achievement, personality ratings can serve as important control variable when studying educational trajectories. For example, educational choices made by parents or teacher recommendations should not be analyzed independently of students' personality. Our results did also demonstrate the validity of short two item measures of personality.

In a broader sense, our results indicate that parents can have a distinct, unique view of their children that has criterion validity over and above self-reports as well as fluid intelligence. This falls in line with the TRI Model (McAbee & Connelly, 2016) that proposes the importance of the reputation component in the personality system. Although we did not model the personality ratings in our study to represent that model, our interpretation of the results fits well with McAbee and Connelly's (2016) assumption that separating personality components can enhance the understanding of personality associations with external variables. Adolescents seem to build a particular reputation with their parents the origin of which needs to be further investigated. For one, this reputation might result from impression management conducted by adolescents. A more likely mechanism might be that parents form an impression through perceiving their offspring in distinct situations that invoke particular manifestations of traits (McAbee & Connelly, 2016).

From a practical vantage point, parents should be aware that their unique

impressions might be influential with regard to their children's academic success. It might, for example, be possible that parents provide more learning opportunities if they consider their child to be high in Openness. Misperceptions therefore might be detrimental if academically relevant traits are affected. Teachers could discuss with parents how their perspective might influence their parenting behavior to help create a positive environment for adolescents performance and development.

2.4.4 Limitations and Future Directions. Several limitations of the study at hand have to be taken into consideration. Due to the study design it was not possible to disentangle effects of facets and perspectives for some traits. In the classical MTMM setting, all items are used across all raters (Campbell & Fiske, 1959) and method effects can thus be separated. It would be desirable to assess a broader set of facets with longer item batteries. However, this has certain practical difficulties, especially in large-scale panel studies that typically focus on measuring many different variables rather than specific traits in depth. The scale reliability was below satisfactory values in some cases which may be a result of the small number of personality items used in the NEPS. As low reliability is associated with a larger measurement error for which we accounted, the size of our effects might be enlarged. Some of our effect sizes indeed surpassed effects reported in meta-analyses. Additionally, the internal consistency of the parent-rated scales was higher than values for the self-reports. Consequently, differences between self-report and parental report in terms of predictive validity might be partly due to how well the constructs were assessed by the two different scales. The use of the same scales across all raters would counteract this problem in future studies.

Due to the flexibility of the CT-C(M-1) model, additional perspectives on personality could easily be incorporated in future studies. Teacher ratings, for example, could be used to examine whether adolescents' self-description is congruent with how they are perceived in the classroom and how teachers' unique perspective relates to academic achievement. The time span of two years that we focused on, regarding change in

achievement, was rather short, and stability in achievement measures was relatively high as a result. Subsequent studies could examine sensitive periods as transitions within the school career, as well as development in achievement over longer intervals. Furthermore, longitudinal examinations are missing in current MTMM research, although the development of perspectives over time would be a highly relevant research topic. Analyzing the association between the parental perspective and future self-descriptions would help elucidate the influence of the parental view on adolescents self-perception. Finally, the parental perspective itself may be analyzed further with regard to interindividual differences in parental reports, thus revealing factors that contribute to the formation of parental perspectives. For instance, Heaven and Ciarrochi (2008) could show that an authoritative parenting style predicts future Conscientiousness in adolescents. Whether parents' view on adolescents changes in accordance with parenting style and how this affects adolescents' self-reports could be analyzed in a longitudinal design. Furthermore, there is empirical evidence for differences between mothers' and fathers' ratings (Tackett, 2011). Paternal ratings have been found to differ more strongly from behavior-based assessments ("thin slices") than maternal ratings indicating that fathers might have a more biased view on their children's Neuroticism (Tackett et al., 2019). Future studies, consequently, might benefit from assessing and comparing reports of both parents or analyzing models separately for mothers and fathers.

2.4.5 Conclusion. This study administered MTMM CFA models to personality data on adolescents, examining the specific parental perspective and its predictive validity regarding academic achievement. Results revealed differences between self- and parental reports in accordance with the SOKA model. Furthermore, the parental perspective on Openness and Extraversion showed incremental validity over and above trait when predicting level and change in academic achievement. We provide evidence on the merits of using the CT-C(M-1) model as well as on the importance of multi-rater data on adolescents' personality. Associations between personality and achievement are

multifaceted and not adequately represented by meta-analytical coefficients alone. Different perspectives on personality can provide non redundant information and differentially predict academic achievement. Large-scale studies can therefore benefit from incorporating multiple personality ratings as they can indeed be considered unique information sources.

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3 Paper 2: Parents' unique perspective and SEB

Perceiver effects within families: Socioeconomic background and parental perspective on elementary school students' personality

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Familial socioeconomic background can impact not only academic success, but also the personality of offspring. Yet, there is little evidence on whether it might influence how parents describe their children's personality. To fill this gap, we used latent multitrait-multimethod models to examine familial socioeconomic background as possible predictor of parents' unique perspective when contrasted against teacher-reports. Two samples of elementary school students were used: Sample 1 (N = 4,203) investigated reports on the Big Five and Sample 2 (N = 3,771) focused on school-related personality facets. Socioeconomic status predicted the unique parental perspective after control for fluid intelligence in both samples. Participation in highbrow culture incrementally predicted parents' perspective over and above socioeconomic status. Specifically, parents with higher participation in highbrow culture rated their children in a more positive light than class teachers. These background specific perceiver effects might reflect both varying personality judgments or actual differences in behavior.

3.1 Introduction

The socioeconomic background of the family is an important predictor of academic achievement (Sirin, 2005). Furthermore, there is first evidence for an association with children's personality (Ayoub et al., 2018). Particularly regarding young children, parents are often used as informants for personality assessment. They are generally considered

good raters who are highly familiar with their offspring (Tackett et al., 2016) since they are their most important adult interaction partners (Luan et al., 2017). Since personality ratings can be understood as "social judgments" (Funder, 1995, p. 653), the investigation of *perceiver effects* (Kenny, 1994) seems paramount for identifying possible sources of interindividual differences in the unique parental perspective in order to increase the quality of parental personality reports (Clark, Durbin, Donnellan, & Neppl, 2017). Socioeconomic status (SES) has been considered as a possible influence on parental reports of children's psychopathology. There is, indeed, some empirical evidence that parental ratings of children's behavioral problems (Duhig, Renk, Epstein, & Phares, 2000) are associated with parental SES and recently similar effects have been reported regarding temperament measures (Strickhouser & Sutin, 2020). Parental reports on children's personality, however, have not yet been investigated in this regard. Additionally, familial socioeconomic background might be better represented by highbrow culture participation than SES alone (DiMaggio, 1982). This measure, thus far, has not been considered as a predictor of parents' unique perspective on offspring's personality. In order to fill this gap, we analyzed method effects within multitrait-multimethod (MTMM) models in large-scale personality data on German youth. We employed a broad Big Five measure, as well as more narrow facet level scales to investigate the pervasiveness of possible effects of socioeconomic background. We, furthermore, used two different measures of socioeconomic background. Our study investigated effects of SES and highbrow culture participation on the unique parental perspective when compared to teacher-reports on a) the Big Five as well as b) school-relevant personality facets of elementary school students. Parental reports were controlled for children's fluid intelligence in both samples.

3.1.1 The parental perspective on offspring's personality.

Parents are the most important adult interaction partners of offspring (Luan et al., 2017), yet research on their unique perspective is scarce outside of clinical child psychology. McAbee and Connelly (2016) recently introduced the Trait-Reputation-Identity (TRI) model which

postulates that personality comprises traits, as well as *identity* - how they describe themselves - and their *reputation* - how others describe them. This conceptualization underscores the relevance of considering unique personality perspectives of others. Parental ratings are structurally different (Eid et al., 2016) from self-reports and other-ratings meaning they can exhibit unique variance which can be analyzed when different perspectives are contrasted against each other. As every perspective on an individual's personality might be a unique information source (Vazire, 2010), the investigation of possible *perceiver effects* (Kenny, 1994) is crucial for understanding the formation of personality judgments. Within the Realistic Accuracy Model (RAM, Funder, 1995), raters' judgments are influenced by a) the relevance of the trait for the rater, b) the availability of trait information, c) the detection of trait information, and d) the utilization of it in the judgment. Two dimensions of traits are assumed to influence trait information. Trait *observability* (John & Robins, 1993) can lead to discrepancies in ratings as some traits, as Conscientiousness, are based on clear behavioral cues while others, such as Emotional Stability, are associated with internal processes that are not easily observable. Moreover, trait *evaluativeness* (John & Robins, 1993) can result in distorted ratings when the self or positively inclined raters interpret traits as Openness and Agreeableness in a distinctly favorable manner. Additionally, raters themselves can differ regarding their perceptiveness, judgmental ability and (non)defensiveness according to the RAM (Funder, 1995). Parents are considered good raters as they are very familiar with their child (Tackett et al., 2016). They see their offspring in numerous different contexts and can evaluate their behavioral tendencies over time. When forming their judgment, parents might be guided by their parental role, so that behaviors that ease and reward parenting - for example conscientious and agreeable conduct - might be particularly salient (Tackett, 2011). Additionally, behavior-centered traits as Extraversion should be easily observable for parents. Tackett (2011) has also argued that parents might be inclined to describe their offspring in a particularly positive manner which could be accounted for by parents' emotional

investment in the target and might manifest itself for highly evaluative traits (Vazire, 2010). It seems of paramount importance to identify possible parental characteristics that could lead to interindividual differences in the unique parental perspective as they could be relevant for increasing the quality of parental personality reports (Clark et al., 2017).

Meta-analytically, agreement between self- and parent-reports was found to be highest for Conscientiousness, followed by Openness and Extraversion and lower for Emotional Stability and Agreeableness (Connelly & Ones, 2010). A similar pattern was found for the agreement of parental reports with teacher-reports (Laidra, Allik, Harro, Merenäkk, & Harro, 2006). In terms of rater effects, agreement between parent and child regarding problematic child behavior has been shown to be influenced by saliency to the parent, saliency to the child as well as observability/willingness to report in a study on 7-17 year olds (Karver, 2006). One meta-analysis (Duhig et al., 2000) on parental correspondence regarding adolescents' psychopathology found higher correspondence in ratings of internalizing and externalizing problems for middle socioeconomic status compared to low socioeconomic status (SES). With regard to children's personality, however, investigations of the possible influence of socioeconomic background on parents' unique perspective are missing in current research.

3.1.2 Familial socioeconomic background and the unique parental perspective.

As summarized by De Los Reyes and Kazdin (2005), SES might have an influence on informant discrepancies regarding ratings of children's psychopathology but results were inconsistent across studies and reported associations might be explained by informant characteristics such as parent psychopathology. In the same vein, Conger and Conger (2002) proposed that SES exerts an influence on children's characteristics through parental characteristics in the Family Stress Model. Specifically, economic pressure based on economic hardship in low SES families is assumed to engender parental maladjustment and result in interparental conflict as well as harsh and inconsistent parenting. This disruptive parenting is, furthermore, presumed to be associated with decreases in

competent functioning as well as increases in behavioral problems. Theoretical or empirical considerations of a possible influence of familial socioeconomic background on the parental perspective on offspring's personality are missing in current research. The formation of parental judgments might be influenced by the described familial processes in two regards. As delineated, low familial SES is assumed to possibly bring about negative and problematic characteristics of children. They might, therefore, exhibit more cues related to a dysfunctional personality in such a family atmosphere which might, in turn, influence the parental perspective on them. Moreover, parental maladjustment and conflict could also have an influence on how parents form their judgment. Dysfunctional personality cues might be more salient to parents who are burdened. However it is also possible that low SES might bring about less accurate parental ratings in general since parents exhibit uninvolved and inattentive parenting (Conger & Conger, 2002; Conger et al., 2002) and therefore might have difficulties to form accurate impressions of children's personality.

A high SES is assumed to be associated with increased resources that can be invested in children's development promoting academic and social competencies of offspring as proposed by the Investment Model (Bradley & Corwyn, 2002). Parental personality judgments might be influenced by a high SES since children could have more possibilities to exhibit cues related to a favorable personality. Parents might, additionally, be more tuned to perceiving these cues as their investments could be accompanied by expectations of advantageous child behavior. Previous studies on the two discussed theoretical models indicate that family stress processes were more predictive of children's socio-emotional development while parental investments were more strongly related to cognitive development (Conger, Conger, & Martin, 2010). With respect to influences on the Big Five, it is not conclusively resolved which pathways might be most relevant. Examining the possible influence of SES on the parental perspective on offspring's personality might be conducive to a better understanding of SES and its consequences for children's outcomes as well as perceiver effects within families.

With respect to measurement of socioeconomic background, SES is the most commonly used metric and usually represented by parental education, income, as well as occupation (House, 2002). In social inequality research, however, participation in the culture of a certain social class is thought to be a more relevant indicator of the family background than mere SES (DiMaggio, 1982). This notion is based upon Bourdieu and Passeron (1977)'s theory of *cultural capital* which includes engagement with the most prestigious, highbrow, culture as a means of distinction from lower social classes. While SES incorporates *structural* aspects of the familial living conditions, highbrow culture participation can be viewed as a *process-based* feature of socioeconomic background (Baumert et al., 2003). Tramonte and Willms (2010) propose the terms *static* and *relational* respectively. Highbrow culture participation reflects processes that shape familial lifestyle and parental engagement with offspring with regard to cultural activity. It is, insofar, a more behavior-oriented representation of familial socioeconomic background. If the latter should be of relevance to the unique parental perspective on offspring, highbrow culture participation therefore might show incremental effects over and above SES. Drawing on Brunswik's (1956) lens model, Wittmann and Klumb (2006) point out that predictors can fail to correlate with a criterion when their levels of generality are incongruent (see also Wittmann, 1988). Highbrow culture participation could be considered a narrower predictor while SES could be seen as broader. The former might accordingly show stronger associations with narrower personality measures on the facet level as opposed to the broader Big Five than the latter.

Strickhouser and Sutin (2020) were able to show that lower parental SES was associated with lower parental reports of sociability, higher reactivity, and lower persistence of 4–15 year olds with effects remaining stable over time. In this study, however, parental reports were not controlled for other- or self-ratings. Generally, specific examinations of the influence on parents' unique perspective on their offspring's personality are scarce in current research. To the authors' knowledge, no empirical investigation thus far has focused on the

unique parental perspective on children's Big Five and its possible associations with the socioeconomic background. The possible relation of participation in highbrow culture with parents' unique perspective has also not been explored as of yet. Since parental reports are commonly included in large-scale assessments of youth, the detection of possible parental *perceiver effects* (Kenny, 1994) can be informative as different measures of socioeconomic background might be relevant control variables when examining effects of the parental perspective on outcome variables. They, furthermore, can help in the understanding of the formation of parental judgments about their offspring within the family context.

3.1.3 The Present Investigation. We present results from two samples of elementary school students in order to provide a more comprehensive overview of effects of socioeconomic background on the unique parental perspective and enhance the robustness of our results. We used personality measures with a different breadth in order to gauge whether effects of socioeconomic background might only be relevant on the broad Big Five factor level or also detectable when school-specific personality facets are used. Participation in highbrow culture, furthermore, is a behavior-oriented measure of socioeconomic background than SES which might mean that it is more strongly associated with narrower personality measures. The independent variables were identical in the two samples: parental ratings were controlled for the child's fluid intelligence and socioeconomic background was represented by SES and participation in highbrow culture. In Sample 1 we examined parents' perspective on elementary school students' Big Five over and above teacher-reports. Sample 2 comprised teacher- and parent-reports on facet measures of school-relevant personality. Our main goal was to examine the effects of familial socioeconomic background on parental ratings in these different settings. We amplified existing research by examining the unique parental perspective while incorporating nuanced measures of socioeconomic background as well as two operationalizations of children's personality. Neither our research questions, nor the study, nor our analyses were preregistered. We investigated the following research questions:

1) Is socioeconomic status related to the unique parental perspective on children's personality? We expect effects on traits that are rated less congruently as Agreeableness, Emotional Stability, and Self-Control.

2) Does participation in highbrow culture predict the unique parental perspective on children's personality over and above socioeconomic status? We expect incremental effects of participation in highbrow culture on the perspective on traits that are rated less congruently.

3.2 Materials & Methods

3.2.1 Sample 1.

Participants. Data from Starting Cohort 2 (Kindergarten) of the German-wide National Educational Panel Study (NEPS) were used. The NEPS has a longitudinal multi-cohort sequence design and is focused on research on educational processes and developmental trajectories of competences (for details see Blossfeld et al., 2011). Data from the NEPS are only available after completion of a NEPS-data usage agreement and are not publicly accessible. However, documentation of the procedures and measures used in Cohort 2 is openly available on the NEPS website: https://www.neps-data.de/Data-Center/Data-and-Documentation/Start-Cohort-Kindergarten. The website also provides a list of all publications using NEPS data: https://www.neps-data.de/Project-Overview/Publications. Data collection for Cohort 2 started in preschool when children were 4 years old and continued annually. We used measurement waves 4 and 5 in our study. N = 6,201 parents and N = 693 class teachers participated in the relevant waves. Our sample (N = 4,203) consists of elementary school students for whom at least one of the personality reports as well as at least one of socioeconomic background measures were available. Students on our sample were on average M = 8.32 (SD = 0.50) years old and 50.7 % girls.

Measures.

Parent- and Teacher-Ratings of Students' Personality. Both teachers and parents filled out the short version of the Fünf-Faktoren-Fragebogen für Kinder [*Five Factor Questionnaire for Children*] (FFFK-K, Weinert et al., 2007) regarding the child's personality. The FFFK-K consists of 10 items (Table B.7 in Appendix B, translated into English by the authors of the current study), two per Big Five factor, and uses a 10-point scale (0 to 10). The items are constructed as semantic differentials (i.e. for Extraversion the child is to be rated: "from 0 "is silent" to 10 "is talkative"). Reports were given by mothers in 89.2% of cases, by fathers in 0.10% of cases, by legal guardians in 0.05 % of cases; the relationship was not reported in 10.65% of cases. For teacher-reports, the reliability of the Emotional Stability scale (ω=.71) was lowest, followed by Conscientiousness (ω=.72), Extraversion (ω=.76), Agreeableness (ω=.77), and Openness (ω=.79). For parent-reports, the reliability of the Emotional Stability scale was lowest (ω=.58), followed by Openness (ω=.63), Conscientiousness (ω=.64), Agreeableness (ω=.67), and Extraversion (ω=.72). We employed latent variable modeling to account for measurement error in the scales. Parents reported on their child's personality in February to May 2014 (wave 4) when children attended Grade 2. Teachers filled out the personality reports from November 2014 to January 2015 (wave 5) when children attended Grade 3. Teacher-ratings were centered at the class mean, in order to account for possible differences between classes.

Socioeconomic status. Parental socioeconomic status (SES) was measured by three economic indicators measured in 2013 (wave 3): The Highest International Socio-Economic Index of Occupational Status (HISEI), an index of the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) representing parental education as well as the number of years in education of the parents. The three indicators showed a reliability of ω=.54. A latent variable was modeled to represent SES.

Participation in highbrow culture. Participation in highbrow culture was assessed with three items on the frequency of visits in the last 12 months (1 = "never", 2 = "once", 3 = "2 to 3 times", 4 = "4 to 5 times", 5 = "more than 5 times") of a) museum and

exhibition, b) opera, ballet, classical concert, and c) theater in 2013 (wave 3). Parents were instructed to answer the items regardless of whether they did these activities with their child, accompanied by others, or alone. The reliability of these three items was $\omega = .63$. A latent variable was modeled to represent cultural participation.

Fluid intelligence. Since higher socioeconomic status is associated with higher academic achievement (Sirin, 2005), it is possible that children in households with higher socioeconomic status have higher cognitive abilities. Parental reports on children's personality were therefore controlled for the effects of intelligence to rule out the possibility that parental personality ratings in different SES households are influenced by children's intelligence. To control for fluid intelligence of children, a latent variable was modeled with 12 dichotomous (solved/not solved) items from a figural reasoning matrices test (for details see Haberkorn and Pohl, 2013) that was administered in Grade 2 (wave 4).

3.2.2 Sample 2.

Participants. We used data from the study *Transition* (Maaz, Baumert, Gresch, & McElvany, 2010) on German elementary school (*Grundschule*) students attending fourth grade collected in the school year 2006/2007. This study is a national extension of the Trends in International Mathematics and Science Study (TIMSS) 2007 (Mullis et al., 2005). The *Transition* study (Maaz et al., 2010) included 253 elementary schools with one random class per school and 13 of the 16 German federal states participating (Berlin, Brandenburg, and Mecklenburg-Vorpommern did not participate due to differences in the school system). Data from the *Transition* study are not publicly available. A total of $N = 4{,}162$ parents and $N = 233$ class teachers were surveyed in February and March 2007. Our sample ($N = 3{,}771$) consists of cases for whom at least one of the personality reports as well as one of the independent variable measures were available. Students were on average $M = 10.42$ ($SD = 0.50$) years old and 48.4 % girls at the time of the personality assessment. The parent report was filled out by the father in 6% of cases ($N = 226$), by mothers in 45.6% of cases ($N = 1{,}719$), by both parents

together in 32.9% of cases (N = 1,240), by legal guardians in 1.1% of cases (N = 41) and the relationship was not reported in 15.3% of cases (N = 545). N = 233 class teachers participated and were asked to rate each child in their class. In the final data set, teachers had on average rated M = 17.32 (SD = 5.07) students, ranging from 2 to 28 students of their class. Teachers were on average M = 45.80 (SD = 10.80) years old and 86.7 % women.

Measures.

Parent- and Teacher-Ratings of Students' Personality. Parents and teachers rated largely the same items on students' school related personality. The items (Table B.8 in Appendix B, translated into English by the authors of the current study) were generated by the authors of the *Transition* study (Maaz et al., 2010) with reference to Carroll's (1963; 1973) model of school learning and were designed to specifically measure personality aspects that are relevant in the school context. Items were rated from *1 = does not apply at all* to *6 = fully applies*. Teachers were given five extra items which were not included in our analyses since they were not available for parents. For the current study, we assigned 12 items to six personality facets with two items each: *interest in learning*, *diligence*, *striving for achievement*, *sociability*, *self-control*, and *emotional stability*. Confirmatory factor analyses showed a good fit of the six facets in teacher-reports (CFA = .97, TLI = .95, RMSEA = [.08, .09], SRMR = .04 for N = 3,326) as well as parental reports (CFA = .98, TLI = .97, RMSEA = [.05, .06], SRMR = .03 for N = 3,491). The reliability of the facets was as follows: parent-ratings of *interest in learning* showed an ω = .91 and teacher-ratings ω = .97; for *diligence* ω = .79 for parent-ratings and ω = .89 for teacher-ratings; for *striving for achievement* parental ratings at ω = .76 and for teacher-ratings ω = .88; for *sociability* ω = .87 for parent-ratings and ω = .91 for teacher-ratings; for *self-control* ω = .79 for parent-ratings and teacher-ratings ω = .94; for *emotional stability* ω = .74 for parent-ratings and teacher-ratings ω = .84. Teacher-ratings were centered at the class mean so as to account for possible differences between classes.

Socioeconomic status. Parental socioeconomic status (SES) was measured by two economic indicators: The Highest International Socio-Economic Index of Occupational Status (HISEI) representing parental occupation as well as an index of the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) representing parental education. The two measures showed a reliability of $\omega = .60$. A latent variable was modeled to represent SES.

Participation in highbrow culture. Familial participation in highbrow culture was assessed with four items on the general frequency (1 = "never", 2 = "rarely", 3 = "frequently", 4 = "very frequently") of parental visits of a) theater, b) museum, c) concerts and, d) classical concerts in 2007. The reliability of these four items was $\omega = .80$. A latent variable was modeled to represent highbrow culture participation.

Fluid intelligence. To control for possible effects of intelligence on parental and teacher-ratings, the sum score from the figural subtest N2 of the Kognitiver Fähigkeits-Test für 4. Klassen [Cognitive Ability Test for Fourth Grade] (KFT 4–12+R; Heller and Perleth, 2000) was used. In this subtest consisting of 25 items, students have to draw analogies between different figures. Two paralleled Versions A and B were administered with respective internal consistency of $\alpha = .92$ for A and $\alpha = .93$ for B. The mean sum score in our sample was $M = 16.63$ ($SD = 6.92$). A latent variable was modeled using the sum score. To correct for attenuation, the error variance of this latent variable was fixed to (1 - α) times the variance in the sample: (1 - .93)*47.83.

3.3 Statistical Analysis

Since we aimed at analyzing the unique parental perspective when compared to teacher-reports, we applied a specific multitrait-multimethod (MTMM) CFA model namely the correlated trait-correlated method minus 1, CT-C(M-1), model (Eid, 2000; Eid et al., 2003). In the CT-C(M-1), one method serves as a *reference method* that is not analyzed separately and the other methods are contrasted against it. In the current study,

personality was measured with two structurally different methods - a teacher-report as well as a parental report. We used the teacher-report as the *reference method* and contrasted the parental reports against it to represent parents' unique perspective. Figure 3.1 illustrates the CT-C(M-1) model in Sample 1 for the Big Five, Figure 3.2 shows the CT-C(M-1) model in Sample 2 for six personality facets. In Figure 3.1, the trait factors T_{11} to T_{51} represent the common variance of teacher- and parental reports; therefore in our model, the expression *trait* signifies the common variance of teacher- and the parent-reports on the respective personality dimension. Congruence of the two personality reports is expressed by the latent correlation between teacher- and parent-report. We calculated the latent correlation between teacher-report and parent-report for each personality dimension using the square root of the *consistency* from the CT-C(M-1) model. The consistency is a true score variance component that we computed for each of the items and aggregated over the personality dimensions: it equals the proportion of variance in the parental report that is explained by the teacher-report. Following equations provided in Eid et al. (2003) were used:

Aggregated true-score variables:

$$\sum_i T_{ijk} = \sum_i \mu_{ijk} + \left(\sum_i \lambda_{Tijk}\right) T_{1j1} + \left(\sum_i \lambda_{Pijk}\right) M_{1jk}$$

Variances of the true-score variables:

$$\text{Var}\left(\sum_i T_{ijk}\right) = \text{Var}\left[\left(\sum_i \lambda_{Tijk}\right) T_{1j1}\right] + \text{Var}\left[\left(\sum_i \lambda_{Pijk}\right) P_{1jk}\right] \text{(A)}$$

$$\text{Var}\left[\left(\sum_i \lambda_{Tijk}\right) T_{1j1}\right] = \left(\sum_i \lambda_{Tijk}\right)^2 \text{Var}\left(T_{1j1}\right) \text{(B)}$$

Consistency:

$$\text{CO}\left(\sum_i T_{ijk}\right) = \frac{(B)}{(A)}$$

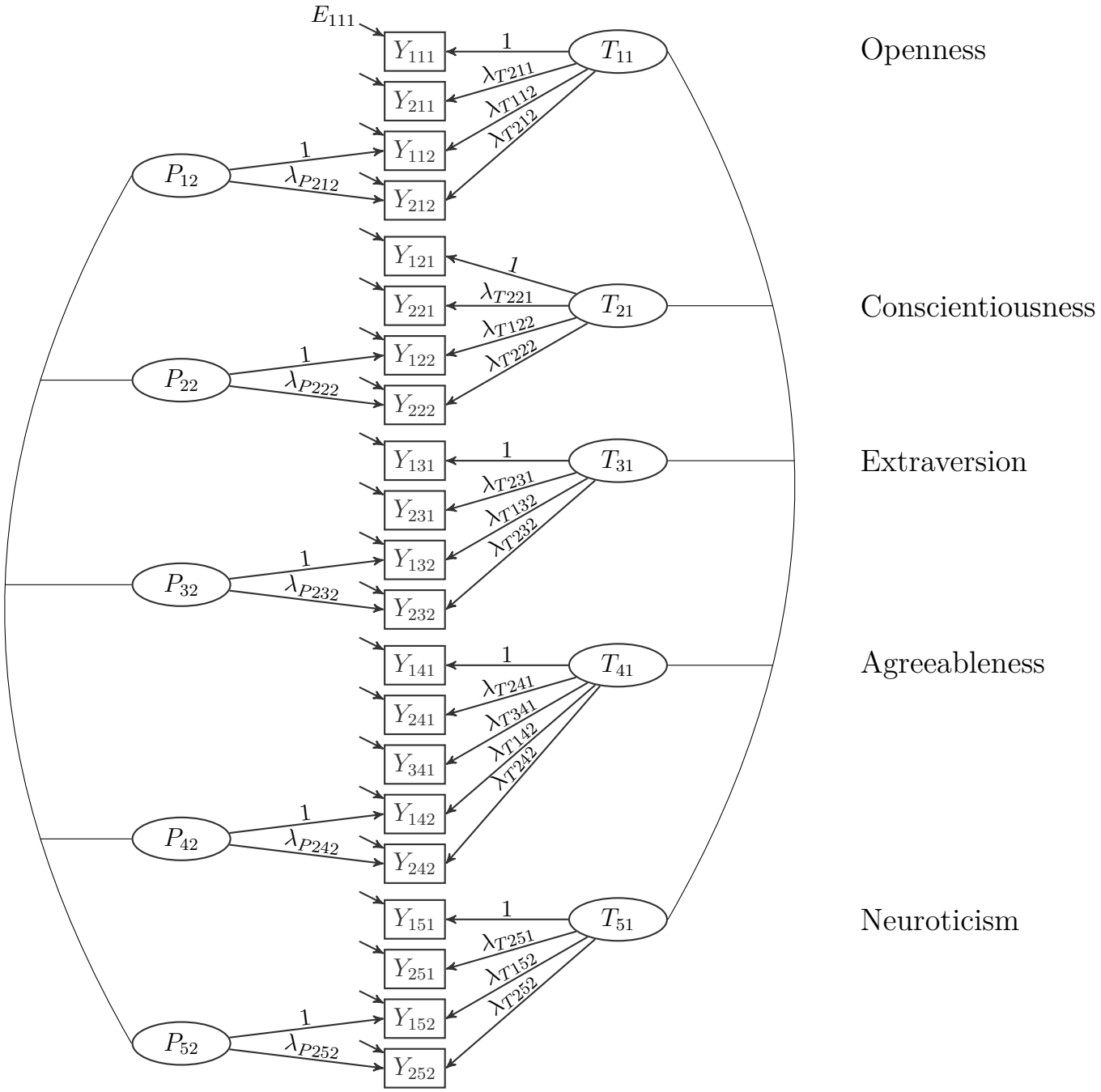

Figure 3.1. Multiple-indicator correlated trait-correlated method minus one model [CT-C(M-1)] for the Big Five in Sample 1 (N = 4,203). Y_{ijk} = observed variable; i = indicator; j = trait; k = perspective (1 = reference method, 2 = parent perspective); T_{jk} = latent trait variable; P_{jk} = trait specific unique parental perspective; E_{ijk} = error variable; $\lambda_{Pijk}, \lambda_{Tijk}$ = factor loadings.

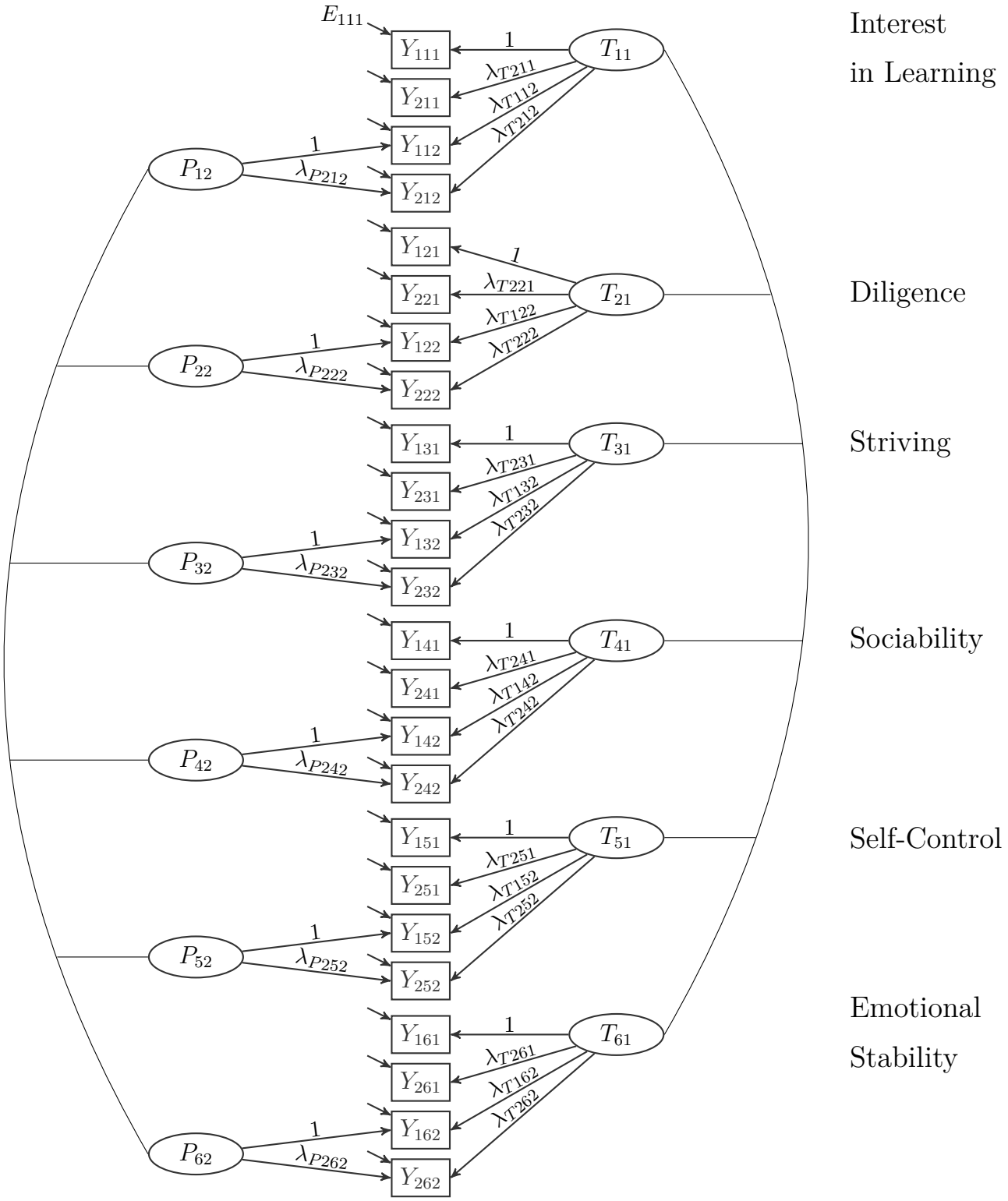

Figure 3.2. Multiple-indicator correlated trait-correlated method minus one model [CT-C(M-1)] for six personality facets in Sample 2 (N = 3,771). Y_{ijk} = observed variable; i = indicator; j = trait; k = perspective (1 = reference method, 2 = parent perspective); T_{jk} = latent trait variable; P_{jk} = trait specific unique parental perspective; E_{ijk} = error variable; $\lambda_{Pijk}, \lambda_{Tijk}$ = factor loadings.

Residualization of explanatory variables. In order to analyze interindividual differences in parental perspectives, we tested effects of explanatory variables on the unique parental perspective factors in extended models. Since trait factors and method factors of the same personality dimension are not allowed to correlate by definition of the CT-C(M-1) model, using explanatory variables that correlate with the trait factor automatically leads to a suppression structure which can result in model misspecifications and parameter bias (Koch, Kelava, & Eid, 2018). Consequently, latent explanatory variables need to be transformed so that they do not correlate with the trait factors any longer. We used the *residual approach* proposed by Koch et al. (2018) as illustrated for one personality dimension in Figure 3.3. Specifically, the untransformed latent explanatory variable η_1 is regressed on the trait factor T_{jk}. The residual from this regression is then defined as latent variable ξ_1 and can load on the unique parental perspective since it is trait-free. The regression coefficient δ_1 of a transformed explanatory variable on P_{jk} represents the association between the explanatory variable ξ_1 and the unique parental perspective corrected for the confounding influence of the trait (Koch et al., 2018). In the current study, this effect represent an association with the parental report under control for teacher-reports, i.e. it compares the relation with the parental view with the coefficient that would have been predicted by the teacher-report. Positive regression coefficients of predictors, therefore, represent an overestimation of the respective personality aspect in comparison to teacher-reports, and negative effects an underestimation. We included highbrow culture participation (ξ_1), SES (ξ_2), and fluid intelligence (ξ_3) as predictors of the unique parental perspectives and estimated the model for all personality aspects (Big Five in Sample 1 and personality facets in Sample 2) simultaneously. We estimated all models with Mplus 8.4 (Muthén & Muthén, 1998–2017); we provide our Mplus syntax in the Supplementary Material. Missing data was accounted for by Full Information Maximum Likelihood (FIML). As reported by (Enders & Bandalos, 2001), FIML is superior to response pattern imputation and yields unbiased results.

Students' class ID was used as a cluster variable to obtain unbiased standard errors. Model fit was assessed using the following criteria: comparative fit index (CFI) and Tucker-Lewis index (TLI) of at least .90, root mean square error of approximation (RMSEA) of no more than .06, and standardized root mean square residual (SRMR) of .08 or lower (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004). We considered the model fit acceptable, when at least two of the fit indices were within these criteria. The extended models fit the data very well with CFIs of .95 or higher, TLIs of .95 or higher, as well as RMSEAs under .04 and SRMRs under .05. We provide the full fit statistics in Table B.1 of Appendix B.

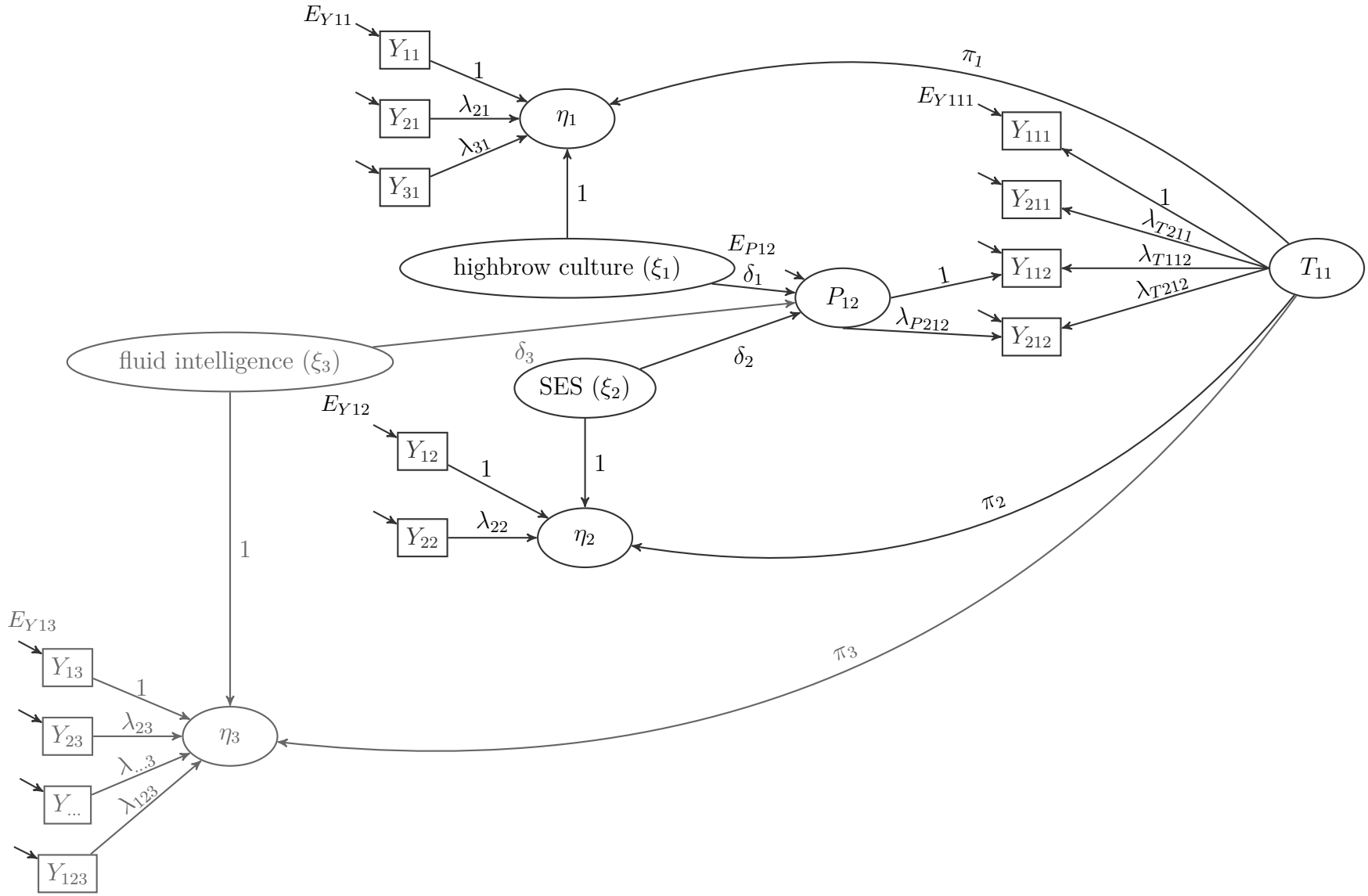

Figure 3.3. Residualization approach, exemplary for one personality dimension. Highbrow culture = familial participation in highbrow culture. SES = socioeconomic status of parents. Fluid intelligence is used as a control variable (in gray).

Table 3.1
Sample 1: Latent bivariate correlations between study variables in a sample of German elementary school students, N = 4,203

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
O (teacher-report) (1)	1.00	.76**	.48**	.34**	.61**	.57**	.41**	-.03	.09*	.11**	.35**	.25**	.40**
C (teacher-report) (2)		1.00	.12**	.60**	.32**	.40**	.52**	-.15**	.16**	.02	.19**	.16**	.29**
E (teacher-report) (3)			1.00	.02	.84**	.27**	.06*	.42**	-.01	.34**	.11**	.11**	.10**
A (teacher-report) (4)				1.00	.08*	.09**	.23**	-.12**	.23**	-.08*	.08*	.08*	.09**
ES (teacher-report) (5)					1.00	.38**	.17**	.29**	-.02	.37**	.13**	.11*	.16**
O (parent-report) (6)						1.00	.58**	.28**	.21**	.43**	.15**	.14**	.33**
C (parent-report) (7)							1.00	-.02	.29**	.21**	.10**	.17**	.20**
E (parent-report) (8)								1.00	.04*	.68**	-.07*	.02	-.07*
A (parent-report) (9)									1.00	.07**	-.07*	.01	.02
ES (parent-report) (10)										1.00	-.02	.07*	.03
SES (11)											1.00	.47**	.18**
highbrow culture (12)												1.00	.13**
reasoning (13)													1.00

Note. $^*p < .05$, $^{**}p < .001$. O = Openness, C = Conscientiousness, E = Extraversion, A = Agreeableness, ES = Emotional Stability. SES = parental socioeconomic status, highbrow culture = participation in highbrow culture, reasoning = measure of fluid intelligence.

Table 3.2
Sample 2: Latent bivariate correlations between study variables in a sample of German elementary school students, N = 3,771

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
INT (teacher-report) (1)	1.00	.82**	.95**	.62**	.54**	.77**	.46**	.43**	.46**	.29**	.20**	.41**	.34**	.19**	.47**
DIL (teacher-report) (2)		1.00	.92**	.73**	.72**	.64**	.41**	.55**	.47**	.35**	.26**	.33**	.25**	.15**	.34**
STR (teacher-report) (3)			1.00	.67**	.59**	.77**	.53**	.51**	.53**	.32**	.23**	.44**	.31**	.20**	.42**
SOC (teacher-report) (4)				1.00	.85**	.54**	.29**	.37**	.33**	.47**	.27**	.25**	.20**	.14**	.28**
CONT (teacher-report) (5)					1.00	.52**	.26**	.37**	.30**	.40**	.29**	.22**	.17**	.12**	.27**
STAB (teacher-report) (6)						1.00	.44**	.33**	.41**	.24**	.17**	.50**	.29**	.16**	.46**
INT (parent-report) (7)							1.00	.75**	.88**	.50**	.40**	.74**	.18**	.18**	.32**
DIL (parent-report) (8)								1.00	.90**	.61**	.47**	.63**	.06*	.11**	.17**
STR (parent-report) (9)									1.00	.56**	.46**	.78**	.13**	.16**	.27**
SOC (parent-report) (10)										1.00	.52**	.46**	.16**	.15**	.19**
CONT (parent-report) (11)											1.00	.43**	.10**	.13**	.11**
STAB (parent-report) (12)												1.00	.16**	.18**	.29**
SES (13)													1.00	.56**	.44**
highbrow culture (14)														1.00	.26**
kft (15)															1.00

Note. $^*p < .05$, $^{**}p < .001$. Personality facets: INT = Interest in Learning, DIL = Diligence, STR = Striving, SOC = Sociability, CONT = Self-Control, STAB = Emotional Stability. SES = parental socioeconomic status, highbrow culture = participation in highbrow culture, kft = measure of fluid intelligence.

3.4 Results

3.4.1 Results in Sample 1. Referring to the latent bivariate correlations in Table 3.2, SES was positively associated with teacher-reports on all Big Five dimensions with the relation to Openness being the strongest. Parent-reports on Openness and Conscientiousness were positively associated with SES as well, but the correlations were weaker than with teacher-reports. SES, additionally, showed negative correlations with parent-reports on Extraversion and Agreeableness. Taken together, teacher-reports were more strongly associated with SES than parent-reports, particularly with regard to Openness. Teachers described students more positively when familial SES was higher. Highbrow culture participation of parents was also positively associated with teacher-reports on all Big Five dimensions. It, moreover, correlated positively with parent-reports on Openness, Conscientiousness, and Emotional Stability. Its association with Openness, again, was stronger for teacher-reports than for parent-reports.

Effects of the independent variables on the unique parental perspective on children's Big Five from the CT-C(M-1) model are presented in Table 3.4. Here, positive regression coefficients of predictors represent an overestimation of a personality dimension by parents in comparison to teacher-reports, and negative effects an underestimation. Compared to the teacher-reports, a higher SES - with fluid intelligence and highbrow participation controlled for - was associated with lower parental ratings of Openness (β = -.09, p = .019), Extraversion (β = -.09, p =.004), Agreeableness (β = -.12, $p < .001$), and Emotional Stability (β = -.08, p = .003). Parents with a higher SES, thus, described their offspring less favorably than the class teachers. A more frequent participation in highbrow culture - with fluid intelligence controlled for - incrementally predicted parents' perspective on Conscientiousness (β = .12, p = .001) and on Emotional Stability (β = .09, p = .005) over and above SES. Parents with higher highbrow culture participation rated their offspring significantly higher on Conscientiousness, and on Emotional Stability, and therefore more favorably than class teachers. Since we found effects of SES on the unique

parental perspective irrespective of the strength of congruence of teacher- and parental report, our expectations for the first research question were partly met. Highbrow culture participation incrementally predicted the unique parental perspective on two dimensions over and above SES irrespective of strength of congruence, partly confirming the expectations for our second research question.

Table 3.3
Sample 1: Standardized effects on the unique parental perspective on elementary school students' Big Five under control for teacher-report from a CT-C(M-1) model, N = 4,203

			Predictors of unique parental perspective		
	r	R^2	fluid intelligence	SES	highbrow cult. part.
Openness	.56	.02*	.13* [.06,.20]	-.09* [-.16,-.01]	.03 [-.05,.12]
Conscientiousness	.52	.02*	.06* [.00,.12]	-.05 [-.11,.02]	.12* [.05,.19]
Extraversion	.43	.01	-.05 [-.11,.01]	-.09* [-.16,-.03]	.04 [-.02,.13]
Agreeableness	.32	.01*	.00 [-.05,.05]	-.12**[-.17,-.07]	.03 [-.02,.09]
Emotional Stability	.38	.01	.00 [-.06,.06]	-.08* [.03,.14]	.09* [-.16,-.03]

Note. $^{*}p < .05$, $^{**}p < .001$. 95%-confidence intervals in squared brackets. r = Latent correlation between teacher- and parent-report calculated as $\sqrt{consistency}$ from the CT-C(M-1) model results. R^2 = total explained variance in unique parental perspective. SES = socioeconomic status of the parents, highbrow cult. part. = joint participation in highbrow culture within the family.

3.4.2 Results in Sample 2. Referring to the latent bivariate correlations in Table 3.3, SES was positively associated with all personality facets rated by teachers as well as parents. The correlations with the teacher-report, however, were stronger. Teachers described students more positively when the familial SES was higher. Parental highbrow culture participation also correlated positively with all personality facets in both reports, but the strength of the correlations did not differ markedly between reports as for SES.

Effects of the independent variables on the unique parental perspective from the CT-C(M-1) model are presented in Table 3.5. Parents with a higher SES - with fluid intelligence and highbrow participation controlled for - rated offspring lower than teachers on the facets Interest in Learning (β = -.10, p = .002), Diligence (β = -.17, $p < .001$), Striving (β = -.15, $p < .001$), as well as Emotional Stability (β = -.12, p = .001). Parents with a higher SES described their offspring less favorably than the class teachers, as in Sample 1. Highbrow culture participation - with fluid intelligence controlled for - was significantly associated with a more positive unique parental perspective compared to the teacher-report on all six personality facets over and above SES. The strongest effect occurred for Emotional Stability (β = .17, $p < .001$) and the weakest association was found for Sociability (β = .09, p = .002). Highbrow culture participation consequently exhibited incremental validity regarding the unique parental perspective over and above SES. Parents rated their offspring significantly higher on all personality facets, and thus more favorably, than was predicted by the teacher-report. In sum, compared to teacher-reports, parental socioeconomic status was associated with lower parental reports on Interest in Learning, Emotional Stability and facets of Conscientiousness. Participation in highbrow culture, by contrast, predicted higher parental reports on all personality facets, in particular on Emotional Stability and Interest in Learning. As hypothesized, SES predicted the unique parental perspective. However, our expectation that effects would be more pronounced when congruence of perspective is low, was not met. Our expectation that participation in highbrow culture would incrementally predict the unique parental perspectives over and

above SES was confirmed, albeit the effect was independent of congruence of perspectives.

Table 3.4
Sample 2: Standardized effects on the unique parental perspective on school-relevant personality facets of elementary school students under control for teacher-report from a CT-C(M-1) model, N = 3,771

			Predictors of unique parental perspective		
	r	R^2	fluid intelligence	SES	highbrow cult. part.
Interest in Learning	.41	.03*	.12* [.05,.19]	-.10* [-.16,-.04]	.14**[.09,.19]
Diligence	.54	.02*	.02 [-.05,.09]	-.17**[-.23,-.11]	.13**[.07,.19]
Striving	.51	.02*	.09* [.02,.17]	-.15**[-.21,-.08]	.14**[.08,.19]
Sociability	.47	.02*	.06 [-.01,.12]	.02 [-.05,.08]	.09* [.03,.15]
Self-Control	.29	.01*	.01 [-.06,.08]	-.02 [-.09,.05]	.10**[.05,.16]
Emotional Stability	.54	.03*	.08* [.01,.15]	-.12* [-.19,-.05]	.17**[.10,.23]

Note. $^{*}p < .05$, $^{**}p < .001$. 95%-confidence intervals in squared brackets. r = Latent correlation between teacher- and parent-report calculated as $\sqrt{consistency}$ from the CT-C(M-1) model results. R^2 = total explained variance in unique parental perspective. SES = socioeconomic status of the parents, highbrow cult. part. = joint participation in highbrow culture within the family.

3.5 Discussion

The current investigation examined predictors of the unique parental perspective on elementary school students' personality in two samples. Parental reports were controlled for teacher-reports as well as children's fluid intelligence. Socioeconomic status of the family was negatively associated with the unique parental perspective when compared to the teacher-report. Highbrow culture participation incrementally predicted the unique parental personality perspective over and above socioeconomic status on Big Five dimensions as well as on the facet level. Parents with a higher highbrow culture participation rated their children more positively when compared to teacher-reports.

With regard to our first research question, the unique parental perspective on elementary school students' personality was negatively associated with familial SES. However, our expectation, that effects would be particularly pronounced when convergence of personality reports is low, was not met. As expectable from theory and empirical evidence, discrepancies between teacher- and parental reports were most pronounced for Agreeableness, which is an evaluative trait, Emotional Stability, which is low in observability, and on the facet level for Self-Control, which could be categorized as evaluative. The strength of agreement for Big Five and facet measures in our study ranged from .29 to .56, which is consistent with previous literature. Self-informant agreement for ratings of adults' Big Five typically ranges between .40 and .60 (McCrae et al., 2004), agreement between other-raters from .20 to .50 (Vazire, 2006). The strength of agreement is notable since teachers and parents know the children from different contexts and might use different frames of reference. Teachers can base their ratings on comparisons with numerous different children, while parents can typically compare their offspring only with siblings and children of friends and family. Parental ratings were relatively concurrent with teacher-reports even when school-specific personality facets were assessed. This could be evidence for the validity and informational value of both perspectives. Bivariate correlations between SES and parental reports on Openness and Conscientiousness as well

as school-relevant personality facets were positive dovetailing with previous empirical evidence on more positive reports on offspring's Big Five and temperament when parental SES was higher (Ayoub et al., 2018; Strickhouser & Sutin, 2020). Using the CT-C(M-1) model, however, SES was negatively associated with the unique parental perspective when compared with teacher-reports. Our statistical approach allowed us to isolate parents' unique perspective in comparison to teacher-ratings and revealed that, in fact, parents with a higher SES rated their children less favorably than the class teachers. Effects of SES on the unique parental perspective were not trait specific in our samples which could indicate that they represent general *perceiver effects* (Kenny, 1994). Empirical evidence suggests that perceivers exhibit a general positivity tendency when rating others irrespective of the particular trait content (Srivastava, Guglielmo, & Beer, 2010; Wood, Harms, & Vazire, 2010). Rau, Nestler, Dufner, and Nestler (2020) have suggested that this generalized positivity in other-perception might be associated with individual differences in perceivers with demographic variables being one set of possible correlates. Our results demonstrate the use of different measures of socioeconomic background as predictors of parents' specific perspective. However, our study represent a more complex situation, as parents rated their offspring so that the perceptual processes are embedded within the familial context. Kenny (1994) proposed that personality judgments are the result of *perceiver effects*, *target effects*, as well as *relationship effects*. Judgments, accordingly, might not only depend on rater and target characteristics, but to some extent also on the relationship between rater and target. Therefore, future research should investigate the possible influence of family life indicators such as familial cohesion on the unique parental perspective. Specifically, changes in the relationship between parents and offspring during puberty might be particularly relevant. Longitudinal examinations are needed to trace the development of the unique parental perspective in accordance to possible disruptions in family life.

As assumed, participation in highbrow culture incrementally predicted the unique parental perspective on children's personality over and above SES. It was positively

associated with Conscientiousness, Emotional Stability, and different personality facets of elementary school students. In other words, parents described their offspring more positively than teachers even when fluid intelligence and SES were held constant. We did not find the expected differences in strength of effects depending on rater discrepancies since highbrow culture participation was consistently associated with socially desirable personality dimensions, i.e. compared to teacher-reports, parents described their offspring as more conscientious, emotionally stable, interested in learning, sociable and self-controlled when familial participation in highbrow culture was higher. At least three interpretations of these findings are conceivable. For one, the positive associations with highbrow participation might result from differences in exhibited behavior, i.e. children might have more opportunities to show socially desirable behavior when parents take them along to cultural activities more frequently. Second, our findings could also be explained alongside the Social Selection Perspective (Conger & Donnellan, 2007) proposing that effects of the familial background on offspring result from parental characteristics that helped parents attain a higher status. Parents with different socioeconomic backgrounds might, for example, differ regarding their own personality as particular personality aspects are associated with academic achievement (Poropat, 2009). As a result, parental knowledge about personality traits might differ as well. Within the RAM (Funder, 1995), differential knowledge about traits can affect detection and utilization of trait information during judgment formation. Consequently, some parents might excel at rating certain traits that they are more familiar with and detect these traits in their offspring more easily or more willingly. Third, parental overestimation could be due to parents with higher highbrow culture participation holding their offspring in higher regard than teachers without differences in behavior being at the base of their ratings. Parents might generally describe offspring more positively because they are emotionally invested (Vazire, 2010), but a more privileged parental background could engender expectations of offspring's personality. The effects of socioeconomic background on children's development have been explained based

on a better access to resources and subsequent higher parental investment in offspring according to the Family Investment Model (Bradley & Corwyn, 2002). Engagement with highbrow culture can be seen as one familial resource pertaining to its cultural capital (Bourdieu & Passeron, 1977) and parents can be assumed to invest this resource into offspring's development. Parental investments into the cultural capital of offspring can be understood as a form of *concerted cultivation* of children by parents (Lareau, 2011). Specifically, parental investments into children's cultural capital could be accompanied by expectations of socially desirable behavior of offspring. Assuming parents "cultivate" their offspring into attaining a high socioeconomic status, they might associate societal notions of a "desirable personality" with this endeavor which could possibly affect children's *reputation* (McAbee & Connelly, 2016) with parents. This would constitute a background specific positivity bias - a highbrow halo. Jæger and Breen (2016) have pointed out that joint familial participation in highbrow culture might be particularly relevant for children's outcomes since it represents an active parental investment in comparison to the passive type of cultural capital in the form of parental highbrow participation. We could, indeed, find slightly stronger effects of joint family highbrow participation compared to parental participation in Sample 2 (Table B.6 in Appendix B) while the pattern of results remain identical. Future studies could investigate the influence of familial participation in highbrow culture on the parental perspective on the Big Five. To further illuminate the effects of socioeconomic background on the unique parental perspective, parental reports should also be compared to self-reports in a next step, given an appropriate age of children. The Trait-Reputation-Identity (TRI) model (McAbee & Connelly, 2016) could be used to compare associations of familial background and the different components of personality. Tackett et al. (2016) furthermore propose the use of thin-slice ratings that contain short sequences of children's behavior as an alternative to personality questionnaires to prevent possibly skewed ratings by parents. An examination of socioeconomic background effects on this type of personality measure could help approximate the mechanisms behind

parental overestimation and whether they are due to a varying perception of offspring. If so, socioeconomic background effects should extent to thin-slice ratings.

3.5.1 Implications. When parental ratings are used in large-scale assessments, it would be ideal to add additional perspectives in order to disentangle parents' unique perspective. Moreover, socioeconomic indicators are important control variables when parental ratings are employed as we have demonstrated that parents' reports might not be independent of their socioeconomic background. Since personality ratings are frequently used as predictors of academic achievement, researchers should take possible parental perceiver effects into consideration when interpreting their results. For example, associations with academic achievement might be enlarged if parents' overestimated ratings are used without controlling for their socioeconomic background. However, the specific unique parental perspective would only affect associations with outcome variables if children's relative ordering is altered. This could be examined comparing parental reports with children's self-reports and evaluating mean-level differences.

Going further, unique perspectives of other raters should be considered. For example, teachers are assumed to interpret status relevant behavior and use those impressions for educational decisions (Bourdieu & Passeron, 1977) so that their specific perspective could have important consequences for children's academic career. Our results in elementary school suggest that teachers rate students' personality more positively than parents when the familial SES is higher. Effects were reversed for highbrow culture participation. Teachers might be aware of parental education and income but do not have direct information about familial cultural activities. By contrast, Farkas (2003) argues that particularly parental highbrow skills and habits enable children to signal a high status to teachers. These effects, however might be dependent on children's age and developmental status. Teachers might not yet expect behavior related to highbrow culture from young elementary school students. The investigation of variables associated with teachers' unique perspective might provide insight into the formation of impressions in the class context.

Parental involvement into class and school activities might be one possible influence on teachers' perspective on students as it might be a highly salient behavior for teachers (Jæger & Breen, 2016). One implication of our results could be that parents might adapt their parenting behavior in accordance with their perspective on offspring. Not only is it possible that parenting experiences help parents in forming personality judgments, but their unique perspective on offspring might in turn affect their parenting decisions. As we could show divergences between the parental view of their offspring and teachers' view, it might be important to encourage parents to reflect on their perspective and possibly discuss it, for example within teacher-parent-conferences.

3.5.2 Limitations and Future Directions. Several limitations of the investigation at hand have to be taken into consideration. The personality items used in Sample 2 were generated by the authors of the *Transition* (Maaz et al., 2010) study and were not validated with measures of the Big Five (Goldberg, 1990). The items are also limited to school-relevant personality. Regarding highbrow participation, cultural participation was only available from two years before the personality rating in Sample 2. It cannot be ruled out that participation changed within that time. Effects might also be stronger, when variables are measured at the same time. Highbrow culture might, furthermore, be redefined towards multiculturalism and inclusivity in modern society (DiMaggio & Mukhtar, 2004) and participation in less classical forms of art as jazz should be incorporated in future research.

The reported effects of socioeconomic background might be caused or mediated by third variables that have not been included. Although we controlled for fluid intelligence, additional influences might be relevant. For example, it could be examined whether effects of socioeconomic background remain significant when time that parents spend with their offspring is included in the model.

Moreover, we did not test for the mechanisms of the emergence of parental perceiver effects. Further research is needed on the relation between process variables and

the formation of parents' judgment. Future studies might also combine three perspectives into one model to contrast two perspectives at once against the self-report. Longitudinal investigations are needed to examine the development of parents' perspective as well as bidirectional associations with trajectories of self- and other-reports.

3.5.3 Conclusion. This investigation was the first to address socioeconomic background effects on the unique parental perspective on elementary school students' personality. SES and participation in highbrow culture both predicted the unique parental perspective over and above children's fluid intelligence. The examination of method effects within MTMM models can, therefore, contribute to a better understanding of personality judgments. Our nuanced analysis of socioeconomic background effects proved informative as SES and highbrow culture participation had differential associations with the unique parental perspective. Future research could address the mechanisms, consequences, and trajectories of parental perceiver effects.

3.5.4 Acknowledgments. This paper uses data from the National Educational Panel Study (NEPS) in Sample 1: Starting Cohort Kindergarten (SC2), doi:10.5157/NEPS:SC2:8.0.1. From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network. We would like to thank Oliver Lüdtke for his feedback on the manuscript.

4 Paper 3: Interplay of parental perspective and SEB

Independent or interacting: Interplay of personality and socioeconomic background in predicting school achievement

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While personality and socioeconomic background have both been identified as relevant predictors of academic achievement, little is known about their possible interplay in their influence on students' performance. Academically relevant personality traits as Conscientiousness might *compensate* for background disadvantages, but it is also possible that privileged students benefit more from advantageous traits (*Matthew effect*), or that personality and socioeconomic background have *independent* effects. The present study used the Latent Moderated Structural Equations (LMS) method (Klein & Moosbrugger, 2000) to investigate latent interactions between socioeconomic background and parent-rated Big Five when predicting school performance in a sample of German ninth graders (N = 2,770). In line with previous empirical findings, Openness and Conscientiousness significantly predicted school performance over and above fluid intelligence and socioeconomic background. We found evidence for significant positive interactions of those two traits with socioeconomic background. They support the *Matthew effect* as students with an advantageous personality benefited more from their privileged background. This evidence might be particularly relevant for the planning of school support programs and interventions targeting background disadvantages.

4.1 Introduction

Socioeconomic status of the family (Sirin, 2005) as well as personality (Poropat, 2009) are both relevant predictors of academic achievement. Their effects could be independent of each other, but it is also possible that they interact when predicting school achievement. In that vein, there is some empirical evidence for the compensation of background disadvantages by personality traits (Ayoub et al., 2018; Damian et al., 2015; Shanahan, Bauldry, Roberts, Macmillan, & Russo, 2014). Damian et al. (2015) outline possible patterns of the interplay between personality and socioeconomic background[2] in the prediction of academic achievement. First, effects of both predictors might be *independent* which would indicate that personality exerts the same influence on academic achievement irrespective of socioeconomic background of the family. Second, academically advantageous traits such as high Conscientiousness, Openness, and Agreeableness (Poropat, 2009) might compensate for familial disadvantages which is proposed by the *resource substitution hypothesis*. Third, advantageous traits might be particularly beneficial for students with a privileged background, signifying the *Matthew effect hypothesis*. Previous research on interactions between personality and socioeconomic background focused on educational success in adulthood, whereas effects might be stronger when variables are measured at the same time, i.e. personality and performance are both assessed in school. These interactions, moreover, have not been investigated with a latent modeling approach employing representative data thus far. The current study addressed these empirical shortcomings by analyzing latent interactions within structural equation models using large-scale data on German high school students from the National Educational Panel Study (NEPS, Blossfeld et al., 2011). We assessed the independent effects of parent-reports of students' Big Five, SES, and cultural capital on their school achievement over and above fluid intelligence and demographic control variables. We

[2] We use socioeconomic background as an umbrella term encompassing two different measures: SES as well as cultural capital.

further examined latent interactions between the Big Five and SES as well as cultural capital in the prediction of school performance.

4.1.1 Familial socioeconomic background and academic achievement.

First summarized by White (1982) and meta-analytically replicated decades later by Sirin (2005), the relation between socioeconomic status (SES) and academic achievement has been long recognized in educational research. The classical measurement of SES consists of parental education, income, as well as occupation (House, 2002). At the same time, it was empirically shown early on (DiMaggio, 1982) and numerously replicated (Cheadle, 2008; De Graaf, De Graaf, & Kraaykamp, 2000; DiMaggio & Mohr, 1985; Dumais, 2002; Jæger, 2011; Kalmijn & Kraaykamp, 1996; Roscigno & Ainsworth-Darnell, 1999; Sullivan, 2001) that SES alone reflects only part of the background influence on achievement since familial cultural capital has an effect over and above SES and prior ability. In terms of a theoretical approach, Bourdieu and Passeron (1977) suggested that better access to cultural resources provided by more privileged parents supports children's success in school. DiMaggio (1982) moreover proposed that cultural capital might enhance cultural mobility of children with an underprivileged background. The mechanisms of the influence of socioeconomic background on achievement are subject of ongoing research. Bradley and Corwyn (2002) argued that the effects of SES might be rather complex than straightforward and the consideration of moderation and mediation effects might be necessary to better explain the achievement gap associated with socioeconomic background. Watermann and Baumert (2006) proposed that psychological characteristics of the child might mediate effects of socioeconomic background on academic achievement.

International large-scale academic achievement assessments such as PISA detected associations between familial SES and students' objective competence scores in most of the OECD countries, with effects in Germany being especially marked (Organisation of Economic Co-Operation and Development, 2007). Lower grades (Johnson, McGue, & Iacono, 2007), as well as outcomes in adulthood as lower educational attainment (Duncan,

Yeung, Brooks-Gunn, & Smith, 1998), lower occupational prestige, and lower income (Becker, Baumert, Tetzner, Maaz, & Köller, 2019) have likewise been linked to low familial SES. Using PISA data, Marks, Cresswell, and Ainley (2006) have shown that cultural capital explains a relevant part of the effect of socioeconomic background on student achievement and that it is a stronger predictor than economic resources in most countries. All in all, socioeconomic background of the family is an important predictor of academic achievement. Yet, the mechanisms behind this relation merit further investigation. Interindividual differences of youth as well as their interplay with socioeconomic background might be relevant in that regard.

4.1.2 Personality and academic achievement. In the last decades, much attention has been given to the Big Five (Goldberg, 1990) personality dimensions as important predictors of academic achievement. De Raad and Schouwenburg (1996) provide a comprehensive review of theoretical mechanisms linking personality and successful learning. Conscientiousness is considered the most important dimension regarding achievement as it describes diligent and ambitious behaviors (Costa & McCrae, 1995). Openness shows the strongest correlations with fluid intelligence (Ashton et al., 2000) of all the Big Five dimensions and comprises facets as intellect as well as interest in new ideas (Costa & McCrae, 1995). Extraversion might be beneficial for younger students by fostering a positive learning attitude (De Raad & Schouwenburg, 1996). Agreeableness might affect academic achievement through cooperative classroom behavior (De Raad & Schouwenburg, 1996).

Conscientiousness, Openness, and to a lesser degree Agreeableness were identified as predictors of academic achievement in meta-analyses (Poropat, 2009, 2014). These effects also persist after control for intelligence, academic self-concepts, and interests (Spengler et al., 2016, 2013). Regarding the NEPS data and the cohort used in the current study, all self-reported Big Five dimensions were related to academic achievement with Conscientiousness as well as Openness being the strongest predictors (Israel et al., 2019).

Previous studies on adolescents' achievement focused predominantly on self-reports of personality but apart from some exceptions (e.g. Fogarty, Davies, MacCann, & Roberts, 2014; Israel et al., 2021) much less is known about predictive validity of parental personality reports over and above fluid intelligence as well as sociodemographic control variables.

4.1.3 Interaction of personality and socioeconomic background in predicting achievement. While most existing research considers *independent effects* of socioeconomic background and personality on academic achievement analyzing incremental effects of both predictors over and above cognitive ability separately, Damian et al. (2015) have suggested that interactive effects of individual differences and environmental factors might be detectable. Two mechanisms can be derived for the possible interplay of personality and socioeconomic background.

First, personality might help compensate for background disadvantages according to the *resource substitution hypothesis*. As intelligence has been shown to reduce negative background effects on achievement (Johnson et al., 2007), academically relevant personality dimensions, likewise, might be particularly beneficial for disadvantaged students. Highly conscientious, open, and agreeable students might be able to catch up on socioeconomic disadvantages because of their beneficial behavior. For example, being particularly disciplined and achievement-driven could provide agency and motivation facilitating the mitigation of background disadvantages. Highly open individuals are assumed to seek out learning opportunities more strongly and also encounter them more frequently (Ziegler et al., 2012) which might help students compensate for lack of home resources. In disadvantaged families, the learning environment could also be more disruptive and unstable (see Bronfenbrenner (1979) for the discussion of the effectiveness of proximal processes in different environments), and Emotional Stability might help cope with negative environmental influences. As outlined, possible interactions of personality dimensions with socioeconomic background might be detectable not only regarding SES, but also with the cultural capital of the family. Taken together, the *resource substitution*

hypothesis would predict that the interaction between personality and socioeconomic background shows a negative coefficient so that background disadvantages are reduced when students have an academically beneficial personality.

Second, academically relevant traits might be particularly beneficial for students with a privileged background, signifying the *Matthew effect hypothesis*. It assumes that a resourceful familial background facilitates the benefits of those traits (Damian et al., 2015). For example, children high in Openness might experience particular advantages regarding their academic achievement when they are provided with ample books and opportunities to pursue their interests without hindrance. In this regard, cultural capital might be particularly relevant since there is empirical evidence for transactions between changes in cultural activity and development of Openness (Schwaba et al., 2018). Cultural activities might serve as intellectual stimulation thereby fostering Openness. A privileged familial environment characterized by a high status as well as cultural capital might consequently be considered a more ideal environment for fostering academically beneficial traits compared to a low status. This could in turn have consequences for students' academic performance since privileged students might perform particularly well in school when their personality is academically advantageous. The *Matthew effect* applied to the interplay of socioeconomic background and personality would predict a positive interaction coefficient since students with an academically beneficial personality benefit more from their privileged background.

Empirically, Damian et al. (2015) found a robust interaction between Conscientiousness and parental SES predicting income, after control for intelligence using a prospective longitudinal design - 11 years after high school graduation participants benefited from high Conscientiousness in adolescence at lower levels of parental SES. However, the independent effects model was the most appropriate pattern for the other personality dimensions as the other interaction effects failed to reach significance once intelligence was introduced into the models. The authors suggest that personality might be

more impactful at earlier ages when it might be used by decision-makers to allocate educational opportunities. Shanahan et al. (2014) also report evidence for the resource substitution hypothesis in terms of greater returns on a beneficial adult personality regarding status attainment at lower levels of parental SES. Both studies focused on academic success in adulthood instead of school performance in adolescence. Concurrent academic performance might, however, be particularly subjected to influences of the family context and therefore constitute an important criterion variable. Most recently, Lechner, Bender, Brandt, and Rammstedt (2021) examined interactions between self-reported Big Five and parental SES in the prediction of adolescents' school grades using a different cohort of ninth graders from the NEPS data than the current study. Only the positive interaction between Conscientiousness and SES reached significance in the study by Lechner et al. (2021). In sum, empirical knowledge on the possible interplay between socioeconomic background and personality in the prediction of academic achievement is, as of yet, limited. First, previous studies only considered effects of SES, neglecting the possible relevance of cultural capital. While SES only pertains to structural background features, cultural capital can be viewed as a process-based feature of the socioeconomic background and is assumed to mediate effects of SES on academic achievement while also having incremental effects on it (Baumert et al., 2003). Additionally, only one previous study used school grades as outcome measures. Grades reflect teachers' evaluations of students' performance as well as classroom behavior: teachers' perceptions including possible biases can have an effect on their evaluation and grades explicitly encompass classroom participation (Meyer, Fleckenstein, Retelsdorf, & Köller, 2019). Students' personality, therefore, might be particularly relevant with regard to school grades. Lastly, none of the previous studies included parental ratings of adolescents' personality albeit parents are frequently used as informants in large-scale assessments of youth.

4.1.4 The Present Investigation. The present paper pursues three objectives. First, we aimed at replicating findings of socioeconomic background differences

in academic achievement using two different background measures: SES and cultural capital. Secondly, we assessed the predictive validity of adolescents' parent-rated Big Five over and above intelligence as well as socioeconomic background. Third, we examined the interplay of socioeconomic background and personality in predicting academic achievement. We extended existing empirical knowledge in several regards. We used cultural capital additionally to SES to differentiate effects of several aspects of the familial background on academic achievement. Our study furthermore employed achievement and personality measures in adolescence while most existing literature has focused on achievement in adulthood possibly overlooking processes in the classroom. Finally, we aimed at methodological thoroughness by using representative large-scale data and structural equation models to examine latent interactions (Klein & Moosbrugger, 2000). All in all, we investigated the following research questions. Neither our study design nor our hypotheses were preregistered.

1) Does socioeconomic background predict school performance? We expect effects of SES over and above fluid intelligence. Furthermore, based on previous findings we expect cultural capital to incrementally predict school grades, and also to mediate effects of SES on performance.

2) Does personality predict school performance? We expect positive effects of Conscientiousness, Openness, and Agreeableness over and above fluid intelligence and socioeconomic background.

3) Are effects of socioeconomic background and personality on school performance independent or interacting? Based on previous findings, we expect a significant interaction between Conscientiousness and SES. Additionally we expect an interaction between Openness and cultural capital.

4.2 Methods

Sample. Data from Starting Cohort 3 of the National Educational Panel Study (NEPS) were used in the current study. The NEPS is a Germany-wide longitudinal study with a multi-cohort sequence design aimed at research on educational processes and developmental trajectories of competences (for details see Blossfeld et al., 2011). Data from the NEPS are not publicly accessible, but available after completion of a NEPS-data usage agreement. Documentation of the procedures and measures used in Cohort 3 is openly available on the NEPS website: https://www.neps-data.de/Data-Center/Data-and-Documentation/Start-Cohort-Grade-5/Documentation. A list of all publications using NEPS data is available on the website as well: https://www.neps-data.de/Project-Overview/Publications. NEPS data are collected every school year, for Starting Cohort 3 starting in Grade 5. A total of N = 3,262 parents participated in measurement wave 6, Grade 9, of Starting Cohort 3. Our sample (N = 2,770) consists of cases for whom the parental personality as well as at least one of the student-reported grades were available (descriptives of all study variables are presented in Table A2 of the appendix). They were on average M = 15.37 (SD = 0.58) years old and 49.7 % girls. The students attended the following secondary school types in ascending order of academic demands (from vocational to highly academic): N = 215 attended a *Hauptschule*, N = 271 a mixed tracks school, N = 597 a *Realschule*, N = 159 the *integrierte Gesamtschule* and N = 1,528 a *Gymnasium*. This means that 55.2 % of students attended a highly academic and competitive school type.

Measures.

School performance. Grades in German, mathematics, biology, chemistry, and physics in Grade 9 (school year 2014/2015, wave 5) were used to model a latent variable representing school performance. In the German grading system, 1.00 is equivalent to A, the best grade, and 5.00 to F, the worst possible grade. To make results more interpretable, grades where recoded for further analyses such that higher values represent

better performance. The reliability of the school performance variable was $\omega = .83$.

Parental Ratings of Personality. Parents filled out the short version of the Fünf-Faktoren-Fragebogen für Kinder [*Five Factor Questionnaire for Children*] (FFFK-K, Weinert et al., 2007) regarding their child's personality. The FFFK-K consists of 10 items (see Table A1 of the appendix), two per Big Five factor, and uses a 10-point scale (0 to 10). The items are constructed as semantic differentials (i.e. for Extraversion the child has to be rated: "from 0 "is silent" to 10 "is talkative"). Reports were given by mothers in 55.3% of cases, by fathers in 10.4% of cases, by legal guardians in 0.01 % of cases; the relationship was not reported in 33.8% of cases. We employed latent variable modeling to account for measurement error in the scales. A CFA of parent-rated Big Five fitted excellently: CFI = .98, TLI = .96, RMSEA = [.03, .05], SRMR = .03. The reliability of the Agreeableness scale was lowest ($\omega = .53$), followed by Neuroticism ($\omega = .60$), and Conscientiousness ($\omega = .64$), Openness ($\omega = .67$), and Extraversion ($\omega = .75$).

Socioeconomic status. Parental socioeconomic status (SES) was measured by three economic indicators: The Highest International Socio-Economic Index of Occupational Status (HISEI), an index of the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) representing parental education, as well as the number of years in education of the parents assessed in 2011 (wave 1). A latent variable was modeled to represent SES. The reliability was $\omega = .59$.

Cultural capital. Cultural capital was measured by five dichotomous items (yes/no) concerning possessions at home (a) classical literature, b) dictionary, c) poem books, d) library card, e) art work, e.g. paintings), as well as participation in highbrow culture consisting of four items on the frequency of visits of a) museums and art exhibitions, b) cinema, c) opera, ballet, classical concerts, and d) theater in 2015 (wave 6). A latent variable was modeled to represent cultural capital. The reliability was $\omega = .70$.

Fluid intelligence. Since higher socioeconomic status is associated with higher academic achievement (Sirin, 2005), it is possible that adolescents in households with

higher socioeconomic status have higher cognitive abilities. Parental reports on adolescents' personality were therefore controlled for the effects of intelligence to rule out the possibility that parental personality ratings in different SES households are influenced by adolescents' intelligence. To control for fluid intelligence of adolescents, a latent variable was modeled with 12 dichotomous (solved/not solved) items from a figural reasoning matrices test, as well as three items assessing processing speed (for details see Haberkorn and Pohl, 2013).

Control variables. We used three additional dichotomous control variables to account for possible differences in school performance: academic school track, the *Gymnasium* (category yes: $N = 1{,}528$); gender ($N = 1{,}376$ girls); migration background irrespective of generation (category yes: $N = 340$) .

Statistical Analysis. In order to address our research questions, we employed a five-step modeling procedure. Model I contained fluid intelligence and the control variables as well as SES as predictors of school performance. Model II additionally included cultural capital to address its incremental predictive validity. Models III a to e additionally included one of the Big Five dimensions as predictors to depict their independent effects on school performance. Models IV a to e included an interaction effect between SES and the respective personality dimension. Models V a to e included an interaction effect between each personality dimension and cultural capital. Figure 4.1 shows a schematic representation of the full models. Since all study variables were latent, we estimated the interaction effects using the Latent Moderated Structural Equations (LMS) method (Klein & Moosbrugger, 2000). It employs the Cholesky decomposition of the (p x 1) vector of the predictor and moderator producing maximum-likelihood estimates of latent variable interaction parameters. Each personality trait was analyzed separately. We estimated all models with Mplus 8.4 (Muthén & Muthén, 1998–2015) and our analysis code is included in Appendix C. Missing data was accounted for by Full Information Maximum Likelihood (FIML). As reported by (Enders & Bandalos, 2001), FIML yields unbiased results and is superior to response pattern imputation. Students' class ID was used as a cluster variable

to obtain unbiased standard errors. The MLR estimator for maximum likelihood estimation with robust standard errors was employed in order to account for possible nonnormality of the measures. Model fit was assessed using the following criteria: comparative fit index (CFI) and Tucker-Lewis index (TLI) of at least .90, root mean square error of approximation (RMSEA) of no more than .06, and standardized root mean square residual (SRMR) of .08 or lower (Hu & Bentler, 1999; Marsh et al., 2004). We considered the model fit acceptable, when at least two of the criteria were met which was invariably fulfilled as seen in Table 4.2. As models IV and V a–e were estimated using type = random with algorithm = integration, chi square-based fit indices are not available for them. We therefore report information criteria (AIC and BIC). We used the AIC and BIC to compare the nonnested models (Kelava et al., 2011) III as well as IV and V in order to assess whether models containing the interaction effect were more fitting than those that only included independent effects of all predictors. Lower values of the information criteria indicate a better model fit.

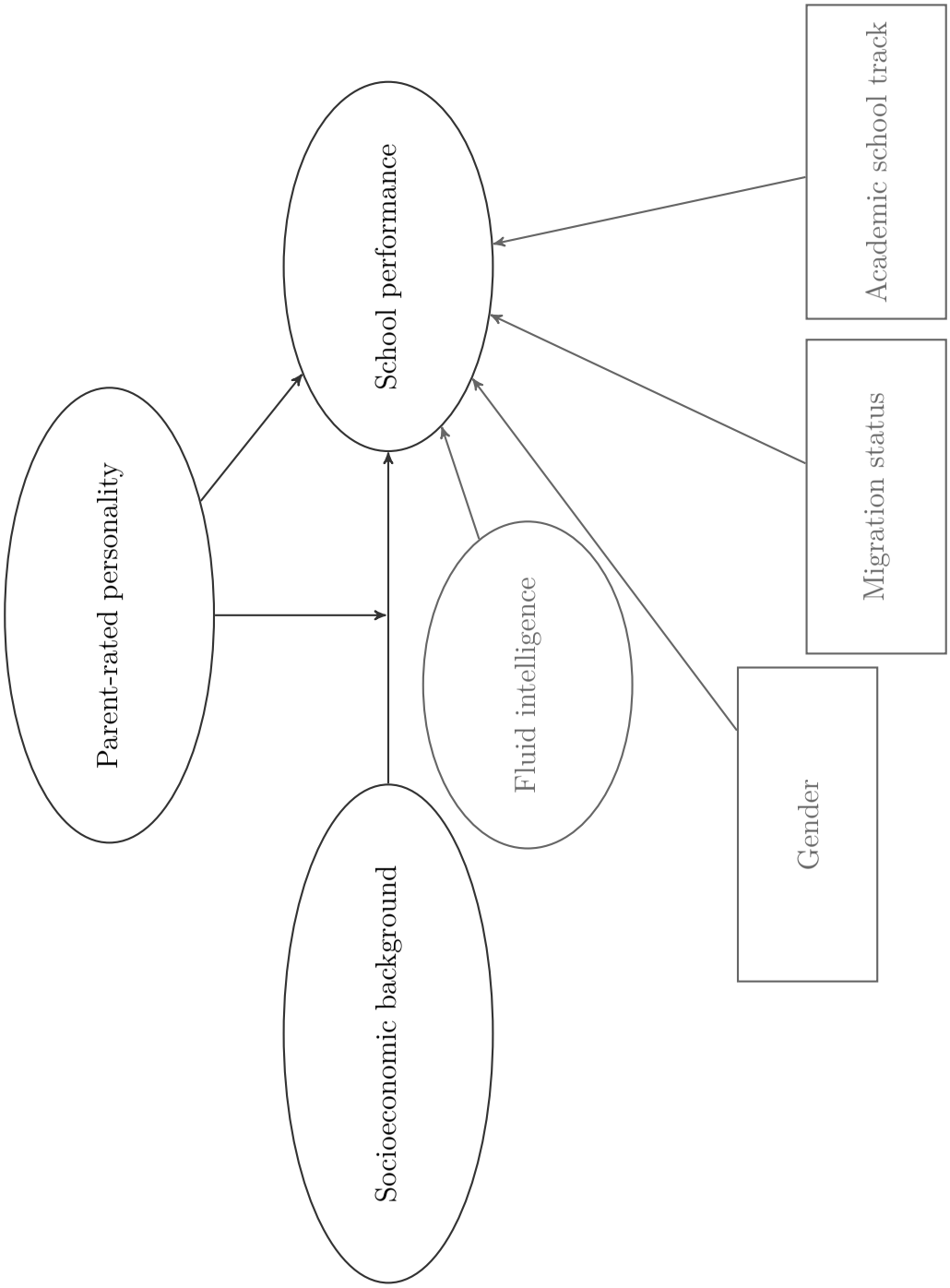

Figure 4.1. Schematic study model for the prediction of school performance by personality of adolescents, socioeconomic background of the family, and control variables in gray in a sample of German ninth graders ($N = 2{,}770$). Moderator effects were modeled as latent interactions with the Latent Structural Equations (LMS) method.

Table 4.1
Latent correlations between study variables in a sample of German ninth graders, N = 2,770

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
O (parent-report) (1)	1.00	.72**	.36**	.18**	-.52**	.56**	.36**	.27**	.04	.03	.11**	.20**
C (parent-report) (2)		1.00	.13**	.29**	-.30**	.55**	.25**	.19**	.22**	.06*	.06*	.11**
E (parent-report) (3)			1.00	.07*	-.69**	.04	-.08*	-.04	.17**	.06*	-.10*	-.04
A (parent-report) (4)				1.00	-.09**	.06*	.02	-.03	-.06*	.02	-.12**	-.07**
N (parent-report) (5)					1.00	-.15**	-.06	-.04	-.02	-.06*	.05	-.02
school perf. (6)						1.00	.36**	.44**	.24**	-.10**	.33**	.27**
fluid int.(7)							1.00	.44**	-.01	-.05	.33**	.32**
academic school (8)								1.00	.04*	.04	.36**	.37**
gender (9)									1.00	.02	-.02	.03
migration (10)										1.00	-.14**	-.03
SES (11)											1.00	.65**
cultural capital (12)												1.00

Note. $^*p < .05$, $^{**}p < .001$. O = Openness, C = Conscientiousness, E = Extraversion, A = Agreeableness, N = Neuroticism. school perf. = school performance, fluid int. = fluid intelligence, socioeconomic status of the family. Academic school is coded with 0 = non-academic school track, 1 = academic school track *Gymnasium*. Gender is coded with 1 = boys, 2 = girls. Migration coded with 0 = not migrated, 1 = immigrant.

4.3 Results

As shown in Table 4.3, SES positively predicted school performance over and above fluid intelligence and the other control variables in Models I ($\beta = .17$, $p < .001$) and II ($\beta = .12$, $p = .004$) - students with a higher socioeconomic status of the family performed better in school. Cultural capital had a small incremental positive effect over SES ($\beta = .08$, $p = .042$) on performance; however, Model I showed lower information criteria than Model II (Table 4.2) and the explained variance in school performance remained stable after adding cultural capital (Table 4.3, bottom row) so that the contribution of the additional variable does not seem substantial. Nevertheless, the effect of SES decreased from Model I to Model II when cultural capital was introduced as an additional predictor. This indicates that cultural capital partly mediated the effect of SES on school performance, as we had expected. Regarding parent-rated personality, Openness was the strongest predictor of school performance ($\beta = .44$, $p < .001$) over and above fluid intelligence and socioeconomic background (Model IIIa). It also showed a significant positive interaction (Model IVa) with SES ($\beta = .08$, $p = .002$) that is depicted in Figure 4.2. School performance was highest when SES and Openness were high. Differences in school performance between high, mean, and low Openness were more pronounced for high SES. The conditional regression line for high Openness is slightly steeper than the other two which corresponds with the positive interaction term. Students whose parents rated their Openness as high showed a stronger positive association between SES and school performance. Openness additionally significantly interacted (Model Va) with cultural capital ($\beta = .05$, $p = .046$) as depicted in Figure 4.3. Again, school performance was highest for high cultural capital and high Openness and the high Openness line was steepest. Table 4.2 shows that AIC and BIC were slightly lower for Model IVa as well as Model Va when compared to Model IIIa. Additionally, both models containing interaction effects explained more variance in school performance (Table 4.3, bottom row) than the model only containing independent effects of Openness and socioeconomic background.

Moreover, Conscientiousness was a similarly strong predictor of school performance ($\beta = .42$, $p < .001$) over and above socioeconomic background (Model IIIb). There was a significant positive interaction between Conscientiousness and SES (Model IVb) when predicting school performance ($\beta = .07$, $p = .015$) as depicted in Figure 4.4. Students whose parents rated their Conscientiousness as high showed a stronger positive association between SES and school performance. Cultural capital did not significantly interact with Conscientiousness (Model Vb) when predicting school performance ($\beta = .02$, $p = .414$). Table 4.2 shows that AIC and BIC were slightly lower for Model IVb containing the interaction effect between Conscientiousness and SES compared to Model IIIb and Model Vb. The former model also explained slightly more variance in school performance than the latter two (Table 4.3, bottom row).

Extraversion showed a small positive effect on school performance ($\beta = .04$, $p = .037$) over and above the socioeconomic background (Model IIIc). Similarly, Agreeableness positively predicted school performance (Model IIId) over and above the control variables ($\beta = .08$, $p < .001$). However neither of those traits significantly interacted with socioeconomic background in the prediction of school performance, as seen in Table 4.3.

We additionally ran the same models using self-reported Big Five of the adolescents in our sample (Table C.3 in Appendix C). There were no significant interactions effects between self-reported personality and socioeconomic background. Self-reported Conscientiousness was the strongest predictor of school performance and self-reported Openness had only a small effect. This might be due to the questionnaire used for the self-reports in the NEPS - the BFI-10 (Rammstedt & John, 2007) assesses aesthetic appreciation while the parent questionnaire encompasses intellect. Since self- and parent-reports were not identical, the comparison of results was not a focus of our study.

Table 4.2
Fit statistics of SEMs for the prediction of ninth graders' (N = 2,770) school performance by socioeconomic background and parent-reported personality

	CFI	TLI	RMSEA	SRMR	AIC	BIC†
Predictors: control variables and SES (I) + cultural capital (II)						
Model I	.97	.97	[.019, .024]	.04	119033.29	119316.47
Model II	.97	.96	[.018, .022]	.03	166945.40	167341.30
Additional predictors: Openness (III) + OxSES (IV) + OxCC (V)						
Model IIIa	.93	.92	[.027, .030]	.05	178885.68	179259.04
Model IVa	-	-	-	-	178878.74	179254.84
Model Va	-	-	-	-	178871.08	179249.93
Additional predictors: Consc. (III) + CxSES (IV) + CxCC (V)						
Model IIIb	.91	.90	[.030, .033]	.05	181492.88	181855.26
Model IVb	-	-	-	-	181440.41	181808.28
Model Vb	-	-	-	-	181492.27	181854.65
Additional predictors: Extraversion (III) + ExSES (IV) + ExCC (V)						
Model IIIc	.93	.93	[.027, .029]	.05	180110.26	180483.62
Model IVc	-	-	-	-	180111.90	180488.01
Model Vc	-	-	-	-	180112.21	180488.31
Additional predictors: Agreeableness (III) + AxSES (IV) + AxCC (V)						
Model IIId	.95	.94	[.022, .04]	.03	191051.96	191469.85
Model IVd	-	-	-	-	191050.57	191473.96
Model Vd	-	-	-	-	191048.88	191472.27
Additional predictors: Neuroticism (III) + NxSES (IV) + NxCC (V)						
Model IIIe	.93	.92	[.026, .029]	.05	181103.33	181476.69
Model IVe	-	-	-	-	181105.03	181481.14
Model Ve	-	-	-	-	181103.79	181479.90

Note. Models IV and V a–e: Latent Moderated Structural Equations (LMS) Models with interaction effects (not all fit indices available). † = sample-size adjusted BIC. SES = socioeconomic status of the family, Consc. = Conscientiousness.

Table 4.3

Latent Moderated Structural Equations (LMS) Models for the prediction of school performance in German ninth graders (N = 2,770) by socioeconomic background and parent-reported personality

			Openness			**Conscientiousness**			**Extraversion**			**Agreeableness**			**Neuroticism**		
	Model I	Model II	Model IIIa	Model IVa	Model Va	Model IIIb	Model IVb	Model Vb	Model IIIc	Model IVc	Model Vc	Model IIId	Model IVd	Model Vd	Model IIIe	Model IVe	Model Ve
Fluid intelligence	.11* (.04)	.10* (.04)	.10* (.04)	.12* (.04)	.08* (.04)	.12* (.04)	.14** (.04)	.12* (.04)	.09* (.04)	.09* (.04)	.09* (.04)	.11* (.04)	.11* (.04)	.11* (.04)	.09* (.04)	.09* (.04)	.09* (.04)
Academic school	.07* (.03)	.06** (.02)	.07* (.03)	.07* (.03)	.08* (.03)	.08* (.03)	.10* (.03)	.08* (.03)	.14** (.02)	.14** (.03)	.14** (.03)	.10** (.03)	.10** (.03)	.10** (.03)	.14** (.02)	.14** (.02)	.14** (.03)
Gender	.27** (.02)	.26** (.02)	.25** (.03)	.24** (.03)	.24** (.03)	.14** (.03)	.18** (.03)	.14** (.03)	.26** (.02)	.26** (.02)	.26** (.02)	.27** (.02)	.27** (.02)	.27** (.02)	.26** (.02)	.26** (.02)	.26** (.02)
Migration	-.04* (.02)	-.05* (.02)	-.09** (.03)	-.09** (.02)	-.09** (.02)	-.10** (.02)	-.10** (.02)	-.10** (.02)	-.06* (.02)	-.06* (.02)	-.06* (.02)	-.05* (.02)	-.05* (.02)	-.05* (.02)	-.05* (.02)	-.06* (.02)	-.06* (.02)
SES	.17** (.03)	.12* (.04)	.21** (.05)	.20** (.05)	.22** (.05)	.19** (.04)	.18** (.04)	.19** (.04)	.10* (.04)	.10* (.04)	.10* (.04)	.14* (.04)	.14* (.04)	.14* (.04)	.10* (.04)	.10* (.04)	.10* (.04)
Cultural capital (CC)		.08* (.04)	-.00 (.06)	-.00 (.05)	.03 (.05)	.02 (.04)	.04 (.04)	.02 (.04)	.08 (.04)	.08 (.04)	.08 (.04)	.08* (.04)	.08 (.04)	.08 (.04)	.08* (.04)	.08* (.04)	.08* (.04)
Parental report (Pers)			.44** (.03)	.44** (.02)	.49** (.04)	.42** (.04)	.41** (.03)	.44** (.03)	.04* (.02)	.04* (.02)	.04* (.02)	.08** (.02)	.08** (.02)	.08** (.02)	.03 (.02)	.03 (.02)	.03 (.02)
PersXSES				**.08*** (.03)			**.07*** (.03)			.01 (.02)			-.04 (.03)			.01 (.02)	
PersXCC					**.05*** (.03)			.02 (.02)			.01 (.02)			-.04 (.02)			.02 (.02)
R^2	.16**	.16**	.38**	.39**	.42**	.32**	.34**	.33**	.14**	.14**	.14**	.18**	.18**	.18**	.14**	.14**	.14**

Note. $^{*}p < .05$, $^{**}p < .001$. Standardized regression coefficients are presented. Standard errors in brackets. A separate model was computed for each personality trait. SES = socioeconomic status of the family.

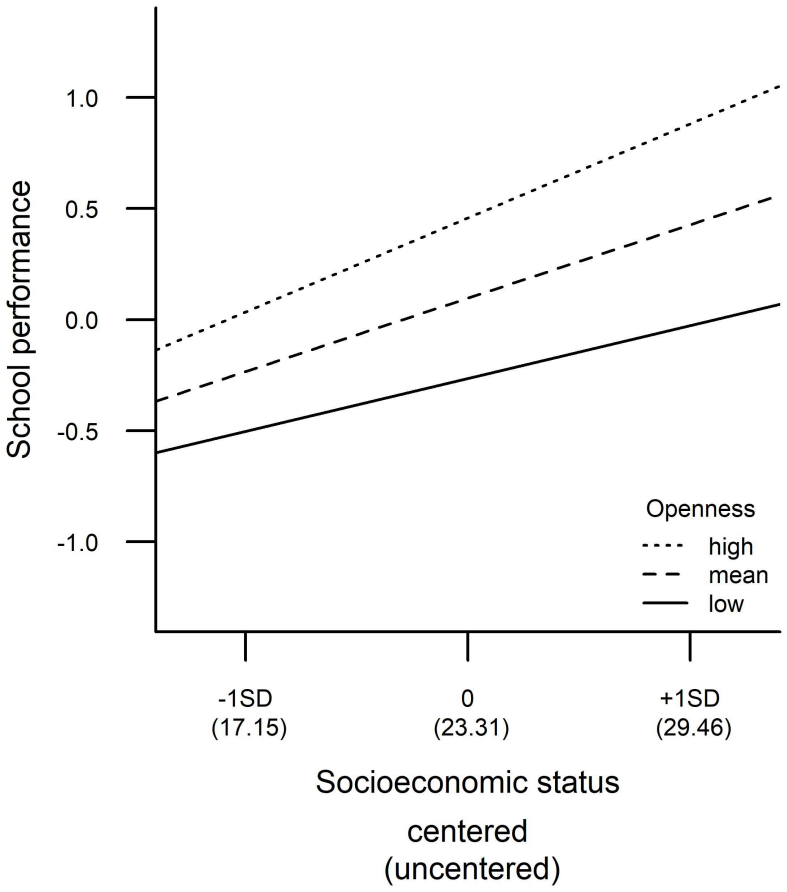

Figure 4.2. Graphic illustration of Model IVa (Table 4.3). Openness: low = *M* - 1 *SD*, mean = *M*, high = *M* + 1 *SD*.

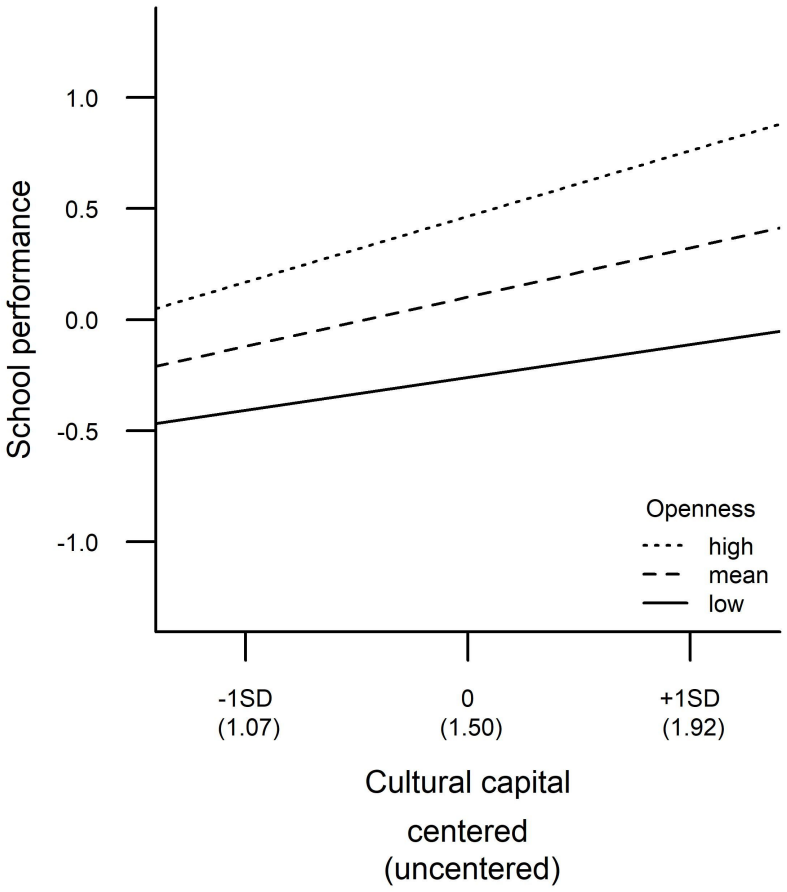

Figure 4.3. Graphic illustration of Model Va (Table 4.3). Openness: low = M - 1 *SD*, mean = M, high = M + 1 *SD*.

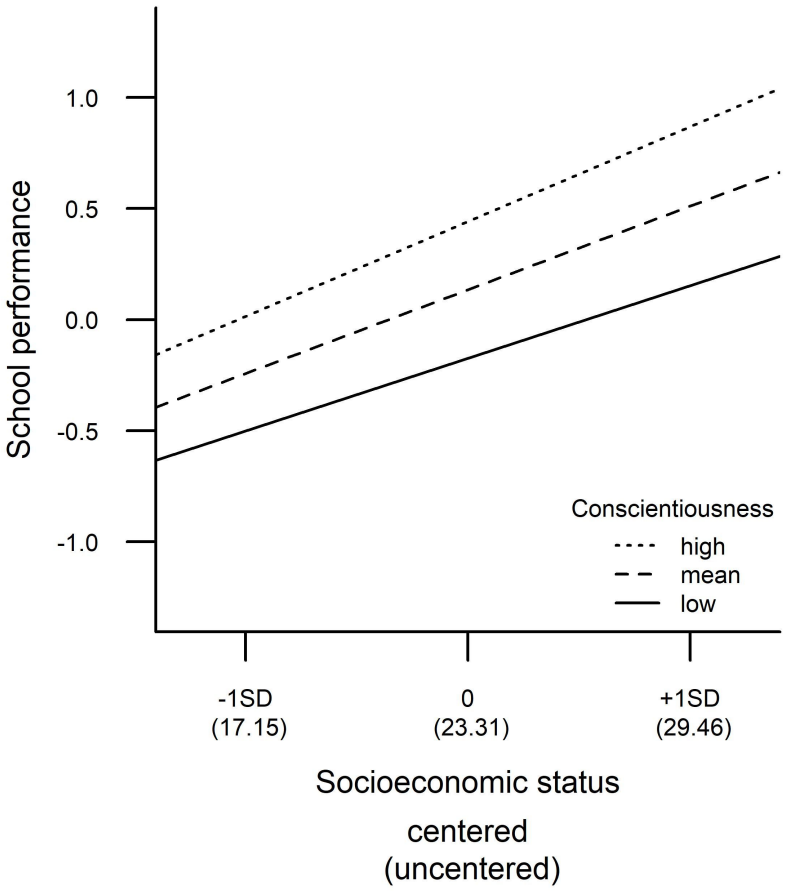

Figure 4.4. Graphic illustration of Model IVb (Table 4.3).
Conscientiousness: low = M - 1SD, mean = M, high = M + 1SD.

4.4 Discussion

The current investigation examined the effects of socioeconomic background and parent-rated Big Five on adolescents' school performance. SES was a robust positive predictor over and above sociodemographic control variables. Cultural capital showed only a marginal contribution to the prediction of school performance. Regarding personality, Openness and Conscientiousness were the strongest positive predictors over and above socioeconomic background, and Agreeableness was also a meaningful positive predictor of school performance. Openness additionally positively interacted with SES as well as cultural capital. Conscientiousness showed a positive interaction only with SES. Students whose parents rated them as high in either of those traits benefited more strongly from their privileged socioeconomic background resulting in a better school performance which is in line with the *Matthew effect*. These results are discussed in the following.

Regarding our first research questions, we could replicate socioeconomic differences in school performance that persisted even when controlling for fluid intelligence and sociodemographic control variables. Higher SES was associated with better school performance. Cultural capital, contrary to our hypothesis, only showed a marginal incremental effect over and above SES so that we could not replicate previous empirical findings (Cheadle, 2008; De Graaf et al., 2000; DiMaggio & Mohr, 1985; Dumais, 2002; Jæger, 2011; Kalmijn & Kraaykamp, 1996; Roscigno & Ainsworth-Darnell, 1999; Sullivan, 2001). However, when comparing different studies results regarding socioeconomic background effects, the operationalization of background variables may play a role. We used parental education as one indicator of SES, while Bourdieu and Passeron (1977) would classify it as institutionalized cultural capital. Home equipment, conversely, has been previously used (Damian et al., 2015) as an indicator of SES. As there is no standardized modeling approach to represent the different forms of socioeconomic background, their respective contribution to educational success is difficult to differentiate in current empirical evidence. Furthermore, socioeconomic background is frequently used

merely as control variable with regard to academic achievement. Our results indicate that the effect of familial SES on school performance remains stable even when intelligence, sociodemographic variables, and personality are controlled for. This is important information for support programs that need to find possibilities to target these pervasive inequalities. Another difference in study results concerns the dependent variable - while PISA results relate to objective test scores (Organisation of Economic Co-Operation and Development, 2007) and many studies focus on academic and occupational outcomes in adulthood, we deliberately used school grades as outcome measure. Teachers' evaluations might be less affected by cultural resources that students possess than by the socioeconomic status of the family that might be better known to them. However, we also found that cultural capital partly mediated the effect of SES meaning that some of the influence of SES on school performance was exerted through cultural capital. With regard to the possible underlying mechanisms, De Graaf et al. (2000) showed that parental reading behavior but not cultural participation predicts children's school success with the effect being more pronounced for lower SES. In early childhood, SES related reading disparities in kindergarten are predicted by home literacy environment, parental school involvement, and parental role strain (Aikens & Barbarin, 2008). Taken together, these empirical results underline the importance of parental behaviors rather than the mere existence of home resources or the participation in highbrow culture with regard to socioeconomic differences in academic achievement.

With respect to our second research question, parent-rated personality did have significant effects on school performance over and above fluid intelligence and socioeconomic background. As expected, Openness and Conscientiousness as well as Agreeableness were significant predictors which dovetails well with previous empirical findings (Poropat, 2009, 2014). While Conscientiousness is generally assumed to be the most important predictor of achievement (De Raad & Schouwenburg, 1996), our results demonstrate that Openness can be similarly relevant. The parent questionnaire used in the

NEPS focuses on the intellectual aspects of Openness which can help explain our results. Our findings also dovetail with meta-analytic findings on the predictive validity of other-ratings regarding academic achievement (Connelly & Ones, 2010). The main effects of Openness and Conscientiousness in our study were twice as big as the SES effect on school performance and overall the largest exceeding fluid intelligence as well. In this sense, these two academically relevant traits might help overcome background differences. Since we used parental reports on personality, another possible interpretation would be that the reputation (McAbee & Connelly, 2016) adolescents have with their parents can somewhat influence their success at school, for example by acting as a self-fulfilling prophecy (Pomerantz & Thompson, 2008). The exact mechanism linking parental reports and school performance should be investigated in future studies.

For our third research question on interactions between personality and socioeconomic background in the prediction of school performance, we found a significant interaction between parent-rated Conscientiousness and SES, as expected. This finding is in line with results reported by Lechner et al. (2021) with regard to self-rated Conscientiousness of a different NEPS cohort of ninth graders. This indicates that the interaction between Conscientiousness and SES is not primarily driven by parental perceptions that might influence teachers' evaluations but might be based on behavior related to this trait, such as orderliness. In contrast to Lechner et al. (2021), we additionally found significant interactions of parent-rated Openness with SES as well as cultural capital, as we had hypothesized. The positive interactions signify that students with an academically advantageous personality benefited more from their privileged background. This evidence fits well with the widely discussed *Matthew effect* in education (Walberg & Tsai, 1983) which generally implies that an initial advantage in educational measures is associated with stronger gains resulting in a widening of the initial gap. This pattern has been documented for reading development (Pfost, Hattie, Dörfler, & Artelt, 2014), the benefit of intervention programs initially aimed at supporting disadvantaged

students (Ceci & Papierno, 2005) or psychosocial factors and achievement (Kuo, Casillas, Allen, & Robbins, 2021). The mechanisms of an academically more advantageous personality amplifying the benefits of higher SES and higher cultural capital need to be investigated in future research. It is possible that parents provide more resources or learning opportunities when they consider their offspring highly conscientious and open. This might also be a bidirectional effect such that parents adjust their personality rating according to children's learning behavior. Another potential pathway might be that parents who consider their offspring highly open, communicate this to the teachers thereby influencing the teacher's perspective on the students. Lastly, students with an academically beneficial personality might be particularly equipped to use the advantages that their familial background offers, for example by seeking out more intellectually stimulating activities or using the resources provided by the parents highly diligently.

4.4.1 Implications. Background-related differences in academic achievement have been targeted using educational interventions for decades resulting in substantial short-term and smaller long-term effects on cognitive as well as noncognitive characteristics of children (Barnett, 2011). The results of the current study indicate that interventions might be most efficient when encompassing two aspects – disadvantages related to socioeconomic background as well as academically relevant personality dimensions. Students can benefit even more from economic and cultural resources when their personality exhibits academically advantageous characteristics such as high Conscientiousness and high Openness. These characteristics additionally are relevant for school grades on their own. Students therefore could achieve gains in their academic performance by showing behaviors related to these traits. Researchers have drawn attention to the relevance of personality traits as targets of policies and interventions highlighting the possibilities of personality development (Bleidorn et al., 2019). The review by Roberts et al. (2017) suggests that interventions can be effective with regard to personality trait change taking an average of 24 weeks and persisting in follow-ups. The

majority of the reviewed studies referred to clinical interventions and Emotional Stability followed by Extraversion showed the strongest changes while the amount of change did not vary with the type of therapy. Moreover, Denissen et al. (2013) proposed that the main driving force of personality development might be self-regulatory mechanisms that can also be targeted by interventions, referring among others to one approach designed to increase Conscientiousness. This particular intervention by Magidson, Roberts, Collado-Rodriguez, and Lejuez (2014) involves identifying life goals and strategic planning of activities apt to reach them. This type of intervention seems highly applicable to the academic context and could help students excel in their academic endeavors.

The results of the current study furthermore suggest that teachers' evaluations of students' performance indeed depend to some extent on the personality students exhibit in class as assumed by Meyer et al. (2019). As reviewed by Jussim and Harber (2005), teachers expectations of students can act as self-fulfilling prophecies with effects typically being small. However, effects seem to be stronger for underprivileged students such that self-fulfilling prophecies show stronger effects among students from lower socioeconomic backgrounds, in particular when these students are also underachieving. Whether teachers' perceptions of students' personality act to some extent as self-fulfilling prophecies should be addressed by future research. The current results indicate that teachers incorporate their perceptions when grading. Since students' grades were highest when they exhibited both a privileged background and an advantageous personality, future research might investigate to what extent teachers' perceptions of personality are affected by students' backgrounds.

4.4.2 Limitations and Future Directions. Several limitations have to be taken into consideration when interpreting our results. First, the questionnaire used for the parental personality reports was originally constructed with regard to children. In our adolescent sample, however, student's personality might be further developed. In the FFFK-K (Weinert et al., 2007), Agreeableness encompasses docility and obedience which might be less adequate to reflect individual differences of adolescents compared to children.

Consequently, effects of students' Agreeableness might be underestimated in our sample. Moreover, the FFFK-K (Weinert et al., 2007) contains only two items per Big Five dimensions. In future studies, it would be preferable to assess the Big Five with all facets, but this poses difficulties in large-scale assessments where time is limited since a broad range of constructs is covered. Lastly, SES measures were administered only in the first data wave in the cohort, four years before the personality measurement. However, SES can be assumed to remain comparatively stable.

The current study used parental personality reports without contrasting them against self- or other-ratings as the main focus of the investigation was on the interaction effects. However, multitrait–multimethod (MTMM) models are needed to represent the unique parental perspective under control for trait including a reference method such as self-reports. In the current cohort of the NEPS, self-reports were provided using a different personality questionnaire than administered to the parents. Future studies should use the same items across all raters. Ideally, teacher-reports as well as parental reports could be contrasted against self-reports to represent these two unique perspectives and further investigate their effects on outcomes.

Future studies, furthermore, could examine the effects reported in our study in different age cohorts. It would be of particular interest to compare the effects in elementary school samples with high school samples. Personality might have differential consequences depending on the age of students since, for example, Extraversion is assumed to be beneficial for younger students because of positive learning attitudes but disadvantageous in high school due to a focus on social life instead of learning (De Raad & Schouwenburg, 1996). Teachers' perceptions of students might also differ depending on the age group since they might have higher expectations of adolescents thereby applying different reference values. Moreover, adolescence is characterized by moderate rank-order stability of personality (Roberts & DelVecchio, 2000) being related to stability as well as change in personality. It is assumed to be associated with dips in personality maturation

(Herzhoff et al., 2017) albeit developmental patterns are inconsistent across studies. These developmental changes might also affect how personality is related to outcome variables as well as possibly having effects on how students are perceived and evaluated by teachers.

We modeled personality as a moderator in the current study, but it is also possible that it mediates the association between socioeconomic background and achievement. Steinmayr, Dinger, and Spinath (2010) could show that self-reported Openness and Conscientiousness partly mediated the effect of parental education on academic achievement in sample of German high school students. It could be further investigated whether a moderated mediation might be a fitting model to explain the interplay of personality and socioeconomic background.

4.4.3 Conclusion. This study investigated latent interactions between socioeconomic background and the parental perspective on adolescents' Big Five when predicting school performance. Openness and Conscientiousness were strong predictors of school performance over and above fluid intelligence and socioeconomic background. Those two traits also showed significant positive interaction with SES and cultural capital. Students whose Openness and Conscientiousness were rated higher by their parents, performed better in school and their performance was more strongly and positively associated with familial socioeconomic background. Our results constitute evidence for the *Matthew effect*. Future research should focus on longitudinal associations between parental ratings and change in school performance. Also, the specific pathways by which personality can moderate socioeconomic background-achievement association need to be examined further.

4.4.4 Acknowledgments. This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort Grade 5, doi:10.5157/NEPS:SC3:8.0.1. From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute

for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network. The authors declare no conflict of interest regarding the authorship, research, or publication. The general idea for this study is based on the bachelor thesis by Yannick Martin entitled *"Können Persönlichkeitseigenschaften den Einfluss der sozialen Herkunft auf die Leistung in der Schule kompensieren? [Can personality traits compensate for the influence of socail background on school achievement?]"*, submitted at Freie Universität Berlin on February 17th, 2020.

5 General Discussion

The current dissertation was aimed at corroborating and expanding upon empirical knowledge of the parental perspective on offspring's personality in childhood and early adolescence. To that end, notions from developmental and personality psychology, as well as educational sciences were integrated into the proposed Identity-Reputation-Context framework in order to portray children's individual differences more comprehensively. Three studies with regard to particular aspects of the framework were conducted. Taken together, the dissertation aimed at illuminating three overarching research questions derived from the Identity-Reputation-Context framework. The results are summarized subsequently.

5.1 Summary of findings

5.1.1 Agreement of parental reports with self- and teacher-reports.

The first overarching research question referred to the accuracy of the parental perspective quantified by the agreement of parental reports with self-reports as well as teacher-report, alluding to the proposed *reputation* component within the guiding framework. As parents can be assumed to be highly acquainted raters, their reports were expected to exhibit substantial convergence with adolescents' self-reports as well as teacher-reports on elementary school students. Differences in convergence in line with the SOKA model (Vazire, 2010) were expected as well. In Study 1, parental reports and adolescents' self-reports on the Big Five showed higher consistency for highly observable traits and lower agreement for evaluative and internal ones, thereby confirming the expectations. The effect sizes ranged from .03 to .50 which represents the lower bound of agreement between self- and other-reports that typically ranges from .40 to .60 (McCrae et al., 2004). This is due to the NEPS design in which different personality questionnaires were used for the two ratings resulting in the confounding of perspective and facet for three of the Big Five dimensions. Although Neuroticism was assessed with the same facets in Study 1, it showed

a consistency of only .22 which might be accounted for by its low observability. The current results demonstrated that self-other agreement can fall below expected values. They, furthermore, illustrated that the CT-C(M-1) model (Eid, 2000; Eid et al., 2003) can be successfully administered even in non-traditional MTMM settings when different personality questionnaires are used, which could inspire further research to apply this type of modeling when it can best represent theoretical assumptions (Tackett et al., 2019). Study 2, additionally, supplied evidence for the applicability of the model to parent- and teacher-reports on elementary school students' personality. While Agreeableness (.32) and Self-Control (.29) were rated least congruently by parents and teachers, the other Big Five dimensions and personality facets were rated relatively consonantly ($.38 < r < .56$). These effect sizes slightly surpass the range of about .20 to .50 typically assumed for other-rater agreement (Vazire, 2006) and exceed the modest to moderate parent-teacher agreement regarding adolescents' personality reported elsewhere (Laidra et al., 2006). This indicates that children are perceived by parents and teachers somewhat similarly despite the different context of family vs. school, albeit both still have unique views. These results provide further evidence that elementary school students of 8 years of age already exhibit behavior akin to the Big Five personality structure and can be validly rated on it. Study 2 also suggested that parents are able to rate school-relevant personality facets in relative concordance with the class teachers which could mean that the familial context elicits learning related behavior for example when children do their homework. The results generally offer testament to parents' expertise on their offspring's personality. To sum up, the parental perspective exhibits characteristics of an accurate other-rating (Funder & West, 1993) since it showed substantial agreement with self- as well as teacher-ratings that varied in accordance with theoretical predictions.

5.1.2 Interplay between familial SEB and parental perspective. The second overarching research question encompassed the nature of a possible interplay between familial socioeconomic background and parents' perspective on their offspring's

personality. Different measures of the socioeconomic background were assumed to be highly relevant aspects of the *context* of individual differences possibly affecting the parental perspective. Since *context* and *reputation* were presumed to interact, furthermore, an interplay of parental ratings and socioeconomic background in the prediction of academic achievement was considered. In Study 2, parents' unique perspective was associated with different measures of socioeconomic background thereby demonstrating parental perceiver effects depending on the familial context. It proved informative to differentiate between structural and process-based measures (Baumert et al., 2003) of socioeconomic background to examine its influence more profoundly. Specifically, SES showed negative associations with the parental perspective when contrasted against the teacher-report. At the same time, teacher-ratings were more strongly associated with SES than parent-reports. Parents with a higher SES described their offspring less positively than class teachers. In other words, teachers reported a more favorable perception of elementary school students than parents when familial SES was higher. Highbrow culture participation, on the other hand, was positively associated with parents' unique perspective when contrasted against the teacher-report. Parents described their offspring more favorably than class teachers when they participated in highbrow culture more frequently. The results call for further research on the mechanisms of these background dependent perceiver effects. Different socioeconomic backgrounds might provide different contexts for children to exhibit certain behavior or even elicit socially desirable characteristics. However, they might also result from a parental bias (Tackett, 2011) that could be interrelated with the socioeconomic background. Study 3, furthermore, demonstrated positive interaction effects between the parent-report on adolescents' personality and socioeconomic background when predicting academic achievement which will be further discussed in 5.1.3. Parents' perception of their offspring might, consequently, enhance the benefits of a privileged background with regard to achievement. The results underscore the importance of considering the *reputation* component of individual differences in personality

and simultaneously demonstrates the usefulness of integrating the *context* layer when studying youth. They also illustrate that socioeconomic background can affect children through multiple pathways not only influencing their psycho-social development (Conger & Donnellan, 2007), but also being connected to how parents perceive their offspring, which in turn can be related to academic outcomes.

5.1.3 Parental perspective and offspring's academic achievement. The third overarching research question focused on the relevance of the parental perspective for their children's academic achievement. Parental perceptions were presumed to be associated with offspring's achievement and to possibly interact with the socioeconomic background when predicting it. The parental perspective on adolescents' personality was an incremental predictor of children's academic achievement over and above trait effects in Study 1. With the variance shared by parent- and self-report held constant, parents' perspective still proved relevant in the prediction of level of and change in school grades as well as reading and mathematical competence. Parents' perspective on Openness, represented mainly by intellect in the parent questionnaire, was a particularly strong predictor in these cases. Although Conscientiousness is often considered the most important Big Five dimension for academic achievement (e.g. Dumfart & Neubauer, 2016) and did predict school grades in Study 1, it was, contrary to Openness, not associated with competences. The current results suggest that personality–achievement associations can depend on the facets tapped in a specific personality questionnaire. They, furthermore, indicate the relevance of adolescents' *reputation* with parents which predicted change in academic achievement from Grade 7 to Grade 9. While parents' perspective on Openness was a positive predictor, parental perspective on Extraversion negatively predicted change in mathematics grades and mathematical competence. When parents perceived their offspring as more extraverted, adolescents' academic performance declined. This finding dovetails well with the assumption that higher Extraversion might be detrimental to academic achievement of older students (De Raad & Schouwenburg, 1996). Interestingly,

the trait Extraversion was not associated with change in grades and competences. This could suggest that adolescents' *reputation* is more relevant for change in their academic performance than their own *identity* with regard to being extraverted. Since Extraversion is a behavior-centered trait, other-raters might also have an informational advantage in rating it compared to the self (Vazire, 2010). Parental reports, additionally, interacted with socioeconomic background in the prediction of adolescents' school grades in Study 3. The results offered some evidence for the *Matthew effect* as a more privileged background was particularly beneficial when parent-reported Openness and Conscientiousness were higher. Previous studies had, by contrast, had reported some evidence for the compensation of background disadvantages by personality traits (Ayoub et al., 2018; Damian et al., 2015; Shanahan et al., 2014), but Study 3 in the current dissertation differed from them in important aspects. First, academic achievement was operationalized through school grades instead of educational success in adulthood in Study 3. Secondly, the interplay of personality and socioeconomic background was examined using latent interactions (Klein & Moosbrugger, 2000) which has rarely been undertaken in previous research. Finally, parental reports on adolescents' personality were used while previous research focused on self-reports. The main effects of parent-rated Openness and Conscientiousness over and above fluid intelligence, school track, gender, migration status, and socioeconomic background were the largest of all predictors and the standardized regression coefficients were more than five times the size of the interaction effects. Even when the evidence for interactions was modest, as in previous studies (Damian et al., 2015; Shanahan et al., 2014), the parental personality report was of integral relevance for ninth graders' school performance. Taken together, the parental perspective on offspring's personality proved relevant with regard to adolescents' academic achievement offering further evidence of its accuracy (Funder & West, 1993). These results, moreover, suggest that parental reports on personality might be meaningful for large-scale assessments of educational trajectories. The proposed Identity-Reputation-Context framework advanced the findings by introducing the

interplay with the contextual aspect of socioeconomic background.

5.2 Implications for Personality Development

The fundamental importance of the parent–child relationship for offspring's development is possibly most evident in Bowlby's (1973) attachment theory postulating that the secure or insecure attachment of child to parent engenders "internal working models". These mental representations of themselves and their relationships with others are linked to children's personality characteristics beyond infancy as reviewed by Thompson (2000). A general framework for the parental influence on children's personality development was proposed by Pomerantz and Thompson (2008) in the form of the Psychological Resource Principle. It states that parents facilitate the development of psychological resources that form the basis of their children's competent functioning. The latter encompasses compliant behavior with respect to societal rules, the establishment of positive social relationships with adults and peers, as well as academic achievement (Pomerantz & Thompson, 2008). The authors, furthermore, differentiate between affective, behavioral, and cognitive resources. The former refer to the increased occurrence of positive emotions, and the decreased occurrence of negative ones. Behavioral resources include behavioral strategies necessary for goal attainment. Cognitive resources refer to children's mental representations of themselves and their surroundings, as initially discussed. Parents are assumed to influence children's resources through their own affect, behavior, and cognition.

The parental perspective on offspring's personality might constitute one resource for children's development. It could be understood as a cognitive resource since it contains a parent's perception of their offspring. Parental cognitions are assumed to influence children's self-perceptions by acting as self-fulfilling prophecies since parents disclose their perceptions to their offspring thereby influencing children's self-perceptions (Pomerantz & Thompson, 2008) and possibly their behavior. Eccles (1983) introduced this idea referring

to the academic field proposing that parents' child-specific beliefs were relevant for children's academic outcomes. Empirically, Frome and Eccles (1998) could show that parental perceptions of such competence mediated the association between children's English and math grades and children's self-perceptions in these domains. Parents' perception, moreover, was more strongly linked to children's self-perceptions than their grades. With regard to parents' perception of their offspring's personality, the current dissertation could show that it was related to self- and teacher-reports as well as children's academic achievement. Future research might investigate the specific role of the parental perspective in the formation and development of children's and adolescents' self-views with regard to personality. Pomerantz and Thompson (2008) furthermore propose that parental perception might influence children's behavioral and affective resources. The authors assume that children might engage more confidently in goal pursuit when they feel that their parents believed in them. They additionally argue that this might also help children to better cope with emotional distress. Parental beliefs about their children's personality might support their offspring in a similar manner. If parents, for example, communicated to their children that they saw them as conscientious, emotionally stable, and agreeable, children might feel well equipped for academic challenges or social relations and seek them out more self-assertively. However, the opposite might also be true and negative parental feedback could deter offspring from certain behavior or inflict damage on self-perceptions.

Discrepancies between parent- and self-perceptions of offspring's personality might be relevant for personality development as well. Informant discrepancies are assumed to be related to problems with communication in the family, possible conflict, and parenting (Tackett, 2011). While certain discrepancies between self- and other-reports depending on trait characteristics are expectable from theory (Vazire, 2010), it has not been examined thus far how divergence of identity and reputation might impact the emerging personality of children and adolescents. Since adolescence is particularly seen as a time of consolidation of self-perceptions with regard to personality (Hill & Edmonds, 2017),

parents' feedback on their perception might serve as an important resource. Discrepancies in perceptions could be impactful as they might challenge children's representations of their own personality. Longitudinal examinations of MTMM data on children's and adolescents' personality are needed in order to trace the trajectories of self- and other-perceptions as well as possible bidirectional influences.

Parental resources with regard to personality development might be more relevant in certain contexts compared to others. Challenging contexts might strain children's own resources thereby increasing the demand for parental support (Pomerantz & Thompson, 2008). Financial hardship is one possible stressor influencing children's outcomes as previously discussed (Conger & Conger, 2002). With regard to IQ, SES has been found to modify the importance of genetic and environmental influences (Turkheimer, Haley, Waldron, d'Onofrio, & Gottesman, 2003). Specifically, a larger portion of variance in IQ was attributable to a shared environment than to genes in underprivileged families while the opposite was true for affluent contexts. These results signify that parental behavior was more relevant than genes for the development of offspring's IQ in low SES households. While previous research focused on the relative importance of genes with regard to variability in personality (Kandler et al., 2019; Mõttus et al., 2019, 2017), possible differences depending on familial socioeconomic background have not yet been considered in that respect. The current dissertation could show that the parental perspective on offspring's personality was associated with the socioeconomic background. The context might furthermore modulate how relevant parental perceptions are for children's development. For example, positive perceptions by parents and the communication of such might provide support in challenging contexts while children growing up in privileged contexts might be less dependent on parents' psychological resources (Pomerantz & Thompson, 2008). The proposed Identity-Reputation-Context framework might be particularly useful for investigating developmental trajectories of personality in childhood and adolescence as it combines all aspects discussed in this chapter - self-perception of

personality, parental perceptions of offspring as well as contextual influences on both.

5.3 Implications for Large-Scale Assessments

Large-scale assessments can benefit from incorporating MTMM data on personality, as different perspectives can be seen as unique information sources. The current dissertation focused on the parental perspective demonstrating its accuracy. It proved relevant in predicting different measures of academic achievement even when trait effects were controlled. Parental reports therefore can help further elucidate children's educational trajectories which can be one goal of large-scale assessments of youth. This dissertation demonstrated that even non identical questionnaires on the Big Five can be modeled to represent the lower bound of congruence of perspectives as well as unique effects on children's outcomes. The design in Study 1 contained facet differences for some of the assessed Big Five which led to the confounding of facet of perspective, but also illustrated the differential relevance of Big Five facets for the prediction of achievement. As previous research reported differential validity of Big Five facets depending on the informant in undergraduate students (Ziegler et al., 2010), large-scale assessments might also profit from including the full range of facets rated by all informants. The current dissertation, nevertheless, demonstrated that 10 item questionnaires on the Big Five can exhibit substantial predictive validity even under control for numerous context characteristics. They can be seen as a valid alternative to long versions and as appropriately capturing students' potential with regard to academic achievement (Spengler et al., 2013). Future research, however, might benefit from using the same questionnaires across all raters.

Study 2 demonstrated associations of familial socioeconomic background and the parental perspective on elementary school students. These results imply that context variables are relevant with regard to personality ratings. When investigating relations of the parental perspective and children's outcomes, researchers should consider that children's reputation with parents might vary with the family's socioeconomic background

and therefore show differential associations depending on it. Study 2 also found that teacher-ratings of elementary school students personality were related to SES and highbrow culture participation with effects being stronger for SES. The modeling approach applied in Study 2 revealed that class teachers rated children's personality more favorably than parents when familial SES was higher. In the original conceptualization of cultural capital, Bourdieu and Passeron (1977) assumed that children could benefit from exhibiting a certain culturally informed *habitus* in order to convey their status to teachers which would use this information in educational decisions. Study 2 did find significant associations between parental highbrow culture participation and teacher-reports as well. Possible consequences for teachers' evaluation of children's performance could be examined in future studies. Investigations of the mechanisms behind these associations, moreover, might be particularly informative for teachers themselves. To sum up, investigations of individual differences in academic achievement could, in line with assumptions in the proposed Identity-Reputation-Context framework, consider children's reputation with parents as well as teachers and the familial context as additional predictors over and above cognitive competences and prior achievement.

5.4 Limitations and Future Research

The current dissertation was limited in several aspects that are discussed in the following while also giving an outlook to possible future research.

First, not all possible associations and interactions within the Identity-Reputation-Context framework, as depicted in Figure 1.1, were tested in this dissertation. Teacher-reports, for example, were not compared to self-reports on personality. They were furthermore not examined as predictors of academic achievement. The latter might also have bidirectional associations with self- and other-reports on personality. The association between socioeconomic background and academic achievement might be moderated by self- and teacher-reports as well. Mediation effects might also be

relevant but were not considered in the current dissertation. For example, personality-reports might mediate the association between socioeconomic background and academic achievement as previously shown in a sample of 17 year-olds in Germany (Steinmayr et al., 2010). It was not possible to conduct all three studies within this dissertation for both elementary school students as well as adolescents, so differences between age groups remain to be examined in future research. The applied CT-C(M-1) models might be, moreover, extended to three personality reports with self-report as a reference method. Comparing other-reports to self-perception would be the most accurate representation of *identity* vs. *reputation*, but it is not always possible to obtain self-reports from young children in particular.

Second, the parental perspective was studied overall, not differentiating between mothers and fathers. While mothers most often are the respondents in assessments of offspring, possible differences between the perspectives might be interesting to study. As suggested by Tackett (2011) mothers and fathers should ideally both be used as informants since the author showed that agreement was lower for Neuroticism and Agreeableness than for behavior-centered traits and both parental ratings incrementally predicted behavioral problems. Discrepancies between mothers' and fathers' ratings furthermore predicted internalizing problems of children. These results demonstrate that perspectives on offspring can even vary within families and disagreement between raters could have informative value.

Furthermore, the associations examined in the three studies were not tested in an experimental design so that causal inferences are not admissible. However this type of design might not be viable for the present research questions and might, furthermore, jeopardize ecological validity as parents' perception arises within the familial context where numerous aspects come into play that seem unrealistic to control for. In Study 1, academic achievement was analyzed longitudinally and the independent variable personality was measured before the dependent variable, the second assessment of achievement two grades

later. Parent-rated personality predicted later academic achievement even under control for previous achievement. However, the associations between these variables might be more complex and could be further investigated using cross-lagged models. For example, change in academic achievement might also have an impact on parental ratings. Change in parental ratings, on the other hand, might also be predictive of change in academic performance. Genetically informed studies, furthermore, could be employed to investigate genetic and environmental contributions to *identity* as well as *reputation*. As pointed out by Pomerantz and Thompson (2008), parental genes as well as parental behavior both can be assumed to have an influence on offspring's personality development. The authors argue against the preeminence of genetic influences proposed by some researchers based on high heritability estimates of personality ranging around .50 and conceptualize parenting as a nonshared environment since parental behavior towards siblings can differ significantly. With regard to the parental perspective, future studies might examine the relative importance of genes, which might also be shared with offspring, and of the familial environment. If the latter should be more relevant, it could be assumed that parental perceptions of offspring originate from interactions within the family which can be altered, rather than from more stable characteristics.

Future research might also employ longitudinal designs in order to analyze the possible importance of the parental perspective for the development of their children's personality. Longitudinal applications of CTCM models are generally scarce in current research. Adolescence might be a particularly eventful period when identity is forming and longitudinal examinations could analyze trajectories of the unique perspectives of others and their associations with changes in adolescents' self-perceptions.

With regard to assessment of personality, only short questionnaire versions were used in the current dissertation as the large-scale data only provided this type of personality measurement. While, for example, the short version of the BFI has been shown to capture 70% of the variance of the full scale (Rammstedt & John, 2007), the full scope

of the Big Five facets cannot be represented with these types of measures. Facet-level examinations might reveal a more detailed pattern of results. As such, parents might perceive particular facets in a certain way which might be informative with respect to the underlying mechanisms.

Future research might also examine the measurement invariance of personality ratings provided by children and adolescents as well as parents and other informants. Mõttus, Allik, and Realo (2020) showed that adult self-reports on the Big Five and ratings by knowledgeable others exhibit metric invariance, with the exception of Agreeableness. Scalar invariance that is recommended for mean-level comparisons was reported for all Big Five domains except Agreeableness and ten facets. The authors, nevertheless, concluded that self- and other-reports measured the same construct. Similar investigations could examine the level of invariance for self-reports of children and adolescents and adult informants. When questionnaires designed for adult populations are used, researchers might inspect whether items are understood in the same way by both young individuals and adult informants. Particularly during periods of developmental changes such as adolescence, the understanding of item content might change as well. Additionally, measurement invariance could also be examined for different socioeconomic backgrounds. One difficulty might lie in the appropriate division into socioeconomic groups if parental educational attainment would not be used as the only criterion. Cultural capital, in particular, might have some bearing on item comprehension since personality items could be argued to contain cultural knowledge about what constitutes individuals.

Finally, the results in the current dissertation only pertain to German elementary school and high school students. The German school system is characterized by a strict stratification since children are allocated to vocational or academic school tracks after the fourth grade. Effects of the familial socioeconomic background on children's academic achievement have been found to be particularly strong in Germany compared to other OECD countries (Organisation of Economic Co-Operation and Development, 2007).

Transitions of children to different types of school, therefore, are not independent of their family's background. Parents might have particularly high expectations of their offspring during the time of transitions and when children attend academic school types. Parental expectations might also be adversely influenced when children attend vocational school types. The results of the current dissertation need to be replicated with data from countries that have a different school system to draw more general conclusions.

5.5 Conclusion

The present dissertation demonstrated the use of an integration of notions from developmental and personality psychology as well as educational sciences in the proposed Identity-Reputation-Context framework for the study of children's and adolescents' personality. Parents' unique perspective on offspring's personality could be disentangled thereby underscoring the relevance of an individual's reputation as an integral part of their environment. The proximal context proved relevant as academic achievement was associated with identity as well as reputation and parents' unique perspective moderated effects of socioeconomic background on achievement. These findings highlight the embeddedness of individual differences. They furthermore demonstrate that individuals exist multiplicatively - in their own perception, but always also in the perception of others; neither is more decisive nor does it have to be, or as put by *Walt Whitman*: I am large, I contain multitudes.

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A Appendix to Paper 1

Table A.1
Personality questionnaires used in the current study

	self-report (BFI-10, Rammstedt and John, 2007)	**parent-report** (FFFK-K, Weinert et al., 2007)
Instruction:	How well do the following statements describe your personality?	For the following antagonistic characteristics you are asked to rate, which characteristic applies to *<name of the child>* more strongly. You can express how well the characteristic applies to the child using the scale from 0 to 10. If the number is small, the first characteristic is more applicable, if the number is big the second characteristic. Please rate the following characteristic of *<name of the child>*.
Openness	• has few artistic interests *(r)* • has an active imagination	• uninterested/thirsty for knowledge • needs more time/comprehends quickly
Conscientious -ness	• tends to be lazy *(r)* • does a thorough job	• untidy/tidy • easily distractible/focused
Extraversion	• is reserved *(r)* • is outgoing, sociable	• quiet/talkative • withdrawn/sociable
Agreeableness	• is generally trusting • tends to find fault with others *(r)* • is considerate and kind to almost everyone	• docile/irritable • defiant/obedient
Neuroticism	• is relaxed, handles stress well *(r)* • gets nervous easily	• insecure/confidence *(r)* • not anxious/anxious

Note. r = items were reversed for analyses.

Table A.2
Unstandardized Loading Parameters of the CT-C(M-1) Model (N = 5,236)

Rating	T_{11}	T_{21}	T_{31}	T_{41}	T_{51}	P_{12}	P_{22}	P_{32}	P_{42}	P_{52}
Openness										
Self										
Item 1	1.00									
Item 2	1.49									
Parent										
Item 1	0.54					1.00				
Item 2	0.14					1.16				
Conscientiousness										
Self										
Item 1		1.00								
Item 2		1.24								
Parent										
Item1		1.65					1.00			
Item 2		1.46					2.32			

Rating	T_{11}	T_{21}	T_{31}	T_{41}	T_{51}	P_{12}	P_{22}	P_{32}	P_{42}	P_{52}
Extraversion										
Self										
Item 1			1.00							
Item 2			0.64							
Parent										
Item 1			1.88					1.00		
Item 2			1.60					1.44		
Agreeableness										
Self										
Item 1				1.00						
Item 2				1.49						
Item 3				1.91						
Parent										
Item 1				1.31					1.00	
Item 2				1.23					2.15	

Rating	T_{11}	T_{21}	T_{31}	T_{41}	T_{51}	P_{12}	P_{22}	P_{32}	P_{42}	P_{52}
Neuroticism										
Self										
Item 1					1.00					
Item 2					2.51					
Parent										
Item 1					1.57					1.00
Item 2					1.33					0.40

Table A.3
Standardized effects of personality perspectives on school performance under control for fluid intelligence, N = 3,287

Performance in the same year: **school grades in 7th Grade**				
	German		mathematics	
Perspective	trait	parents	trait	parents
Openness	.12* [.04,.21]	.16* [.04,.29]	-.05 [-.11,.02]	.38**[.28,.48]
Conscient.	.39**[.26,.53]	.11* [.03,.20]	.12* [.02,.22]	.05 [-.03,.12]
Extraversion	-.09 [-.25,.08]	.10 [-.06,.26]	-.04 [-.17,.09]	-.12* [-.23,-.00]
Agreeableness	-.26 [-.52,.01]	-.09* [-.15,-.03]	.02 [-.18,.21]	-.01 [-.05,.03]
Neuroticism	-.16 [-.31,.00]	.11* [.01,.20]	-.05 [-.14,.04]	.07 [-.00,.15]
Change from previous performance: **school grades in 9th Grade**				
	German		mathematics	
Perspective	trait	parents	trait	parents
Openness	-.00 [-.05,.04]	.12* [.04,.19]	-.05 [-.10,.00]	.13* [.05,.22]
Conscient.	.12* [.05,.19]	.06 [-.00,.13]	.08* [.01,.16]	.03 [-.04,.10]
Extraversion	-.01 [-.10,.07]	-.04 [-.12,.04]	-.04 [-.15,.07]	-.15* [-.24,-.06]
Agreeableness	-.06 [-.18,.07]	-.03 [-.07,.02]	.07 [-.08,.22]	-.01 [-.05,.03]
Neuroticism	-.01 [-.10,.09]	-.01 [-.09,.06]	.04 [-.06,.13]	-.08* [-.16,-.00]

Note. $^{*}p < .05$, $^{**}p < .001$. Conscient. = Conscientiousness. 95%-confidence intervals in squared brackets. Personality measured in 7th Grade. Controlled for gender and fluid intelligence. Performance in 9th Grade controlled for previous performance.

Table A.4
Standardized effects of personality perspectives on competences after control for fluid intelligence, N = 4,391

Competence in the same year: **competences in 7th Grade**				
	reading competence		mathematical competence	
Perspective	trait	parents	trait	parents
Openness	.22* [.06,.38]	.49**[.36,.62]	.03 [-.05,.11]	.41** [.33,.49]
Conscient.	.06 [-.16,.29]	.03 [-.04,.10]	-.06 [-.19,.08]	.02 [-.04,.08]
Extraversion	-.32* [-.55,-.09]	-.03 [-.26,.20]	-.13 [-.30,.03]	-.14* [-.28,-.00]
Agreeableness	-.29 [-.73,.14]	-.07* [-.12,-.01]	-.07 [-.32,.18]	-.09**[-.13,-.04]
Neuroticism	-.14 [-.36,.07]	.15* [.05,.25]	-.12 [-.24,.01]	.08* [.01,.16]
Change from previous competence: **competences in 9th Grade**				
	reading competence		mathematical competence	
Perspective	trait	parents	trait	parents
Openness	.06 [-.01,.12]	.20**[.12,.29]	-.01 [-.04,.03]	.17**[.11,.22]
Conscient.	.00 [-.08,.08]	.05 [-.00,.10]	.03 [-.03,.09]	.05*[.01,.09]
Extraversion	-.09 [-.20,.01]	-.06 [-.15,.03]	-.04 [-.13,.04]	-.09* [-.16,-.03]
Agreeableness	-.07 [-.23,.08]	-.05*[-.08,-.02]	-.03 [-.14,.09]	-.02 [-.04,.01]
Neuroticism	-.07 [-.16,.02]	.07* [.00,.13]	.01 [-.05,.08]	.03 [-.02,.09]

Note. $^{*}p < .05$, $^{**}p < .001$. Conscient. = Conscientiousness. 95%-confidence intervals in squared brackets. Personality measured in 7th Grade. Controlled for gender and fluid intelligence. Competence in 9th Grade controlled for previous competence.

Mplus Code for basic CT-C(M-1) model in Figure 2.1

```
TITLE:
    CT-CM-1

 DATA:
    FILE IS "H:/NEPS/pers.txt";
VARIABLE:
  NAMES =
    Y111 Y211 Y112 Y212 Y121 Y221 Y122 Y222 Y131
    Y231 Y132 Y232 Y141 Y241 Y341 Y142 Y242 Y151
    Y251 Y152 Y252 class;

 MISSING = all (-999);
 CLUSTER = class;

ANALYSIS:
  TYPE = complex;
  ESTIMATOR = MLR;

MODEL:

T11 BY Y111@1 Y211 Y112 Y212;

T21 BY Y121@1 Y221 Y122 Y222;

T31 BY Y131@1 Y231 Y132 Y232;
```

```
T41 BY Y141@1 Y241 Y341 Y142 Y242;

T51 BY  Y151@1 Y251 Y152 Y252;

P12 BY  Y112@1 Y212;

P22  BY Y122@1 Y222;

P32 BY  Y132@1 Y232;

P42 BY Y142@1 Y242;

P52 BY Y152@1 Y252;

!no correlation between parent perspective and trait factor
!of the same Big Five dimension

  P12 WITH T11@0;
  P22 WITH T21@0;
  P32 WITH T31@0;
  P42 WITH T41@0;
  P52 WITH T51@0;

!correlated errors
  Y241 WITH Y121;
  Y231 WITH Y141;
  Y112 WITH Y132;
```

```
  Y142 WITH Y122;
  Y211 WITH Y231;
  Y211 WITH Y121;
  Y242 WITH Y222;
  Y212 WITH Y222;
  Y251 WITH Y131;
  Y252 WITH Y142;
  Y251 WITH Y141;
  Y151 WITH Y121;
  Y211 WITH Y241;
  Y221 WITH Y231;
  Y111 WITH Y121;
  Y251 WITH Y121;
  Y241 WITH Y131;
  Y111 WITH Y151;
  Y212 WITH Y232;

OUTPUT: STANDARDIZED;
```

Mplus Code for extended CT-C(M-1) model in Figure 2.2, for grades in German

```
TITLE:
    CT-C(M-1) with German grades as dependent variables

DATA:
    FILE IS "H:/NEPS/pers2.txt";

VARIABLE:
     NAMES =
```

```
    Y111 Y211 Y112 Y212 Y121 Y221 Y122 Y222 Y131
    Y231 Y132 Y232 Y141 Y241 Y341 Y142 Y242 Y151
    Y251 Y152 Y252 gender gerGrade7 gerGrade9 class;

 MISSING = all (-999);
 CLUSTER = class;

ANALYSIS:
  TYPE = complex;
  ESTIMATOR = MLR;

MODEL:

T11 BY Y111@1 Y211 Y112 Y212;

T21 BY Y121@1 Y221 Y122 Y222;

T31 BY Y131@1 Y231 Y132 Y232;

T41 BY Y141@1 Y241 Y341 Y142 Y242;

T51 BY  Y151@1 Y251 Y152 Y252;

P12 BY  Y112@1 Y212;

P22  BY Y122@1 Y222;
```

```
P32 BY  Y132@1 Y232;

P42 BY Y142@1 Y242;

P52 BY Y152@1 Y252;

!prediction of grades by Big Five under control for gender
gerGrade7 ON P12 P22 P32 P42 P525 T11 T21 T31 T41 T51 gender;
!prediction of change in performance under control for gender
gerGrade9 ON P12 P22 P32 P42 P525 T11 T21 T31 T41 T51 ger12 gender;

!no correlation between parent perspective and trait factor
!of the same Big Five dimension

  P12 WITH T11@0;
  P22 WITH T21@0;
  P32 WITH T31@0;
  P42 WITH T41@0;
  P52 WITH T51@0;

!correlated errors

  Y241 WITH Y121;
  Y231 WITH Y141;
  Y112 WITH Y132;
  Y142 WITH Y122;
  Y211 WITH Y231;
```

```
  Y211 WITH Y121;
  Y242 WITH Y222;
  Y212 WITH Y222;
  Y251 WITH Y131;
  Y252 WITH Y142;
  Y251 WITH Y141;
  Y151 WITH Y121;
  Y211 WITH Y241;
  Y221 WITH Y231;
  Y111 WITH Y121;
  Y251 WITH Y121;
  Y241 WITH Y131;
  Y111 WITH Y151;
  Y212 WITH Y232;

OUTPUT: STANDARDIZED;
```

B Appendix to Paper 2

Table B.1
Fit statistics for correlated trait-correlated method minus one [CT-C(M-1)] models of parental reports on their children's personality in Samples 1 and 2

Model	χ^2	*df*	*p*	CFI	TLI	RMSEA	SRMR
Sample 1 (N = 4,203)							
M1: basic CT-C(M-1)	1158.98	114	< .001	.95	.91	[.046, .051]	.04
M2: extended model	2102.34†	627	< .001	.96	.95	[.023, .025]	.04
Sample 2 (N = 3,771)							
M3: basic CT-C(M-1)	2829.70	238	< .001	.97	.95	[.052, .056]	.04
M4: extended model	1811.77†	345	< .001	.98	.97	[.032, .035]	.03

Note. M1-M4: models 1 to 4. Extended models included parental socioeconomic status, joint family participation in highbrow culture, and children's fluid intelligence as predictors of the unique parental perspective. † = chi-square value for MLR.

Table B.2
Sample 1: Correlations between trait factors of the Big Five in elementary school students, N = 4,203

	(1)	(2)	(3)	(4)	(5)
Openness (1)	1.00				
Conscientiousness (2)	.76**	1.00			
Extraversion (3)	.45**	.09*	1.00		
Agreeableness (4)	.33**	.59**	.00	1.00	
Emotional Stability (5)	.61**	.32**	.83**	.07*	1.00

Note. $^{*}p < .05$, $^{**}p < .001$. Results from a CT-C(M-1) Model.

Table B.3
Sample 1: Correlations between parent factors of the Big Five in elementary school students, N = 4,203

	(1)	(2)	(3)	(4)	(5)
Openness (1)	1.00				
Conscientiousness (2)	.52**	1.00			
Extraversion (3)	.36**	.04	1.00		
Agreeableness (4)	.21**	.26**	.08*	1.00	
Emotional Stability (5)	.46**	.22**	.65**	.09**	1.00

Note. $^{*}p < .05$, $^{**}p < .001$. Results from a CT-C(M-1) Model.

Table B.4
Sample 2: Correlations between trait factors of personality facets in elementary school students, N = 3,771

	(1)	(2)	(3)	(4)	(5)	(6)
Interest in Learning (1)	1.00					
Diligence (2)	.81**	1.00				
Striving (3)	.95**	.91**	1.00			
Sociability (4)	.62**	.72**	.65**	1.00		
Self-Control (5)	.55**	.72**	.59**	.84**	1.00	
Emotional Stability (6)	.77**	.63**	.81**	.55**	.53**	1.00

Note. $^{**}p < .001$. Results from a CT-C(M-1) Model.

Table B.5
Sample 2: Correlations between parent factors of personality facets in elementary school students, N = 3,771

	(1)	(2)	(3)	(4)	(5)	(6)
Interest in Learning (1)	1.00					
Diligence (2)	.73**	1.00				
Striving (3)	.84**	.88**	1.00			
Sociability (4)	.46**	.51**	.55**	1.00		
Self-Control (5)	.36**	.42**	.43**	.43**	1.00	
Emotional Stability (6)	.71**	.62**	.76**	.44**	.42**	1.00

Note. $^{**}p < .001$. Results from a CT-C(M-1) Model.

Table B.6
Sample 2: Standardized effects on the parental perspective on school-relevant personality facets of elementary school students under control for teacher-report from a CT-C(M-1) model, N = 3,771

			Predictors of parental perspective		
	r	R^2	fluid intelligence	SES	highbrow cult. part.
Interest in Learning	.41	.04**	.12**[.05,.19]	-.10* [-.16,-.04]	.17**[.12,.22]
Diligence	.54	.03*	.03 [-.04,.10]	-.17**[-.23,-.11]	.16**[.10,.22]
Striving	.51	.03*	.10* [.03,.17]	-.15**[-.21,-.09]	.17**[.12,.23]
Sociability	.47	.02*	.06 [-.00,.12]	.01 [-.05,.07]	.12**[.07,.17]
Self-Control	.29	.01*	.02 [-.05,.08]	-.02 [-.09,.04]	.13**[.07,.18]
Emotional Stability	.54	.03*	.09* [.02,.15]	-.11* [-.17,-.04]	.18**[.12,.24]

Note. $^{*}p < .05$, $^{**}p < .001$. 95%-confidence intervals in squared brackets. r = Latent correlation between teacher- and parent-report calculated as $\sqrt{consistency}$ from the CT-C(M-1) model results. R^2 = total explained variance in parental perspective. SES = socioeconomic status of the parents, highbrow cult. part. = joint participation in highbrow culture within the family.

Table B.7
Personality questionnaire (FFFK-K, Weinert et al., 2007) used in Sample 1

	teacher-report	**parent-report**
Instruction:	How would you rate the child compared to children of the same age?	For the following antagonistic characteristics you are asked to rate, which characteristic applies to *<name of the child>* more strongly. You can express how well the characteristic applies to the child using the scale from 0 to 10. If the number is small, the first characteristic is more applicable, if the number is big the second characteristic. Please rate the following characteristic of *<name of the child>*.
Openness	• uninterested/inquisitive (*wenig interessiert/wissensdurstig*) • comprehends quickly/needs more time, *r* (*begreift schnell/braucht mehr Zeit*)	• uninterested/inquisitive (*wenig interessiert/wissensdurstig*) • needs more time/comprehends quickly (*braucht mehr Zeit/begreift schnell*)
Conscientious -ness	• untidy/tidy (*unordentlich/ordentlich*) • focused/easily distracted, *r* (*konzentriert/leicht ablenkbar*)	• untidy/tidy (*unordentlich/ordentlich*) • easily distracted/focused (*leicht ablenkbar/konzentriert*)
Extraversion	• talkative/quiet, *r* (*gesprächig/still*) • withdrawn/sociable (*zurückgezogen/kontaktfreudig*)	• quiet/talkative (*still/gesprächig*) • withdrawn/sociable (*zurückgezogen/kontaktfreudig*)
Agreeableness	• docile/irritable (*gutmütig/reizbar*) • defiant/obedient (*trotzig/fügsam*)	• docile/irritable (*gutmütig/reizbar*) • defiant/obedient (*trotzig/fügsam*)
Emotional Stability	• confidence/insecure, *r* (*Selbstvertrauen/unsicher*) • anxious/unworried (*ängstlich/unängstlich*)	• insecure/confidence, (*unsicher/Selbstvertrauen*) • unworried/anxious, *r* (*unängstlich/ängstlich*)

Note. *r* = items were reversed for analyses. Original German items in parentheses, English translation by authors of the study.

Table B.8
Personality items used in Sample 2

	teacher-report	**parent-report**
Instruction:	Please rate how strongly the following characteristics apply for this child in your opinion.	Each child has strengths and weaknesses. How strongly do the following characteristics apply to your child? My child...
Interest in Learning	• has interest in learning (*hat Interesse am Lernen*) • enjoys acquiring knowledge (*hat Freude daran, sich neues Wissen anzueignen.*)	• has interest in learning (*hat Interesse am Lernen*) • enjoys acquiring new knowledge (*hat Freude daran, sich neues Wissen anzueignen.*)
Diligence	• is punctual (*ist pünktlich*) • is conscientious, diligent, and thorough (*ist gewissenhaft, fleißig und sorgfältig*)	• is always very punctual (*ist immer sehr pünktlich*) • is conscientious and diligent (*ist gewissenhaft und fleißig*)
Striving	• is very willing to achieve in class (*ist im Unterricht sehr leistungsbereit*) • is always willing to make in effort in school (*ist immer bereit sich in der Schule anzustrengen*)	• is very willing to achieve (*ist sehr leistungsbereit*) • is always willing to make in effort in school (*ist immer bereit sich in der Schule anzustrengen*)
Sociability	• has a sense of community (*hat Gemeinschaftssinn*) • has a good social behavior (*hat ein gutes Sozialverhalten*)	• has a sense of community (*hat Gemeinschaftssinn*) • has a good social behavior (*hat ein gutes Sozialverhalten*)
Self-Control	• has difficulties controlling emotions, *r* (*hat es schwer, seine Emotionen zu kontrollieren*) • is oftentimes too impulsive, *r* (*ist oftmals zu impulsiv*)	• can sometimes lose their self-control, *r* (*kann schon einmal die Selbstbeherrschung verlieren*) • is very impulsive, *r* (*ist sehr impulsiv*)
Emotional Stability	• is not very resilient, *r* (*ist wenig belastbar*) • is prone to self-doubt in performance situations, *r* (*hat in Leistungssituationen schnell Selbstzweifel*)	• is not very resilient, *r* (*ist wenig belastbar*) • is prone to self-doubt in performance situations, *r* (*hat in Leistungssituationen schnell Selbstzweifel*)

Note. *r* = items were reversed for analyses. Original German items given in parentheses, English translation by authors of the study.

Mplus Code for basic CT-C(M-1) model in Figure 3.1

```
TITLE:
    CT-CM-1

 DATA:
    FILE IS "H:/NEPS/pers.txt";
VARIABLE:
  NAMES =
    Y111  Y211 Y112 Y212 Y121 Y221 Y122 Y222 Y131
    Y231 Y132 Y232 Y141  Y241 Y341 Y142 Y242 Y151
    Y251 Y152 Y252  idclass;

 MISSING = all (-999);
CLUSTER= idclass;

ANALYSIS:
  TYPE = complex;

MODEL:

T11 BY Y111
          Y211
          Y112
          Y212;

T21 BY Y121
          Y221
```

```
          Y122
          Y222;

T31 BY Y131
          Y231
          Y132
          Y232;

T41 BY Y141
         Y241
         Y341
         Y142
         Y242;

T51 BY  Y151
          Y251
          Y152
          Y252;

P12 BY  Y112
          Y212;

P22  BY Y122
          Y222;

P32 BY  Y132
          Y232;
```

```
P42 BY Y142
          Y242;

P52 BY Y152
          Y252;

 P12 WITH T11@0;
 P22 WITH T21@0;
 P32 WITH T31@0;
 P42 WITH T41@0;
 P52 WITH T51@0;

!correlated errors
Y231 WITH Y141;
Y231 WITH Y341;
Y151 WITH Y251;
Y141 WITH Y241;
Y122 WITH Y242;
Y112 WITH Y132;
Y252 WITH Y142;

OUTPUT: STANDARDIZED;
```

Mplus Code for extended CT-C(M-1) model in Figure 3.3 with three residualized independent variables

```
TITLE:
    CT-C(M-1) with independent variables

DATA:
    FILE IS "H:/NEPS/pers2.txt";

VARIABLE:
     NAMES =
    Y111  Y211 Y112 Y212 Y121 Y221 Y122 Y222 Y131
    Y231 Y132 Y232 Y141 Y241 Y341 Y142 Y242 Y151
    Y251 Y152 Y252 cult1 cult2 cult3 hisei casmin
    r1 r2 r3 r4 r5 r6
    r7 r8 r9 r10 r11 r12 idclass ;

 MISSING = all (-999);

CLUSTER= idclass;

ANALYSIS:
 TYPE = complex;

MODEL:

T11 BY Y111
          Y211
```

```
          Y112
          Y212;

T21 BY Y121
          Y221
          Y122
          Y222;

T31 BY Y131
          Y231
          Y132
          Y232;

T41 BY Y141
         Y241
         Y341
         Y142
         Y242;

T51 BY  Y151
          Y251
          Y152
          Y252;

P12 BY  Y112
          Y212;
```

```
P22  BY Y122
          Y222;

P32 BY  Y132
          Y232;

P42 BY Y142
          Y242;

P52 BY Y152
          Y252;

! Identify mean structure of the
! nonreference factor
[P12];
[P22];
[P32];
[P42];
[P52];
[Y112@0];
[Y122@0];
[Y132@0];
[Y142@0];
[Y152@0];

! Latent explanatory variable participation in highbrow culture
Eta1 BY cult1 cult2 cult3;
```

```
! Latent explanatory variable SES
Eta2 BY hisei casmin;

! Latent control variable fluid intelligence
Eta3 BY r1 r2 r3
 r4 r5 r6 r7 r8
 r9 r10 r11 r12;

! Transformation of explanatory variables
Eta1 on T11;
Eta2 on T11;
Eta3 on T11;
Eta1 on T21;
Eta2 on T21;
Eta3 on T21;
Eta1 on T31;
Eta2 on T31;
Eta3 on T31;
Eta1 on T41;
Eta2 on T41;
Eta3 on T41;
Eta1 on T51;
Eta2 on T51;
Eta3 on T51;

! Define residualized explanatory variables
```

```
Xi1 by Eta1@1;

Eta1@0;

Xi2 by Eta2@1;

Eta2@0;

Xi3 by Eta3@1;

Eta3@0;


! Fix correlation between Xi1, Xi2 and trait to 0

Xi1 with T11@0;

Xi2 with T11@0;

Xi3 with T11@0;

Xi1 with T21@0;

Xi2 with T21@0;

Xi3 with T21@0;

Xi1 with T31@0;

Xi2 with T31@0;

Xi3 with T31@0;

Xi1 with T41@0;

Xi2 with T41@0;

Xi3 with T41@0;

Xi1 with T51@0;

Xi2 with T51@0;

Xi3 with T51@0;


! Fix mean of Xi1, Xi2, Xi3 to 0

[Xi1@0];

[Xi2@0];
```

```
[Xi3@0];

! Latent regression analysis for the
! prediction of individual method effects
! using transformed explanatory variables
P12 on Xi1 Xi2 Xi3;
P12 (Res1_r);
P22 on Xi1 Xi2 Xi3;
P22 (Res2_r);
P32 on Xi1 Xi Xi32;
P32 (Res3_r);
P42 on Xi1 Xi2 Xi3;
P42 (Res4_r);
P52 on Xi1 Xi2 Xi3;
P52 (Res5_r);

 P12 WITH T11@0;
 P22 WITH T21@0;
 P32 WITH T31@0;
 P42 WITH T41@0;
 P52 WITH T51@0;

!correlated errors

r21WITH r2;
r10 WITH r6;
cult1 WITH cult3;
```

```
Y231 WITH Y141;

Y231 WITH Y341;

Y151 WITH Y251;

Y141 WITH Y241;

Y122 WITH Y242;

Y112 WITH Y132;

Y252 WITH Y142;
```

C Appendix to Paper 3

Table C.1
Personality questionnaire (FFFK-K, Weinert et al., 2007) used for parent-reported personality

	parent-report
Instruction:	For the following antagonistic characteristics you are asked to rate, which characteristic applies to <*name of the child*> more strongly. You can express how well the characteristic applies to the child using the scale from 0 to 10. If the number is small, the first characteristic is more applicable, if the number is big the second characteristic. Please rate the following characteristic of <*name of the child*>.
Openness	• uninterested/inquisitive (*wenig interessiert/wissensdurstig*) • needs more time/comprehends quickly (*braucht mehr Zeit/begreift schnell*)
Conscientiousness	• untidy/tidy (*unordentlich/ordentlich*) • easily distracted/focused (*leicht ablenkbar/konzentriert*)
Extraversion	• quiet/talkative (*still/gesprächig*) • withdrawn/sociable (*zurückgezogen/kontaktfreudig*)
Agreeableness	• docile/irritable, *r* (*gutmütig/reizbar*) • defiant/obedient (*trotzig/fügsam*)
Neuroticism	• insecure/confidence, *r* (*unsicher/Selbstvertrauen*) • unworried/anxious (*unängstlich/ängstlich*)

Note. *r* = items were reversed for analyses. Original German items given in parentheses, English translation by authors of the study.

Table C.2
Descriptives of study variables

Study variables	*N*	*M*	*SD*
Big Five items (scale 0 to 10)			
Openness 1	2,769	7.29	1.86
Openness 2	2,769	7.41	1.98
Conscientiousness 1	2,770	5.44	2.36
Conscientiousness 2	2,766	6.37	2.19
Extraversion 1	2,769	6.78	2.18
Extraversion 2	2,770	7.41	2.10
Agreeableness 1	2,767	6.15	2.40
Agreeableness 2	2,757	5.97	1.92
Neuroticism 1	2,770	2.81	2.01
Neuroticism 2	2,769	3.77	2.34
School performance – grades (6 = best to 1= failed)			
German	2,710	4.37	0.83
mathematics	2,708	4.21	1.00
biology	2,169	4.53	0.86
chemistry	2,360	4.47	0.91
physics	2,541	4.32	0.96
Socioeconomic status (SES)			
CASMIN	1,917	5.11	3.83
HISEI	1,791	50.44	15.81

educational years	1,906	14.28	5.14
Cultural capital			
Home possessions			
(1 = yes, 0 = no)		*n* yes	%
classical literature	2,760	1,553	56.3
dictionary	2,760	2,723	98.3
poem books	2,760	2,293	83.1
library card	2,760	2,082	75.4
art work, e.g. paintings	2,760	1,303	47.2
Visit frequency			
(scale 1 = never to 5			
= very often)			
museums and art exhibitions	2,770	2.53	1.18
cinema	2,770	3.21	1.24
opera, ballet, classical concerts	2,770	1.77	1.08
theater	2,769	2.03	1.12
Control variables		*n*	%
gender (2 = girl)	2,759	1,376	49.9
migration status (1 = migrated)	2,770	340	12.3
school type (1 = academic school)	2,770	1,528	55.2
Fluid intelligence			
reasoning item 1 (1 = solved)	2,149	1,970	91.7
reasoning item 2 (1 = solved)	2,148	2,034	94.7
reasoning item 3 (1 = solved)	2,144	1,342	62.6
reasoning item 4 (1 = solved)	2,135	1,538	72.0
reasoning item 5 (1 = solved)	2,156	1,838	85.3
reasoning item 6 (1 = solved)	2,153	1,849	85.9

reasoning item 7 (1 = solved)	2,150	1,297	60.3
reasoning item 8 (1 = solved)	2,149	1,537	71.5
reasoning item 9 (1 = solved)	2,155	2,067	95.9
reasoning item 10 (1 = solved)	2,150	1,889	87.9
reasoning item 11 (1 = solved)	2,153	1,801	83.7
reasoning item 12 (1 = solved)	2,146	1,415	65.9
		M	SD
speed itemset 1	2,157	23.96	5.21
speed itemset 2	2,155	19.31	4.88
speed itemset 3	2,154	20.80	5.22

Table C.3

Latent Moderated Structural Equations (LMS) Models for the prediction of school performance in German ninth graders (N = 2,770) by socioeconomic background and self-reported personality

			Openness			**Conscientiousness**			**Extraversion**			**Agreeableness**			**Neuroticism**		
	Model I	Model II	Model IIIa	Model IVa	Model Va	Model IIIb	Model IVb	Model Vb	Model IIIc	Model IVc	Model Vc	Model IIId	Model IVd	Model Vd	Model IIIe	Model IVe	Model Ve
Fluid intelligence	.11* (.04)	.10* (.04)	.47** (.07)	.44** (.06)	.06 (.04)	.23** (.04)	.20** (.04)	.39** (.04)	.11* (.04)	.11* (.05)	.09* (.04)	.10* (.04)	.11* (.04)	.10* (.04)	.11* (.04)	.09* (.04)	.09* (.04)
Academic school	.07* (.03)	.06** (.02)	-.06 (.04)	.04 (.03)	.13** (.02)	.11** (.03)	.15* (.03)	.10* (.03)	.09** (.02)	.09** (.02)	.14** (.03)	.09** (.02)	.10** (.03)	.10** (.03)	.08** (.02)	.14** (.02)	.14** (.03)
Gender	.27** (.02)	.26** (.02)	.30** (.03)	.22** (.03)	.22** (.02)	.18** (.03)	.18** (.03)	.13** (.03)	.26** (.02)	.26** (.02)	.26** (.02)	.22** (.02)	.27** (.02)	.23** (.02)	.25** (.02)	.26** (.02)	.26** (.02)
Migration	-.04* (.02)	-.05* (.02)	-.06* (.02)	-.07* (.02)	-.05* (.02)	-.04 (.02)	-.06* (.02)	-.04 (.02)	-.05* (.02)	-.05* (.02)	-.06* (.02)	-.05* (.02)	-.05* (.02)	-.05* (.02)	-.05* (.02)	-.06* (.02)	-.06* (.02)
SES	.17** (.03)	.12* (.04)	.09* (.04)	.09* (.03)	.08* (.03)	.20** (.05)	.14** (.04)	.14** (.04)	.09* (.03)	.08* (.03)	.10* (.04)	.09* (.03)	.14* (.04)	.08* (.03)	.09* (.03)	.10* (.04)	.10* (.04)
Cultural capital (CC)		.08* (.04)	.05 (.04)	.01 (.04)	.06* (.03)	.01 (.05)	.04 (.04)	.04 (.04)	.09* (.03)	.09* (.03)	.08 (.04)	.10* (.03)	.08 (.04)	.09* (.03)	.10* (.03)	.08* (.04)	.08* (.04)
Self report (Pers)			.05* (.02)	.09* (.03)	.11** (.03)	.41** (.04)	.39** (.04)	.39** (.04)	.10** (.03)	.10* (.03)	.04* (.02)	.07** (.02)	.08** (.02)	.07* (.03)	-.06 (.03)	.03 (.02)	.03 (.02)
PersXSES				.01 (.03)			.01 (.03)			.01 (.03)			-.04 (.03)			.01 (.02)	
PersXCC					.03 (.03)			.01 (.03)			.01 (.02)			.03 (.02)			.02 (.02)
R^2	.16**	.16**	.38**	.39**	.42**	.39**	.29**	.32**	.14**	.16**	.14**	.14**	.18**	.14**	.14**	.14**	.14**

Note. $^{*}p < .05$, $^{**}p < .001$. Standardized regression coefficients are presented. Standard errors in brackets. A separate model was computed for each personality trait. SES = socioeconomic status of the family.

Mplus Code for Latent Moderated Structural Equations (LMS) model for the interaction between Openness and SES in predicting school performance (Model IVa in Table 3.2)

```
TITLE:
    Latent moderated SEM for Openness

DATA:
    FILE IS "H:/NEPS/pers2.txt";

VARIABLE:
   NAMES = Y11 Y12
                   gradeG gradeM gradeB
                   gradeC gradeP
                   casmin10 hisei10 years10
                   h1 h2 h3 h4 h5
                   p1 p2 p3 p4 p5
                   r1 r2 r3 r4 r5 r6 r7 r8 r9
                   r10 r11 r12 s1 s2 s3 idclass
                   sex mig school;
  USEVARIABLES ARE all;
  MISSING = all (-999);
  CLUSTER= idclass;

ANALYSIS:
 TYPE = random complex;
 ESTIMATOR = MLR;
 ALGORITHM= integration;
```

```
MODEL:

O BY Y11 Y12;

ses BY casmin10 hisei10 years10;

cc BY h1 h2 h3 h4 h5
         p1 p2 p3 p4 p5;

int BY  r1 r2 r3 r4
          r5 r6 r7 r8 r9
          r10 r11 r12
          s1 s2 s3;

perf BY   gradeG gradeM
             gradeB gradeC gradeP;

OxSES | O XWITH ses;

perf ON int school sex mig
            ses cc O OxSES;

!correlated errors
gradeP  WITH gradeB;
gradeC  WITH gradeM;
gradeP    WITH gradeC;
gradeB WITH gradeM;
```

```
gradeB WITH gradeG;

gradeC WITH gradeB;

gradeP WITH gradeM;

R2 WITH R1;

R10 WITH R6;

R12 WITH R7;

S2 WITH S1;

S3 WITH S2;

S3 WITH S1;

P5 WITH P2;

P4 WITH P3;

P4 WITH H1;

P2 WITH H5;

H3 WITH H1;

YEARS10  WITH CASMIN10;


OUTPUT: sampstat standardized cinterval;
```

Contributions

Paper 1

The core idea of the manuscript was developed by Emilija Meier-Faust (EMF) and Rainer Watermann (RW). The core idea of the analytical strategy was proposed by EMF and advanced using the feedback of RW. EMF conducted the statistical analysis and wrote the first draft of the paper. EMF and RW discussed the results. RW provided feedback and contributed to the revisions as well as the final version of the manuscript.

Paper 2

The core ideas of the manuscript and the analytical strategy were developed by EMF and RW. EMF conducted the statistical analysis and wrote the first draft of the paper. EMF and RW discussed the results. RW provided feedback and contributed to the revisions as well as the final version of the manuscript.

Paper 3

The core idea of the manuscript was developed by EMF, Annelie Schulze (AS), and Yannick Martin (YM). The core idea of the analytical strategy was developed by EMF. AS, YM, Susanne Bergann (SB), and Annabell Daniel (AD) contributed to further development of the analytical strategy. EMF conducted the statistical analysis. AS, SB, AD, YM, and EMF discussed the results. EMF wrote the first draft of the paper. AS, SB, AD, and YM provided feedback and contributed to the manuscript.

Eidesstattliche Erklärung

Hiermit versichere ich, dass ich die vorgelegte Arbeit selbstständig und unter Zuhilfenahme keiner anderen als der angegebenen Quellen und Hilfsmittel verfasst habe. Die Arbeit ist in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden.

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