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The Roles of Social-Emotional Skills in Students' Academic and Life Success: A Multi-Informant, Multi-Cohort Perspective

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Abstract

Social-emotional skills have been shown to be beneficial for many important life outcomes for students. However, previous studies on the topic have suffered from many issues (e.g., consideration of only a small subset of skills, single-informant, and single-cohort design). To address these limitations, this study used a multi-informant (self, teacher, and parent) and multi-cohort (ages 10 and 15 from Finland, N = 5,533) perspective to study the association between 15 social-emotional skills and 20 educational (e.g., school grades), social (e.g., relationships with teachers), psychological health (e.g., life satisfaction), and physical health outcomes (e.g., sleep trouble). Results showed that (a) there was a modest level of inter-rater agreement on social-emotional skills, with the highest agreement between students and parents (mean r = .41); (b) inclusion of multi-informant ratings substantially enhanced the ability of social-emotional skills in predicting outcome variables, with parent- and self-rated skills playing important, unique roles; (c) by modeling skills at the facet-level rather than at the domain-level, we identified the key skills for different outcomes and found significant variation in facets' predictive utility even within the same domain; (d) although the older cohort showed lower levels of most social-emotional skills (9/15), there were only minor changes in the inter-rater agreement and predictive utility on outcomes. Overall, Self-Control, Trust, Optimism, and Energy were found among the four most important skills for academic and life success. We further identified the unique contribution of each skill for specific outcomes, pointing the way to effective and precise interventions.

Keywords: socio-emotional skills; social and emotional learning; achievement; multi-informant; psychological wellbeing

Success in school is influenced by more than merely cognitive abilities and opportunities (Demange et al., 2021; Kautz et al., 2014; Lavrijsen et al., 2021; Soto et al., 2022). It is also influenced by students' capacities to manage goal- and task-directed behaviors, maintain social relationships, and regulate emotions (Demange et al., 2021; Durlak et al., 2015; Soto et al., 2022). We collectively refer to these capacities as social-emotional skills (Abrahams et al., 2019; Collie, 2020; Kankaraš & Suarez-Alvarez, 2019; Schoon, 2021). Moreover, existing research has shown that how students, parents, and teachers navigate social and emotional situations can have powerful consequences for a multitude of important life outcomes for the student, such as educational achievement and attainment, psychological and physical health, and career success (Demange et al., 2021; Kautz et al., 2014; Smithers et al., 2018; see Gutman & Schoon, 2013; OECD, 2015 for the overviews). Importantly, social-emotional skills are more malleable than cognitive skills through targeted interventions, programs, and policies (Kautz et al., 2014). The literature on social-emotional skills, however, lacks consensus on its components and measurement, with a bewildering array of terms and taxonomies (e.g., soft skills, character strengths, non-cognitive skills, social and emotional learning, and behavioral-social-emotional skills; Kautz et al., 2014; Soto et al., 2021).

Drawing on the integrative framework of social-emotional skills developed by the OECD (Chernyshenko et al., 2018; Kankaraš & Suarez-Alvarez, 2019), the present study assesses the social-emotional skills of two cohorts of Finnish students (aged 10 and 15 years) across three informants' ratings (self, teacher, and parent). We aim to provide a comprehensive evaluation of the development of social-emotional skills and how they are associated with various educational, social, and psychological and physical health outcomes. To do so, we first examine the inter-rater agreement of different informants' ratings on social-emotional skills. Second, we link students' social-emotional skills to various important academic and life outcomes as reported by students, teachers, and parents. Third, we identify the relative importance of each skill for every outcome and examine how different informants' ratings contribute to the prediction of outcomes. Last, we systematically compare the level of social-emotional skills, inter-rater agreement, and predictive utility among different informants' ratings across two cohorts.

The OECD Framework of Social-Emotional Skills

The OECD Social-Emotional Skill Framework

The OECD (2015) defines social-emotional skills[1] as: "individual capacities that (a) are manifested in consistent patterns of thoughts, feelings, and behaviors, (b) can be developed through formal and informal learning experiences, and (c) influence important socioeconomic outcomes throughout an individual's life" (see similar definition by Abrahams et al., 2019). This definition captures essential features of social-emotional skills reflected in all constructs proposed in the multidisciplinary literature of 21st Century skills, education, psychology, personality, and social and emotional learning. Taken together, the components proposed in the literature result in more than 160 individual skills, strengths, and competencies (Berg et al., 2017; Trilling & Fadel, 2009). However, many of these skills overlap and share similarities in their underlying construct (the jingle-jangle fallacy; John & Mauskopf, 2015). Furthermore, the number and nature of the skills used in different models and frameworks vary substantially (Abrahams et al., 2019; Soto et al., 2021).

To solve these conceptual and measurement issues, researchers have been exploring the convergence and divergence of social-emotional skill frameworks. They have begun clustering various skills into a smaller number of overarching domains. John and De Fruyt (2015) reviewed various relevant frameworks advocated during the past two decades. They found that various social-emotional skills could be grouped under the broad umbrella of the Big Five personality traits. Their theoretical findings are also supported by recent empirical evidence (e.g., Primi et al., 2019; Soto et al., 2022; Walton et al., 2021). In addition to being based on a solid empirical foundation, the Big Five framework provides a parsimonious and efficient

[1] The term "skills" was used here following the conceptual framework of the OECD study on social-emotional skills. The term "skills" has been widely accepted, building on contemporary knowledge of the development of the skills defined and assessed by the OECD (OECD, 2021b). However, we acknowledge that the "skills" terminology, unlike "traits" and "dimensions", is not value-free. The (un)desirable level of some skills could vary across different countries/cultures. For instance, assertiveness is highly appreciated and desirable in Western culture, but to a lesser extent in Eastern culture (Kashima et al., 1995). In the context of this study, the 15 skills proposed in the OECD framework are aligned with the values endorsed by Finnish society (Daun et al., 1994). However, the desirability of the 15 skills may still warrant further investigation in cross-cultural studies.

summary of social-emotional skills. Based on the Big Five taxonomy for personality, OECD proposed a social-emotional skill model where five skill domains were defined as follows:

Task Performance: The ability to be self-disciplined, persistent, and dedicate effort in achieving goals and completing tasks (corresponding to *Conscientiousness*);

Emotional Regulation: The ability to control one's emotional responses and moods and be positive and optimistic for self and life in general (corresponding to *Emotional Stability*);

Collaboration: The ability to maintain positive relations and be sympathetic to others (corresponding to Agreeableness);

Open-mindedness: The ability to engage with new ideas and generate novel ways to do or think (corresponding to *Openness*);

Engaging with Others: The ability to engage with others, and be energetic and assertive (corresponding to *Extraversion*);

After reviewing various specific skills (i.e., which we refer to as skill facets) and conducting a series of pilot studies, 15 skill facets (three for each of the domains listed above, see Table 1 for the definition and example items of each facet) were selected for inclusion in the OECD framework on following criteria: (a) be predictive of success in a wide range of important life outcomes and events; (b) be malleable and susceptible to possible policy interventions; (c) be appropriate for 10- and 15-year-olds (i.e., two OECD participating cohorts); (d) be comparable and relevant across different cultures, languages, and social and school contexts; (e) be relevant for the future (rather than only relevant now; see Chernyshenko et al., 2018; Kankaraš & Suarez-Alvarez, 2019 for details for the conceptual framework development).

Similarities and Differences Between the OECD Social-Emotional Skills and the Big Five Personality Traits

Social-emotional skills are defined by the OECD as a broad range of malleable skills that enable individuals to manage goal- and task-directed behaviors, navigate interpersonal and social situations, and regulate emotions effectively (Chernyshenko et al., 2018; John & De Fruyt, 2015). These skills were organized under a five-dimensional taxonomy similar to the Big Five, given conceptual and practical benefits (see earlier discussion and Abrahams et al., 2019, Soto et al., 2022 for further discussion). To date,

the distinction between social-emotional skills and personality traits is still debated. Some economists and psychologists have proposed that skills are indeed traits (Brunello & Schlotter, 2011; Kautz et al., 2014; Soland et al., 2013), whereas others have distinguished traits from skills (see Soto et al., 2021). A recent expert consensus study by Walton et al. (2021) asked 90 experts from different fields—personality psychology and social-emotional learning—to rate the degree of overlap between the Big Five personality traits and 20 popular social-emotional skill terms. With a very high degree of agreement, there is a consensus among experts that the Big Five personality traits and popular social-emotional skills overlap to a significant degree at the broad domain level.

Conceptually, personality traits are referred to as relatively stable dispositions that account for consistencies in thoughts, feelings, and behaviors across situations and over time (Costa et al., 2019). However, historically, the term *relatively stable* has been misinterpreted as personality traits not changing over time (Bleidorn et al., 2019; also see Roberts et al., 2006). In fact, there is growing evidence to show that personality traits are both relatively stable and responsive to major life events (e.g., Bleidorn & Schwaba, 2018; Denissen et al., 2019; Jackson et al., 2012; van Scheppingen et al., 2016) and purposeful interventions (Hudson et al., 2020; Jackson et al., 2021; Roberts et al., 2017; Stieger et al., 2021). Importantly, these changes can significantly impact individuals across major life domains (Roberts et al., 2007; Soto, 2019). Therefore, personality traits have recently been proposed to "occupy a particularly sweet spot at the interface of social science and public policy—broad and enduring enough that they impact a host of important life outcomes yet malleable enough to serve as potentially powerful targets for interventions designed to improve public welfare" (Bleidorn et al., 2019, p. 1057). The relatively stable and malleable nature of personality traits is similar to that of social-emotional skills defined by the OECD—social-emotional skills represent the capacities that are manifested in consistent patterns of thoughts, feelings, and behaviors and are malleable and susceptible to possible policy interventions (OECD, 2021b; Chernyshenko et al., 2018; John & De Fruyt, 2015).

Moreover, skills and traits are often reciprocally related (Casillas et al., 2015; Dweck, 2017), even though some behaviors can be conceptualized as either trait-like or skill-like characteristics. Someone skilled at doing a specific behavior (high skill) is more likely to repeat that behavior, which can eventually

become a characteristic tendency (high trait). For example, consider students who have a high level of behavioral self-regulation, which makes them consistently respond to situations according to their long-term goals and values; eventually, such students will become highly conscientious persons. Similarly, someone who does a behavior on a regular basis (high trait) due to recurrent need fulfillment and goal pursuit is likely to improve at it (high skill; see Dweck, 2017; Soto et al., 2021 for more discussion).

These conceptual similarities between social-emotional skills and personality traits raise the question of how the OECD skill-based approach differs from the Big Five personality traits. Instead of defining a clear conceptual distinction between skills and traits, the OECD framework takes a pragmatic approach and focuses on skills that are changeable through interventions, relevant to school contexts, and important for the future (Chernyshenko et al., 2018; Kankaraš & Suarez-Alvarez, 2019). Here, we highlight several key features of the OECD skill-based approach.

First, social-emotional skill interventions require finer distinctions of discrete skills and are better designed to develop narrow subskills, rather than the broad range of skills captured in the Big Five personality constructs. For example, while Conscientiousness was correlated with social outcomes (e.g., friendship quality), only Responsibility, one of the nine facets of Conscientiousness, significantly predicted social outcomes when all facets were investigated simultaneously (Soto et al., 2021, see Danner et al., 2021 for more discussion). Rather than incorporating skill development programs into personality models, the OECD recommends that skill acquisition efforts should be directed by a framework that specifies essential skills that can be improved over time. Therefore, the OECD framework focuses on the facet level, i.e., on more specific socio-emotional skills at the lower level rather than broad skill domains.

Second, the Big Five domains were used as an organizational framework rather than as aggregated-level skills in the OECD framework (Chernyshenko et al., 2018; John & De Fruyt, 2015). A large number of skills and frameworks were reviewed, and the skills that were deemed essential but fell outside of the Big Five framework were considered for inclusion in the OECD framework (Kankaraš et al., 2019). Take, for example, the Open-Mindedness domain (relating to Openness in Big Five). This domain considers not only the facets resembling Openness (e.g., curiosity and innovation/creativity) but also the facets that emphasize appreciating beauty, valuing and noticing cultures, living in harmony with nature, and emotions relevant to

spirituality, such as tolerance and reverence. These facets stem from positive psychology research, primarily outside of the Big Five personality literature. In total, more than 80 skill facets were included in the initial OECD framework (John & De Fruyt, 2015), which was narrowed to 15 facets in the final version after criteria assessment and pilot studies (see the section above). These facets considered in the OECD framework emphasize their unique origin in 21st-century skills and positive psychology, with its approach based on strengths and virtues (Ciarrochi et al., 2016; Seligman et al., 2005), and can thus advance our understanding beyond the hierarchical personality taxonomy of the Big Five.

In addition, the OECD skill-based approach was applied to two adolescent cohorts (ages 10 and 15) with a multi-informant and multicohort design on 15 key skill facets. Although the multi-informant, multi-cohort design has been widely used in personality research, particularly when studying children and adolescents (e.g., Göllner et al., 2017; Gresham et al., 2010; Luan et al., 2017; Rohrer et al., 2018; Van den Akker et al., 2014), there are some research gaps needing to be filled. First, previous adolescent studies (with multi-informant, multi-cohort design) mainly focused on the domain-level traits of the Big Five or several trait facets. Second, past research on adolescence primarily explored the unique predictive effects of the domain-level traits or facets on limited life outcomes (e.g., Brandt et al., 2021, for academic performance; Luan et al., 2018, for self-esteem). Thus, the OECD study offers a valuable opportunity to extend the literature about the inter-rater agreement of different informants' ratings on many skill facets, the vital role of each facet in predicting various life outcomes, mean-level of skills, and the associated differences between the two adolescent cohorts.

A Facet Approach Versus a Domain Approach

As briefly mentioned above, although organizing social-emotional skills based on the Big Five taxonomy is heuristically useful, we believe research on these skills will advance faster by focusing on the facet level. Indeed, great focus on the facet level (rather than the domain level) has been a growing trend in personality research on the Big Five (e.g., Danner et al., 2021; Soto & John, 2017). A domain approach is where all items from multiple facet skills are aggregated at the domain level, and the domain-level factors are subsequently used to predict/correlate with external criteria of interest. This approach has been widely used in the research on social-emotional skills and personality (e.g., Kankaraš et al., 2019; Ross et al., 2019).

However, such a parsimonious model with few skill domains can only be a very broad approximation of social-emotional skills. Modeling social-emotional skills at the facet-level offers multiple potential advantages over higher levels of abstraction (i.e., a domain approach).

First, modeling skill facets would facilitate theory development, as facets refer to more nuanced social-emotional skills. Facet-level skills provide a more comprehensive and fine-grained description of individual differences in thoughts, feelings, and behaviors. For instance, Self-Control, a facet under the Task Performance domain, shows a much sharper decrease during adolescence compared to the other facets within the same domain (Soto et al., 2011). Second, a facet approach can increase the predictive accuracy of important outcomes compared to a domain approach. Numerous empirical studies have provided strong support for the outperformance of facets (over domains) in predicting various outcomes (Danner et al., 2021; Denissen et al., 2020; Soto & John, 2017). Third, a facet approach provides a deeper understanding of the associations between global skill domains and outcome variables. A substantial association between a global skill domain and an outcome could be driven by significant relations between one or more of the specific skill facets with that outcome. A facet-level approach allows differential associations with outcomes of interest to be identified at the facet level. Importantly, these advantages of the facet approach also point the way to effective and precise interventions by targeting specific skill facets.

The Important Role of Social-Emotional Skills for Academic and Life Success

There is a broad consensus and evidence that social-emotional skills are associated with academic achievement, well-being, and other life outcomes such as income and health (Durlak et al., 2011; Gutman & Schoon, 2013; Kankaraš et al., 2019; Kautz et al., 2014; Smithers et al., 2018; Soto & John, 2017). Given that the OECD social-emotional skill framework is organized under the broad umbrella of the Big Five, we first review the existing evidence for the validity of the Big Five personality traits in predicting academic and life outcomes, based on meta-analyses and reviews of meta-analyses. This will allow us to systematically compare the prediction of the five high-order skill domains with that of the Big Five.

Conscientiousness (corresponding to Task Performance in the OECD framework) is assumed to be the strongest predictor of educational outcomes among the Big Five traits, with a strong theoretical and empirical basis (Poropat, 2009; Zell & Lesick, 2021). For example, a recent study by Zell & Lesick (2021)

synthesized results from 54 meta-analyses investigating the relations between the Big Five traits and academic performance. They found Conscientiousness was moderately and positively associated with academic performance, followed by Openness (corresponding to Open-Mindedness in the OECD framework). The relations of academic performance with other personality traits were weak or insignificant. In contrast, a recent meta-analysis by Anglim et al. (2020) showed that among the five personality traits, Extraversion (parallel to the OECD's Engaging with Others), Agreeableness (parallel to Collaboration), and Emotional Stability (parallel to Emotional Regulation) were moderately correlated with social outcomes (e.g., relationship with others); the relations for Conscientiousness and Openness were positive but slightly weaker.

Personality traits also play an important role in predicting psychological and physical health outcomes (Anglim et al., 2020; Roberts et al., 2007; Steel et al., 2008; Strickhouser et al., 2017). Emotional Stability was found as a dominant predictor of psychological wellbeing (e.g., subjective wellbeing, life satisfaction), followed by Extraversion (Anglim et al., 2020; Steel et al., 2008). Extraversion and Emotional Stability were also the strongest personality correlates of physical activity and sleep quality (Stephan et al., 2018; Wilson & Dishman, 2015). Strickhouser et al. (2017) performed a meta-synthesis of 36 meta-analyses examining the relations between the Big Five and health and well-being. Apart from Extraversion and Emotional Stability, Conscientiousness and Agreeableness were also positively and weakly related to overall health.

What remains unclear, however, is which skill(s)—particularly at the facet level—are more effective than others in predicting outcomes in specific domains. Research endeavors in this direction are imperative as they can shed light on precise and cost-efficient interventions. Although past research has provided preliminary suggestions to this question (Primi et al., 2019; Soto et al., 2021), most of these studies mainly examined domain-level skills with self-reported measures. This study examined relations between social-emotional skills and various academic and life outcomes from a multi-informant and multi-cohort perspective.

To capture a range of important outcomes in all spheres of adolescents' lives, this study adopted the OECD conceptual framework of life outcomes (Kankaraš et al., 2019). This framework includes four

aspects of outcomes: Educational, social, psychological, and physical outcomes. These outcomes represent the most desirable ends for a sustainable society – educated, socially supported, happy, and healthy citizens (OECD, 2015). By linking social-emotional skills to these outcomes, we illustrate the comprehensive role that social-emotional skills play in academic and life success. Given that few studies have systematically compared the predictive effects of a large set of social-emotional skills at the facet-level, in the section below, we reviewed the literature and provided theoretical assumptions for the most effective skill (that we expect) for 20 outcomes across the four aspects of important life outcomes (see Table 2 for a summary).

Social-Emotional Skills and Educational Outcomes

The skills in the Task Performance domain focus on goal attainment and completion through self-regulation, dedication, and persistence. These skills are more powerful than others in predicting educational outcomes as they reflect the capacities of task completion regardless of setbacks (Duckworth et al., 2019; Gutman & Schoon, 2013; Zell & Lesick, 2021). Very few studies, however, have systematically compared the unique contribution of facet skills under the Task Performance domain in predicting different aspects of education outcomes, such as academic achievement, class engagement, and educational aspirations. Specifically, Self-Control, the capacity to reduce mind wandering and enhance mental concentration, is assumed to be more closely linked to academic achievement (Muenks et al., 2017; Steinmayr et al., 2018; Werner et al., 2019). In contrast, Persistence is expected to be more highly associated with class engagement as it enables individuals to overcome obstacles and finish tasks (Muenks et al., 2017; Steinmayr et al., 2018; Tang et al., 2019). For educational aspirations, previous research tends to suggest that (un-specified) skills under the Open-Mindedness domain (rather than under the Task Performance domain) are among the most important predictors for educational aspirations (Rottinghaus et al., 2002). Educational aspirations—directional thoughts and plans for the future--may largely be aroused when ample information is received. For instance, knowing good examples of role models would promote aspirations and motivation (Dennehy & Dasgupta, 2017; D. Hu et al., 2020). Skills under the Open-mindedness domain are closely associated with information seeking and collection, which may result in a strong relation with educational aspirations.

Social-Emotional Skills and Social Outcomes

Social outcomes are critical aspects of life that include human relationships and conflicts, and social or global connectedness (Kankaraš et al., 2019). In this study, social relationships (i.e., relationships with teacher/peer/parent), school belonging, victimization, and global mindedness were chosen by the OECD to measure social outcomes. The ability to empathize, trust and co-operate with others (three skills under Collaboration) as well as to be in contact with other people (a skill under Engaging with Others), is a fundamental pre-requisite for forming and maintaining stable and fulfilling social connections (Allen et al., 2017; Anglim et al., 2020; Kankaraš et al., 2019). In particular, Sociability and Trust were more correlated with positive social connections (e.g., positive relations with others, sense of belonging) than were other skills (Anglim et al., 2020). However, for negative relations, such as victimization, Emotional Control from the Emotional Regulation domain was the most effective skill to prevent victimization (Kulig et al., 2019; Mitsopoulou & Giovazolias, 2015; Riley et al., 2019). This is likely because students can reduce peer conflicts by regulating their own emotional reactions. Lastly, global mindedness is expected to be mostly associated with Tolerance, given that it represents the embrace of multiple cultures, knowledge, and people (Kankaraš et al., 2019).

Social-Emotional Skills and Psychological Health Outcomes

Psychological health is defined as having a good mental state, which includes various evaluations (from both positive and negative sides) that people make of their lives (OECD, 2013). Social-emotional skills are critical in determining psychological health outcomes (e.g., subjective well-being, life satisfaction, and anxiety; Kankaraš et al., 2019). Skills under the Emotional Regulation domain (i.e., Stress Resistance, Optimism, and Emotional Control) are supposed to show more prominent effects on psychological health than other skills since psychological health is primarily related to emotion states and experiences (Steel et al., 2008). For specific skills, Optimism is expected to be the most beneficial skill for subjective well-being and life satisfaction as it represents the skill to maintain positive experiences (Anglim et al., 2020; Scheier et al., 2001). In contrast, Stress Resistance is supposed to be most effective to prevent negative experiences (e.g., anxiety, negative affect) as this skill captures the ability to handle stress or other affective problems (Anglim et al., 2020; Kotov et al., 2010).

Social-Emotional Skills and Physical Health Outcomes

Physical health, in addition to psychological health, is the other important category for health-related life outcomes. Given that physical health is closely associated with health-related behaviors, the OECD framework considers student general health condition and a series of health-related behaviors (i.e., eating, sleeping, and physical activities) in the category of physical health outcomes. Stress Resistance, the capacity to modulate anxiety and calmly solve problems, is assumed to be most beneficial for eliminating stress and preventing sleep problems (Lund et al., 2010; Stephan et al., 2018; Sutin et al., 2020), whereas Self-Control is assumed to be most helpful for developing a healthy eating habit given its decisive role in regulating behaviors (Murray & Booth, 2015; Strickhouser et al., 2017). Since Energy is the manifestation of energetic and vigorous behavior, it is assumed to be the most powerful predictor of physical activity (Rhodes & Smith, 2006; Soto et al., 2022). For general health condition, Optimism, the ability to maintain positive and optimistic expectations for self and life in general, has been found to have the strongest relation with an individual's health (Carver et al., 2010; Strickhouser et al., 2017).

Multi-Informant Ratings on Students' Social-Emotional Skills

While people can provide meaningful self-reports about their own behaviors, observer reports can be especially valuable for situations and developmental periods (e.g., adolescence) when self-reports are less accurate (Vazire & Carlson, 2011). Researchers have agreed that social-emotional skills should be based on multi-informant ratings rather than a single source of ratings (John & De Fruyt, 2015).

Observer reports of skills, in addition to self-reports, are commonly used and act as a necessary supplement to self-descriptions (Gresham et al., 2010). Parents and teachers are typically the main informants for primary school children. Adolescent self-reports are often supplemented by ratings from parents and teachers for secondary school students. Modest interrater agreement among informants has been identified in previous studies across children's and adolescents' social-emotional skills and behaviors (Gresham et al., 2010; Renk & Phares, 2004; Rescorla et al., 2014). For example, Renk and Phares (2004) meta-analyzed 74 studies on social competence and showed a moderate parent-teacher agreement (r = .38), which was slightly higher than self-teacher agreement (r = .25) and self-parent agreement (r = .21). The

magnitude of these correlations suggests that each different informants' ratings share some variance, but also provides unique perspectives on children's standing and development of skills.

Such informant discrepancies are not surprising, as social-emotional skills are multidimensional constructs manifested in various ways in different contexts (Abrahams et al., 2019). Different informants can provide unique information on children's behaviors in different contexts. Teachers, for example, have experience with children in the structured classroom setting and are in a better place to observe more interpersonal and task-oriented skills, while parents are more adept at rating children based on their home environment. Additionally, teachers rely on a much wider frame of reference (comparing a student with the other pupils they teach) to characterize the skills of their students. In contrast, a parent's scope is typically much narrower and more idiosyncratic (see John & De Fruyt, 2015 for further discussion). Therefore, informant discrepancies should not be simply considered as measurement error. Instead, different informants focus on different aspects of social-emotional skills and have their own informative and unique viewpoints.

Moreover, multi-informant designs play an important role in predicting variables of interest. Despite established evidence on the modest inter-rater agreement among informants on student social-emotional skills, little is known about the degree to which the pattern of social-emotional skills in predicting outcomes converges across different informants. Evidence is also lacking about whether a specific informant's rating consistently outperforms others in predicting a set of outcomes. The inclusion of multi-informant ratings could enhance the ability of social-emotional skills in predicting outcome variables. Thus, the present study fills this research gap by including skills rated by youths, teachers, and parents to model the prediction of various outcomes.

The Development of Social-Emotional Skills During Childhood and Adolescence

Social-emotional skills, as defined by the OECD (2015), are malleable and can be developed with the help of supportive environments (Collie, 2020; Durlak et al., 2015; Kautz et al., 2014). Childhood and adolescence are not only the key periods for developing these skills (Durlak et al., 2015; Kautz et al., 2014), but are also the periods that witness the most change in skills (Soto et al., 2011; Steinberg et al., 2008). In the OECD Study on Social-Emotional Skills (OECD, 2021b), two age cohorts (ages 10 and 15) were studied to cover childhood and adolescence. In most countries, 15-years of age (when students are approximately in

the 9th grade) marks the end of compulsory education (OECD, 2020), after which adolescents either enter work life, vocational education, or general secondary high school education. Thus, ages 10 and 15 are critical to developing social-emotional skills, which serve as the cornerstones for future development and life success (Gutman & Schoon, 2013; OECD, 2015). Unfortunately, this is also the period when students start to lose their motivation and engagement in school learning (Wigfield et al., 2015). Thus, the present study examines the age cohort differences to understand the developmental changes of specific social-emotional skills from ages 10 to 15.

In one exceptional study, the developmental trajectories of various social-emotional skills grounded in the Collaborative for Academic, Social, and Emotional Learning (CASEL) framework during adolescence (10-18 years) were examined (Ross et al., 2019). By examining social-emotional skills at the domain level, Ross et al. (2019) found that, in general, adolescents became more skilled as they grew older. However, the growth patterns were heterogeneous across different domains. For instance, Self-Awareness skills (resembling the Emotional Regulation domain in the OECD framework) declined from ages 10 to 15, increasing after 15 years of age. In contrast, Responsible Decision-Making skills increased from ages 10 to 18, with a much faster increase between ages 15 and 18. Self-Management skills (resembling the Task Performance domain in the OECD framework) declined throughout adolescence, though the rate of change was slower between ages 15 and 18. This suggests that the development of social-emotional skills during adolescence is complex and is likely coupled with the puberty process and school transition (changing of school, teachers, and peers; Ross et al., 2019; Steinberg et al., 2008).

Previous research has also documented a temporary decline in Big Five personality traits during adolescence, known as the disruption hypothesis (Soto & Tackett, 2015). It is proposed that some of the biological, social, and psychological changes that occur during the transition from childhood to adolescence may cause adjustment issues, accompanied by temporary dips in psychosocial maturity. Adolescents display more deviant behaviors than children as they seek autonomy and challenge authority (Steinberg et al., 2008). However, they gradually become more responsible and emotionally stable by internalizing social norms. Thus, it leads to a U-shape personality development curve typically observed from childhood to late adolescence (Borghuis et al., 2017; Denissen et al., 2013; Soto & Tackett, 2015; for a summary, see

Bleidorn & Hopwood, 2019). More specific to the development stage focused on in this study (ages 10 vs. 15), personality studies showed a decreasing trend in Extraversion, Emotional Stability, and Conscientiousness (Borghuis et al., 2017; Denissen et al., 2013; Soto, 2016). The evidence for Openness and Agreeableness is somewhat less consistent in the literature. The drops in Openness and Agreeableness are observed in some studies (Denissen et al., 2013; Soto, 2016; Soto et al., 2011; Van den Akker et al., 2014), whereas other studies reported slight growth trends (Borghuis et al., 2017) or no mean-level changes (Luan et al., 2017) during adolescence.

The Present Investigation

Although social-emotional skills are more malleable than cognitive skills and have potential benefits for a range of academic and life outcomes (Duckworth & Yeager, 2015; Gutman & Schoon, 2013), previous studies on social-emotional skills have suffered from a series of issues: Only a small subset of skills being considered, using a single-informant and single-cohort design, and limited academic and life outcomes. The present investigation utilizes the integrative social-emotional skill model by the OECD (Kankaraš et al., 2019, see Table 1), with a multi-informant multi-cohort design, to identify the key skills for different educational, social, psychological health, and physical health outcomes, and to provide clear guidance for effective interventions promoting youths' academic and life achievement. Given the research scope and the complexity of the statistical model, the present research focused on 10- and 15-year-old students in Finland from the OECD Study on Social and Emotional Skills (OECD, 2021b).

The Finnish education system offers equal opportunities for education for all young people. Education is publicly funded and free of charge, from pre-primary to higher education (Ministry of Education and Culture, 2022). The Finnish education system consists of a single structure system with basic education (comprehensive school) from Year 1 to 9 (age 7 to 15). At the end of the comprehensive school, each young person must apply for general upper secondary education or vocational education. Compulsory education ends when a student reaches the age of 18 or completes an upper secondary qualification (a general upper secondary qualification or a vocational qualification). Moreover, basic education at the City of Helsinki Education Division (2022) is built upon a school-specific curriculum that describes the principles of schoolwork and special emphasis of the school. The curriculum is based on national and municipal

curricula. Teaching goals include children's development with cross-curricular competence and future skills with at least two yearly long-term, cross-subject, and phenomenon-based entities, i.e., real-world phenomena from multiple school subjects' points of view. The general upper secondary education curriculum also includes the development of socio-emotional skills. In sum, due to strong equity policies, high-quality teachers (e.g., Master's Degrees have been required since the 1970s), and autonomous educational sectors (Niemi et al., 2016), Finnish youth have shown high school performance and digital skills, while spending fewer hours in school (OECD, 2017, 2019; Välijärvi et al., 2007). Our main research questions are as follows:

RQ1: How Do Different Informants Agree With Each Other on the Ratings of Social-Emotional Skills?

We expect a moderate inter-rater agreement between different raters (students vs. teacher, student vs. parent, and teacher vs. parent; Gresham et al., 2010; Rescorla et al., 2014; Hypothesis 1a). Specifically, we hypothesize that teacher-parent agreement will be greater than the agreement between teacher-student and parent-student pairs across social-emotional skills (Renk & Phares, 2004; Gresham et al., 2010; H1b).

RQ2: Which Social-Emotional Skill Matters More Than Others in Predicting Educational, Social, Psychological Health, and Physical Health Outcomes?

We used relative weight analysis (Tonidandel & LeBreton, 2011) to address this research question, a statistical technique developed to examine a set of correlated predictors simultaneously. In the relative weight analysis, we include three sets of social-emotional skills (15 skills * 3 informants) and explore how different informants' ratings jointly contribute to predicting different outcomes (RQ2). Specific hypotheses (H2) for each outcome variable are listed in Table 2, formulated in advance of the statistical testing (but not pre-registered).

RQ3: Are There Any Cohort Differences in the Mean Level, Inter-Rater Agreement, and Predictive Utility of Social-Emotional Skills?

Specific hypotheses (H3) for age cohort differences in the level of each social-emotional skill are listed in Table 3. We also examined the age cohort differences in inter-rater agreement and predictive utility of different informants' ratings for explaining various outcomes. Given little research on cohort differences

in inter-rater agreement (RQ3a) and predictive utility (RQ3b) during childhood and adolescence, we leave these as open research questions.

Method

Participants

The data used in this study were drawn from a representative population sample in the Helsinki site (in Finland) of the OECD Study on Social and Emotional Skills (OECD, 2021b). The data included survey responses from all student, teacher, and parent participants. For students, the two target populations were 10-year-olds (Mean age = 10.67, *SD* = .30) and 15-year-olds (Mean age = 15.66, *SD* = .29), also referred to as the 'younger' and 'older' cohorts by the OECD (2021). A majority of the students in the younger and older cohorts were from 4th and 9th Grade, respectively (equivalent to the same graders in the U.S. system; see detailed descriptive information of the studied sample in Table 4). While the sample is representative of the Helsinki population, it would also be useful to examine how representative the sample was of the broader Finnish population. In doing so, we utilized two key demographic variables available in this dataset: Parental educational level and home language. The percentages of mothers and fathers having tertiary education in this sample were 32%, almost identical to the national statistics (31.7%). In this study, about 84% of students used Finnish/Swedish (both are official languages) at home, whereas 92.5% were shown in the national statistics (Statistics Finland, 2020). It indicates that more immigrants live in Helsinki (the capital city) than in other places in Finland, which is typical in urban areas.

The samples were collected using a complex two-stage sampling design (i.e., students nested within schools) and were representative of the Helsinki population after using the appropriate survey weights (OECD, 2021a). All public schools of the City of Helsinki participated in the OECD Study on Social and Emotional Skills, resulting in 83 schools for the younger cohort and 55 schools for the older cohort in 2019. The survey was filled out via an online survey in school among students and teachers. Teachers completed a short survey about themselves and about each of the students in their classroom. One parent or guardian for each student also completed a survey about their child. Participation in the study was voluntary.

Measures

Social-Emotional Skills

Students' social-emotional skills were assessed as 15 facets and by three informants: student, teacher, and either parent or guardian. Three items were used to measure each skill from each informant based on a 5-point Likert scale (in total, 15 facets x 3 items x 3 informants = 135 items). The wording of the items was consistent across informants (e.g., "[I/This student/My child] keeps my/his/her/his emotions under control"). All the (sub)scales have good reliability (Cronbach's alpha $\alpha > .77$ and Omega coefficient $\omega > .79$, respectively) from the Finnish sample, according to the OECD technical report (2021a). A full description of the items and scales can also be found in Appendix 1 in Supplementary Materials and the OECD report (2021a). All responses were recorded to ensure high scores were indicative of adaptive skills.

Educational Outcomes

The OECD Study on Social and Emotional Skills focuses on three educational outcomes: Academic performance, class engagement, and educational aspirations. Three measures of academic performance were provided in the dataset. The first measure consisted of school grades (i.e., GPA) in math, reading/language, and arts, obtained from the students' school registry. School grades were standardized on a scale from 1 to 50. We performed a principal component analysis of the three GPA scores in this study. The first main component then served as the indicator of school grades, which accounted for 79% of the total variability. The second measure was a cognitive test. The test covered calculation (e.g., How many legs do three cows and four chickens have in total?) and reasoning skills (e.g., If the day after tomorrow is two days before Thursday, then what day is it today?). The cognitive test included five items for the younger cohort and seven for the older cohort. Students' responses were scored as 1 (correct) or 0 (incorrect), with a summed score representing overall performance in the cognitive test. The third measure was the teachers' ratings on students' performance in math, reading/language, science, and arts. The teachers evaluated these performances on a scale from 1 to 5 (1 poor - 3 average - 5 excellent). Again, the first main principal component of the four performance scores served as the indicator of teacher-reported performance, which accounted for 75% of the total variability. In addition, a single-item measure was used to measure the extent to which students participated in class activities, whereas educational aspirations were captured by the

highest level of education students expected to complete (see Table S1 in supplemental materials for detailed measurement description).

Social, Psychological Health, and Physical Health Outcomes

According to the OECD conceptual framework for the important life outcomes, a wide range of social, psychological health, and physical health outcomes were chosen (Kankaraš et al., 2019). A full description of the items is documented in Table S1. Social outcomes included relationships with teachers/parents/friends, school belonging, victimization, and global mindedness. For relationships with teachers, students were asked about their perceived relationship with their teachers over the past 12 months (three items, e.g., "I got along well with most of my teachers") on a scale from 1 (1 *never or almost never*) to 4 (*once a week or more*). Students were asked about their perceived relationship with their parents and friends by responding to three items (e.g., "I get upset easily with my parents") and four items (e.g., "My friends understand me"), respectively. Both measures were answered on a scale from 1 (*almost never or never true*) to 4 (*almost always or always true*). The school belonging scale consisted of six items (e.g., "I make friends easily at school") with a response ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). For victimization, students were asked how often they had experienced bullying at school over the past 12 months (four items, e.g., "other students made fun of me") on a scale from 1 (1 *never or almost never*) to 4 (*once a week or more*). For global mindedness, students were asked how informed they were about the different topics (i.e., climate change, global health, international conflict, poverty, and gender equality) by selecting one of four options from 1 (*I have never heard of it*) to 4 (*I know a lot about this*).

Psychological health outcomes included the World Health Organization (WHO)-Five Well-Being index, life satisfaction, and test anxiety. For the wellbeing index, students were asked to indicate how they had been feeling over the past two weeks (five items, e.g., "I felt cheerful and in good spirits") on a scale from 1 (*at no time*) to 5 (*all the time*). Life satisfaction was assessed by a single item (i.e., "Overall, how satisfied are you with your life as a whole these days?") on a scale from 0 (*not at all satisfied*) to 10 (*completely satisfied*). For text anxiety, students were asked to indicate how anxious they felt about testing (three items, e.g., "I often worry that it will be difficult for me to take a test").

Physical health outcomes were captured by four aspects, including general health conditions, sleep quality, eating habits, and physical activity. Both self-rated and parent-rated health-related outcomes were considered in this study. Self-rated health variables included general health condition and sleep trouble. Self-reported health was measured by a single item (i.e., "in general, how would you describe your health?") on a scale from 1 (*excellent*) to 5 (*poor*). For sleeping trouble, students were asked to evaluate a statement (i.e., "I have trouble sleeping) on a scale from 1 (*not at all accurate*) to 5 (*perfectly accurate*). Parent-rated health variables included general health conditions, eating habits, sleep hours, and physical activity. Again, parent-reported health was measured by a single item (i.e., "in general, how would you describe your health?") on a scale from 1 (*excellent*) to 5 (*poor*). Parent-reported eating habits were assessed by asking parents how often their child eats breakfast, fruit, and vegetables (3 items). Parent-reported physical activity was measured by how often their child does moderate (e.g., walking, climbing stairs, and riding a bike to school) and vigorous physical activities (e.g., running, cycling, and aerobics). Parents were also asked how often their child sleeps 8 hours or more at night, which was used to measure parent-reported sleep hours. The measures of parent-reported eating habits, sleep hours, and physical activity were based on a scale from 1 (*once a week or less*) to 4 (*every day*).

All answers were recoded to ensure that high scores were indicative of more favorable responses, except for test anxiety and victimization. All outcome variables measured by multiple items (e.g., WHO-wellbeing, belonging, test anxiety, victimization, relationships with others) showed adequate to strong internal consistency for the Finnish sample according to OECD technical report ($\alpha > .71$, $\omega > .72$, see Table S1 for items). We used the weighted likelihood estimate (WLE) summary scores of these latent outcome variables provided by the OECD in this study. These WLE scores have demonstrated validity and invariance across cohorts and are adequate for cross-cohort comparison of the proposed relations (see OECD, 2021a, for more details).

Statistical Strategy

In the present study, multigroup confirmatory factor analyses (CFAs) and structural equation models (SEMs) were conducted using Mplus 8.6 (Muthén & Muthén, 2008–2021) using the robust maximum likelihood estimator. To account for a nested data structure in which students are nested within schools, we

used the Mplus complex design to control for the clustering of students within schools with the weighting variables provided by the OECD (2021a).

Set-ESEM

Evaluating the factor structure of the OECD social-emotional skill model, which purposely includes multiple related scales (facets) of the same domain, requires appropriate statistical models that take this substantive structure into account. Confirmatory Factor Analysis (CFA) models are based on a restrictive assumption that each item loads on one and only one factor, which typically results in poor model fit and inflated factor intercorrelations (Marsh et al., 2017). Researchers have developed ESEM approaches that allow them to define the underlying factor structure more appropriately by including cross-loadings that can be justified by substantive theory and still apply the advanced statistical methods relating to CFAs/SEMs (Guo et al., 2019; Marsh et al., 2014). However, ESEMs often lose parsimony with an instrument such as the OECD instrument of social-emotional skills, which presupposes multiple facets (measured by multiple items) within each of the five domains. Thus, a balance of ESEM and parsimony is needed for such instruments. In this study, we employed a recently developed approach—Set-ESEM with target rotation—where cross-loadings are only allowed within an a priori defined set of factors (Dicke et al., 2018; Marsh et al., 2019). For example, Self-Control items are only allowed to cross-load on Responsibility and Persistence facets that belong to the Task Performance domain (see Figure 1). We modeled student-reported skills with teacher- and parent-reported skills in one Set-ESEM model. Therefore, across the three informants, there are 45 factors (15 factors x 3 informants) representing the five domains.

Method Effects

Method effects associated with negative item wording have been reported for many scales, since the construct-irrelevant variance of negatively worded items tends to detract from the construct validity of interpretations (DiStefano & Motl, 2006). Correlated uniquenesses were thus added between the negatively worded items used to measure skills, to control for this negative-item bias (Marsh et al., 2010). In addition, we included correlated uniquenesses for each matched pair of parallel worded items used to assess the same construct by different raters. The exclusion of these correlated uniquenesses would bias parameter estimates

so that correlations between matching latent constructs across different raters are systematically inflated (Marsh et al., 2010, 2013).

Acquiescence

The tendency of a person to consistently agree (yea-saying) or disagree (nay-saying) with questionnaire items, regardless of their content, is known as the acquiescent response style (D. N. Jackson & Messick, 1958). Individual variation in acquiescence may distort a psychological measure's reliability, validity, and structure at both the item and scale levels, particularly for children and adolescents (Rammstedt & Farmer, 2013; see Soto & John, 2017 for more discussion). Following Soto and John's (2017) suggestion, we modeled acquiescence as a method factor to control for the influence of acquiescence on item response. Each item by the same raters was allowed to load on an acquiescence method factor. In total, three acquiescence method factors (one for each informant) were modeled. All loadings on the acquiescence factor were constrained to be equal to 1 without reversing negatively worded items[2]. This acquiescence factor was orthogonal, i.e., it was not allowed to correlate with any of the skill factors and with other acquiescence factors (see Figure 1).

Missing Data

There is a small amount of missing data on student self-rated and teacher-rated social-emotional skill items (on average, 1.27% and 13.6% missing data, respectively). However, the missing data on parent-rated social-emotional skill items were substantially larger (on average 70%), as a large number of parents did not respond to the survey. The response rate was extremely high for those parents who agreed to participate in the survey (95%). All models were fitted using the robust maximum likelihood estimator available in Mplus, in conjunction with the Mplus full-information-likelihood method (FIML) procedures to handle missing data. The FIML method has been shown to result in unbiased estimates for missing values, even in the case of a high level of missing values (Enders, 2010). Specifically, in the main analysis, 135 social-emotional skill items from the three raters (45 items for each rater) were all included in each CFA/Set-ESEM model. We also conducted a robustness check for missing data (see "Robustness Analyses" section where we

[2] Note that the negatively worded items have been reversed in this study, so that the factor loadings of those items on the acquiescence method factor were fixed to -1 rather than 1 (Soto & John, 2017).

conducted supplemental analyses using two approaches: (1) completed sample and (2) inclusion of auxiliary variables for more detail).

Goodness of Fit

A number of traditional indices that are relatively independent of sample size were utilized to assess model fit (L. Hu & Bentler, 1999): the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA) and the Tucker-Lewis Index (TLI). The TLI and CFI vary along a 0-to-1 continuum, and values greater than .90 and .95 typically reflect acceptable and excellent fits to the data respectively. RMSEA values of less than .05 and .08 reflect a close fit and a minimally acceptable fit to the data, respectively. However, for purposes of model comparison, comparison of the relative fit of models, imposing more or fewer invariance constraints, is more important than the absolute level of fit for any one model—so long as the fit of the best-fitting model is acceptable. Researchers suggest that for the more parsimonious model, if the decrease in CFI and TLI is less than .01 and the increase in RMSEA is less than .015, then there is reasonable support for the more parsimonious model (Chen, 2007; Cheung & Rensvold, 2002).

Relative Importance Approach

In order to know which skills are more effective than others for a specific outcome, this study utilized relative importance analysis (Tonidandel & LeBreton, 2011) as our analytical approach. This approach is particularly useful when a series of predictors are potentially correlated highly (Tonidandel & LeBreton, 2011). In conventional multiple regression analysis containing numbers of correlated predictors, comparing standardized regression coefficients of predictors may not be informative, as the analysis does not appropriately partition variance. Thus, such analysis is not suitable for addressing questions regarding which skill would be most predictive for a specific outcome. Given its strength in appropriately partitioning the variance among correlated predictors, the relative importance analysis has been recently employed in psychology research (e.g., Lavrijsen et al., 2021; Steinmayr et al., 2018).

In a relative weight analysis, we transformed the original predictors into a set of variables that were uncorrelated with each other, but maximally related to the original predictors. Next, we used a regression model to predict outcomes using the transformed variables. These regression coefficients no longer suffer

from problems associated with collinearity because the transformed variables are uncorrelated (orthogonal). We used the standardized regression coefficients from this model to rescale the results back to the original predictors. Specifically, the standardized regression weights used to transform the original predictor X_i into the orthogonal variable Z_j are noted as λ_{ij}, which are equal to the correlations between X_i and Z_j (as a set of Z_j are independent from each other). The squared standardized regression coefficients from the regression (λ_{ij}^2) represent the proportion of variance in each Z_j accounted for by X_i. In a second step, the criterion Y can be regressed on the orthogonal variables Z_j. The squared standardized regression coefficients from this regression (β_j^2) represent the proportion of variance in Y accounted for by each Z_j. The relative weight of predictor X_i was obtained by summing the products of the squared standardized regression coefficients, that is, $RW_i = \sum_j^1(\lambda_{ij}^2 \times \beta_j^2)$; (Tonidandel & LeBreton, 2011). In this way, we calculated a relative weight for each predictor. This represents the amount of explained variance that can be attributed to the predictor, which indicates its relative importance. The relative weights are an additive decomposition of the total model R^2--the sum of the relative weights equals the total model R^2. Furthermore, we checked each relative weight for significance and performed bootstrap analyses with 10,000 resamples to examine whether the relative weights differed from each other (Tonidandel & LeBreton, 2015). The upper and lower bounds of a 95% confidence interval for the statistic of interest were generated with a bootstrapping procedure. The relative weight analysis was conducted in R (Tonidandel & LeBreton, 2015). The present study was based on the analysis of secondary data published by OECD; the data are freely available online (https://www.oecd.org/education/ceri/social-emotional-skills-study/). All the analyses codes and supplementary materials are available at https://osf.io/wz7er/?view_only=c4b9677b33534a92bf01e5c4d9e74133.

Results

Preliminary Analysis: Factor Structure of the OECD Social-Emotional Skill Model

CFA and Set-ESEM

Our study is among the first to assess the OECD social-emotional skill model, in which a hierarchical factor structure was proposed (15 first-order facets nested within 5 second-order domains, see

Table 1). We first evaluated the first-order factor structure of the OECD social-emotional skill model, combining three informants' ratings, based on CFA. The CFA model with 45 first-order facets (15 facets for each rater) provided an unacceptable goodness of fit (M1, CFI = .897, TLI = .883, See Table 5).

Next, we modeled the data using Set-ESEM, where cross-loadings are only allowed within a domain (or set) of factors that were defined in the theoretical framework of the OECD social-emotional skill model (in total, five sets * three raters = 15 sets, see Figure 1). The fit of the Set-ESEM model improved substantially (M2; CFI = .937, TLI = .926), which indicates that the Set-ESEM model presents the underlying factor structure of the social-emotional skill model more appropriately than did the CFA model. Consequently, we chose the Set-ESEM model as a baseline model to test the influences of further modeling of method effects, acquiescence, higher-order structure, and measurement invariance (see OSF link for annotated Mplus syntaxes).

Next, we evaluated a priori method effects associated with negatively worded items and parallel worded items. The model with correlated uniquenesses for both parallel worded items and negatively worded items resulted in improved fit (M4, CFI = .946, TLI = .935). To control for the influence of acquiescence on item responses, we added three acquiescence method factors; each item from the same rater was allowed to load on one acquiescence method factor with the loadings being fixed to be 1 (see Figure 1). It resulted in better model fit (M5, CFI = .949, TLI = .939). Hence, all subsequent models included correlated uniquenesses for both parallel and negatively worded items and the acquiescence method factors.

Our supplemental analysis showed that the higher-order Set-ESEM model including the five higher-order domains (3 facets on each domain) did not provide acceptable fit (M6, CFI = .883, TLI = .873; ΔCFI = -.066, ΔTLI = -.066 compared to the first-order model). These results indicate that five higher-order social-emotional skill factors were not well defined and, therefore, should not be pursued further (see Appendix 2 for more details). However, given the borderline model fits, as requested by reviewers and editors, we used this model and examined the role of five broad domains of social-emotional skills in order to compare with the findings based on Big Five personality traits.

In order to evaluate the inter-rater agreement across different informants' ratings based on the latent matrix, it is critical to test the factor loading (metric) invariance of the 15 social-emotional skill facets. There

was a negligible decrease in fit (ΔCFI = .007, ΔTLI = .008) for the model (M7), in which the factor loadings were constrained to be equal across groups, indicating that the data supported the invariance of factor loadings. To enhance the interpretation, we also tested factor variance invariance. Adding equality constraints on the factor variances (M8) resulted in a satisfactory level of fit to the data, and only a negligible change in fit (ΔCFI = .006, ΔTLI = .007). These results suggest that the inter-rater agreement between different informants' ratings can be directly comparable. The factor structure for the most parsimonious model (M8) was presented in Table S2 in Appendix 3, in which the absolute mean of standardized target factor loadings was .668 and of standardized non-targeted factor loadings was .072.

Inter-Rater Agreement on Social-Emotional Skills

One important feature of multi-informant rating scales is the extent to which informants agree on the ratings of the same construct. There are a total of 15 convergent correlations between each pair of informants' ratings on each skill facet, located on the diagonal of the correlation matrix (e.g., student vs. teacher, student vs. parent, and teacher vs. parent, see Table 6, see Figure S1 and OSF link for the full correlation matrix). The stronger convergent correlations indicate higher inter-rater agreement between two raters. The convergent correlations between students' and teachers' ratings are statistically significant and modest, with a mean of r =.256 (p < .001, 95%CI [.236, .276]). Results showed that students and teachers agreed the most on ratings of the Sociability facet (.347, p < .001, 95%CI [.306, .388]) and least on the facet of Tolerance (.122, p < .001, 95%CI [.077, .167])). The inter-rated agreement between students' and parents' ratings were consistently higher (mean r = .411, p < .001, 95%CI [.376, .446]) than those for students' and teacher' ratings across 15 facets (Δr = .154, p < .001, 95%CI [.115, .193]), but the values varied as a function of facet with a range of .275 (Responsibility, p < .001, 95%CI [.201, .349]) to .552 (Sociability, p < .001, 95%CI [.485, .619]). For teacher-parent agreement, the convergent correlations (mean r = .333, p < .001, 95%CI [.306, .360]) were also higher than student-teacher agreement (Δr = .077, p < .001, 95%CI [-.106, -.048]) but lower than student-parent agreement (Δr = .078, p = .001, 95%CI [.033, .123]). These teacher-parent correlations ranged from a minimum of .190 (Tolerance, p < .001, 95%CI [.135, .245]) to .540 (Self-Control, p < .001, 95%CI [.469, .611]).

We also conducted the inter-rater agreement based on the five broad domain skills. The inter-rater agreement between student-teacher agreement were statistically significant and modest with a mean of *r* =.322 (*p* < .001, 95% CI [.291, .353]). The values varied from the domain of Task Performance (.267, *p* < .001, 95%CI [.232, .302]) to the domain of the Engaging with Others (.433, *p* < .001, 95%CI [.392, .474]). The inter-rated agreement between students' and parents' ratings were consistently higher than student-teacher agreement for the five skill domains (mean *r* =.478 (*p* < .001, 95%CI [.415, .541]; Δ*r* = .156, *p* < .001, 95%CI [.091, .221]). The student-parent agreement varied as a function of domains with a range of .368 (Task Performance, *p* < .001, 95%CI [.282, .454]) to .639 (Engaging with Others, *p* < .001, 95%CI [.565, .713]). For teacher-parent agreement, the mean of the convergent correlations on the five skill domains was .419, (*p* < .001, 95%CI [.378, .460]), ranging from a minimum of.318 (Emotional Regulation, *p* < .001, 95%CI [.257, .379]) to .495 (Engaging with Others, *p* < .001, 95%CI [.360, .490]). The significance test showed that the strength of teacher-parent agreement was similar with that of student-parent agreement (Δ*r* = .059, *p* = .112, 95%CI [-.014, .132]) but statistically higher than that of student-teacher agreement (Δ*r* = .097, *p* < .001, 95%CI [.052, .142]). All pairs of inter-rater agreement showed the highest agreement in the domain of Engaging with Others (see Table S3 in Appendix 4 for more details).

Overall, consistent with H1a, there was a modest inter-rater agreement among students, teachers, and parents. However, the highest inter-rater agreement was between students and parents, whereas the lowest inter-rater agreement was for students and teachers, which was not in line with our hypothesis (H1b).

Roles of Social-Emotional Skills in Predicting Educational, Social, Psychological-, and Physical-Health Outcomes

In this section, we relied on relative weights analysis to determine the relative importance of 15 social-emotional skill facets for each outcome. In doing so, we saved the factor scores of social-emotional skills and outcome variables across the three raters from Model M9 in Table 5. Factor scores provide partial implicit control for measurement errors and preserve the nature of the underlying measurement structure better than scale scores do. Given that each rater had unique contributions and was complementary to each other in predicting outcomes, we conducted a relative weight analysis by including three sets of skills rated

by different informants simultaneously (i.e., 45 social-emotional skills in total, see the correlation matrix between each skill from each rater and the 20 outcomes in Table 7, also see the OSF link for more detail). This allows us to determine the relative importance of every skill from a multi-informant perspective and compare the unique predictive utility of different informants' ratings. We also conducted a set of parallel analyses based on five broad social-emotional skill domains.

Joint Relations of Three Raters' Social-Emotional Skills

We first reported the proportion of the variance for an outcome variable explained by a model that included the 45 skill facets from three informants (i.e., R^2 see Figure 2). The total R^2 is a sum of relative weights of each skill listed in the Ɛ columns in Table S7 in Appendix 5. To facilitate the interpretation, we rescaled relative weights for each skill in terms of the percentage of its relative weight to the total R^2, representing the percentage of explained variance for an outcome variable accounted for by each skill (Tonidandel & LeBreton, 2015). For example, three sets of social-emotional skills explained 41% variance in school grades (R^2 = .41). For a skill like Self-Control from three informants' ratings, its relative weights are .013, .035, and .006 for self-, teacher-, and parent-ratings, respectively. In total, it accounted for .054/.41 = 13.1% of explained variances for school grades. Larger percentages of the explained variance indicate greater relative importance of each skill for an outcome variable. To further enhance the interpretation, we summarized the best five predictive skills for each outcome based on the percentage of explained variance (%) (Table 8, also see Appendix 5 for more detailed results).

Joint Relations with Educational Outcomes. The R^2 contributed from each and all informants' ratings on the 15 skill facets was summarized in Figure 2. In total, for educational outcomes, social-emotional skill facets explained a significant amount of variance in the OECD cognitive test (R^2 = .27), school grades (R^2 = .41), class engagement (R^2 = .49), and teacher-reported performance (R^2 = .66) but much less in educational aspirations (R^2 = .10). Across the three raters, Self-Control (accounting for 13.1% – 16.8% of explained variances) and Persistence (accounting for 9.4% – 15.5% of explained variances) were among the most significant skills for academic achievement. In contrast, class engagement was associated mostly with Curiosity (accounting for 16.8% of explained variances) and Persistence (15.5%).

Joint Relations with Social Outcomes. Social-emotional skill facets explained a significant amount of variances in relationships with teachers, parents, and friends (R^2 = .31, .50, .52, respectively) as well as in school belonging (R^2 = .68), victimization (R^2 = .28), and global mindedness (R^2 = .40). Overall, Trust was relatively the most important predictor for social outcomes (accounting for 8.9% – 25.7% of explained variances), except for global mindedness. Emotional control, Sociability, and Cooperation also stood out for the prediction of relationships with parents (17%), relationships with friends (13.6%), and victimization (14.7%), respectively. Global mindedness was largely predicted by Tolerance (23%).

Joint Relations with Psychological Health Outcomes. Regarding psychological outcomes, social-emotional skills explained large amounts of variance in life satisfaction (R^2 = .70), subjective well-being (R^2 = .61) and test anxiety (R^2 = .56; see Figure 2). Optimism outperformed other facets substantially in predicting subjective well-being and life satisfaction, accounting for 21.5% and 35.3% of explained variances, respectively, whereas Stress Resistance was the best predictor of test anxiety (contributing to 32.5% of explained variance).

Joint Relations with Physical Health Outcomes. For physical health outcomes, social-emotional skills also explained a significant part of the variance in self-reported health conditions (R^2 = .56) and sleep trouble (R^2 = .38), as well as in parent-reported health conditions (R^2 = .39), eating habit (R^2 = .25), physical activity (R^2 = .38), and sleep hours (R^2 = .36). Overall, Energy was a dominant predictor of physical health outcomes (accounting for 10.6% – 36.8% of explained variances), followed by Optimism outcomes (14% – 18.5% of explained variances). Stress Resistance is also a key predictor of physical health outcomes, particularly for sleep behaviors (17.2% and 7.7% of explained variances in sleep trouble and sleep hours, respectively).

Joint Relations with Academic and Life Outcomes Based on the Domain-Level Analyses. In addition, we reported the proportion of the variance for an outcome variable explained by a model that included the 15 broad skill domains from three raters (i.e., five skills domains from each rater). Three sets of broad social-emotional skill domains jointly explained significant amounts of variances across 20 outcomes with a mean of R^2 = .39 (see Table S4 in Appendix 4). On average, the R^2 explained by the five skill domains across outcomes was systematically smaller than that explained by the 15 skill facets (mean R^2

= .44) to a small extent, except for class engagement. Among the five skill domains, Task Performance had the strongest association with educational outcomes, on average, accounting for 30.0% of explained variances across the five education outcomes, followed by Open-Mindedness (25.4% of explained variances). Collaboration and Emotional Regulations contributed more to explaining variances for six social outcomes (on average, 24.0% and 21.5% of explained variances, respectively) than did other domains. Psychological health outcomes were largely predicted by Emotional Regulation (38.2% of explained variances), followed by Engaging with Others (23.0% of explained variances). Similarly, Emotional Regulation and Engaging with Others were also more associated with six physical health outcomes (31.0% and 29.6% of explained variances, respectively) than were other domains.

Summary of Relative Important Skills. We first summarized the five most predictive skill facets for each outcome (see Table 8). Then, we utilized two criteria to determine whether the expected (hypothesized) facet was among the strongest predictors in the expected direction (a "hit"): (1) the joint prediction model should explain at least 26% of the variance for a specific outcome (.26 is considered as large magnitude of R^2, Cohen, 1988); and (2) the predicted facet should account for at least 10% of explained variance for a specific outcome. Following these two criteria, educational aspirations were excluded as the social-emotional skills did not explain significant variance in these outcomes. In total, 16 out of 19 cases "hit" the hypotheses (84%, see Table 8). For those cases that did not "hit" the hypotheses, on average, the predicted/hypothesized skills account for 6.8% of explained variances. It indicates that our findings are largely consistent with the hypotheses.

In order to provide a clear take-home message for relative important skills for various academic and life outcomes, we outlined the most important skills for each type of outcomes: Self-Control for educational outcomes, Trust for social outcomes, Optimism for psychological health outcomes, and Energy for physical health outcomes (see Figure 3). More importantly, these four skills also play significant roles in predicting other outcomes. For instance, Optimism significantly predicted physical health outcomes, whereas Trust and Energy made substantial contributions to predicting psychological health outcomes. On average, each of these four skills contributed to 8%-10% explained variance for each outcome.

Comparing the Unique Predictive Utility of Different Informants' Ratings (RQ2). When the three sets of informants' ratings were considered simultaneously (3*15 skills; see Appendix 5 for detailed results), teacher-rated skills had a much larger contribution to the prediction of teacher-reported performance (R^2 = .48) than did self-rated (R^2 = .05) and parent-rated skills (R^2 = .12) (See Figure 2). But all three sets of skills contribute similarly to explaining variances of the OECD cognitive test (R^2 = from .07 to .11) and school grades (R^2 = from .09 to .17). Student self-rated skills are dominant predictors of class engagement (R^2 = .38).

Self-rated skills also contributed more to predicting social outcomes and psychological health outcomes (R^2 =.14 to .58) than did teacher- and parent-rated skills (R^2 =.03 to .12 and .06 to .13, respectively). For physical health outcomes, student- and parent-rated skills contributed more than did teacher-rated skills (R^2 = from .03 to .07). More specifically, parent-rated skills were more predictive of parent-reported health conditions (R^2 = .27) and physical activity (R^2 = .20), whereas student-rated skills were more predictive of parent-reported sleep hour (R^2 = .19). For eating habits, both student- and parent-rated skills contributed similarly to predicting parent-reported eating habits (R^2 = .09 and .11, respectively). Student-rated skills were also more predictive of both self-reported health conditions (R^2 = .36) and sleep trouble (R^2 = .24) than parent-rated skills (R^2 = .18 and .10, respectively).

Supplemental Analysis

Test Similarity in The Prediction of Outcomes Between Different Raters. In supplemental analyses, we also explored whether the relations between social-emotional skills and outcomes varied as a function of different informants' ratings. We first conducted three sets of relative weights analyses for each rater separately (see Appendix 6 and Tables S8-S10). Next, we calculated a Profile Similarity Index (PSI) for the rank ordering of the relative importance of skills across raters for each outcome using Spearman's correlation. The PSI is the correlation between the rank orderings of the relative importance of skills obtained from different raters. On average, across 20 outcomes, the Spearman's correlation between student-rated results and teacher-rated results was .45, between student-rated results and parent-rated results was .57, and between teacher-rated results and parent-rated results was .47. Second, we examined the extent to which the five most predictive skills for each outcome overlapped across raters. In doing so, we took the five most

predictive skills for each outcome based on relative weights analyses for each rater separately. There were three sets of the five most predictive skills for each outcome from students, teachers, and parents, respectively. For each outcome, we calculated the overlap of the five most predictive skills for each pairwise comparison between raters (i.e., sets) based on percentages (e.g., if the three most predictive skills were matched between students' and teachers' ratings, there was a 60% overlap). On average, across 20 outcomes, we found that the percentage overlap of the five most predictive skills was 59% between student-rated results and teacher-rated results, 67% between student-rated results and parent-rated results, and 59% between teacher-rated results and parent-rated results. This indicates that three out of the five most predictive skills overlapped across different informants' ratings for most of the outcomes, when we ran relative weights analyses for each rater separately.

In sum, our tests showed that the predictive roles of skills were moderately consistent across the three informants' ratings (see detailed comparisons between different raters in Appendix 6). More importantly, we found that when the outcomes were predicted by each informant's rating of social-emotional skills separately, the R^2 for the outcomes substantially decreased, compared to that predicted by the three informants' ratings together. Specifically, the model with three sets of social-emotional skills together explained significant amounts of variances across 20 outcomes (average R^2 = 44.1%). The averaged R^2 reduced by 14.0%, 33.4%, and 27.4% when the outcomes were predicted by student's, teacher's, or parent's ratings, separately.

Robustness Check

Controlling for Background Variables. To check the robustness of our findings, we conducted two sensitivity analyses. Given that students' background variables, such as family socioeconomic status (SES), may have strong relations with various outcomes, the first sensitivity analysis was performed by including four background variables (i.e., gender, year levels, SES, and home languages) as covariates (see Appendix 1 for the covariate measures). The relative weight analyses showed that controlling for the background variables, there was only a slight decrease in terms of explained variance (i.e., R^2, average decrease = 3.0%), except for school grades (Δ = 18%) and parent-reported sleeping hours (Δ = 20%; see Figure S2). We also

systematically compared the five most important skill facets and the hypothesis test between models with and without covariates and found that the pattern was highly similar (see Appendix 7).

Completed Sample. The second sensitivity analysis was to confirm that missing data does not influence the pattern of results. Given a significant amount of missing data on parents' responses, we reran the analysis based on completed parents' data. The pattern of results remained highly consistent with the original pattern (the absolute average change of R^2 = 4.8% Figure S3). The five most important skill facets and the hypothesis tests were also replicated (see Appendix 8).

Inclusion of Auxiliary Variables. We also explored potential missing data mechanisms by conducting a series of tests to examine differences between parent participating and non-participating groups for both demographic variables (e.g., gender, grade level, SES, and language spoken at home). Compared with the completed sample, we found that students from the families with low SES ($t(2998) = 21.23$, $p < .001$, Cohen's d =.456, 95% CI [.414, .498]), and those who did not speak the official languages (i.e., Finnish/Swedish) at home ($\mathcal{X}^2(1) = 118.71$, $p < .001$, percentage difference = 12.7%), were less likely to have their parents participate in the survey. Thus, we further included these variables as auxiliary variables in the models in the sensitivity analysis. We found that the inclusion of these variables resulted in highly similar parameter estimates compared to those in the original models (see the correlation matrix among 45 latent facets via the OSF link).

Age Cohort Differences in the Social-Emotional Skills, Inter-Rater Agreement, and Their Relations with Outcomes

Age Cohort Differences in The Levels of Social-Emotional Skills

In order to compare the correlation matrices and mean-level differences of social-emotional skills between the two cohorts, we conducted multiple-group analyses to test the factor structure invariance in terms of factor loadings, factor variances, and intercepts. First, we extended the first-order Set-ESEM model with 15 facets to multi-group analyses (MG1), where method effects and acquiescence were also controlled for. The configural multiple-group model provided reasonable model fit (MG1, CFI = .944, TLI = .932, see Table 5). To make the inter-rater agreement comparable across raters and cohorts, we first tested factor loading invariance across the two cohorts (MG2). It resulted in a negligible decrease in fit (ΔCFI = .004, Δ

TLI = .003). Subsequently, we further added equality constraints on the factor loading across raters, which again resulted in a slight decrease in fit (Mg3, ΔCFI = .006, ΔTLI = .007). Following the invariance test in the total-group model analysis, we also tested factor variances invariance across cohorts and raters (MG4 & MG5). The model with such equality constraints resulted in a satisfactory level of fit to the data (CFI = .926, TLI = .913), and only a negligible change in fit (ΔCFI = .008, ΔTLI = .009). Additionally, in this study, we are interested in comparing the latent mean differences in different informants' ratings on social-emotional skills between cohorts, which requires a test of intercept (scale) invariance across both cohorts and raters. Adding equality constraints on the intercept across cohort (MG6, ΔCFI = .007, ΔTLI = .007) and further adding equality constraints on the intercept across raters (MG7, ΔCFI = .001, ΔTLI = .001) resulted a minor decrease in fit. These results support that the factor structure was invariant in terms of factor loadings, variances, and intercepts. The findings provided good support for the invariance tests.

Cohort differences in social-emotional skill facets based on different raters were reported in Table 9. On average, nine out of 15 social-emotional skills showed a declining trend across different informants over two age cohorts. Specifically, Persistence, Stress Resistance, Optimism, Empathy, Trust, Curiosity, Creativity, Sociability, and Energy were significantly lower (*d*s = -.16 to -.49) for the older cohort. In contrast, older students had higher Emotional control (*d* = .12) and Assertiveness (*d* = .15). Moreover, Self-Control, Responsibility, Cooperation, and Tolerance remained stable across the two cohorts, on average. Nine out of 12 cases "hit" the hypotheses (75%, see Table 9), indicating that our findings are largely consistent with the hypotheses.

For cohort differences in the domain level of social-emotional skills, all five skill domains declined over two age cohorts (see Table S5 in Appendix 4). The largest drop was in the domain of Engaging with Others (*d* = -.487, *p* < .001, 95% CI [-.591 -.383]), followed by Emotional Regulation (*d* = -.364, *p* < .001, 95% CI [-.456 -.272]) and Open-Mindedness (*d* = -.487, *p* < .001, 95% CI [-.591 -.383]). A slight decrease was evident for Collaborations (*d* = -.184, *p* < .001, 95% CI [-.278 -.090]) and Task Performance (*d* = -.102, *p* = .014, 95% CI [-.182 -.022]).

Age Cohort Differences in Inter-Rater Agreement Across Different Informants' Ratings (RQ3a)

On average, the older cohort showed stronger inter-rater agreement (i.e., convergent validity) on the 15 skill facets between students and teachers, compared to the younger cohort (Δr = .057, p = .005, 95% CI [.017, .097]). In contrast, the inter-rater agreement between students and parents (Δr = .034, p = .318, 95% CI [.017, .097]) as well as between parents and teachers (Δr = -.020, p =.412, 95% CI [.017, .097]) were similar in size (see OSF link for the full correlation matrices). Similarly, for the five skill domains, the older cohort showed stronger inter-rater agreement between students and teachers than the younger cohort (Δr = .089, p = .003, 95% CI [.030, .148]). However, for both cohorts the inter-rater agreement between students and parents (Δr = .078, p = .221, 95% CI [-.045, .201]) as well as between parents and teachers (Δr =.002, p =.959, 95% CI [-.082, .078]) were similar in size (see Table S6 in Appendix 4).

Cohort Differences in Relations Between Social-Emotional Skills and Outcomes (RQ3b)

Despite the mean differences in social-emotional skills between the two cohorts, the roles of social-emotional skills were rather consistent. On average, across 20 outcomes, 45 social-emotional skills (15 skills from each rater) explained more variance for the older cohort (mean R^2 = .54) than for the younger cohort (mean R^2 = .47) (See OSF link for more details). Nevertheless, the explained variance for most outcomes was comparable between the two cohorts ($\Delta R^2 < .10$) with several exceptions. Specifically, the social-emotional skills explained large variances in school grades (R^2 = .70), educational aspirations (R^2 = .42), and Global Mindedness (R^2 = .59) for the older cohort but much less for the younger cohort (R^2 = .19, .10, and .40, respectively). In addition, we explored whether the relative importance of social-emotional skills for the outcomes varied as a function of two age cohorts. We first summed the R^2 of each skill from three raters' ratings for each outcome, based on the models that included the 45 skills from three raters. Then we calculated a PSI for the rank ordering of the relative importance (i.e., R^2) of skills across age groups for each outcome using Spearman's correlation. Results showed that on average, across 20 outcomes, the Spearman's correlation was .62. Next, we calculated the percentage of overlap of the five most predictive skills for each outcome between two age cohorts. On average, across 20 outcomes, we found that the percentage overlap of the five most predictive skills was 66%. In sum, our tests showed that the predictive roles of skill facets were moderately consistent across two age cohorts.

The broad domain-level analyses showed that across 20 outcomes, 15 skill domains (five domains from each rater) explained more variances for the older cohort (mean R^2 = .47) than for the younger cohort (mean R^2 = .42). Nevertheless, similar to the findings based on the face-level analyses, the explained variances for most outcomes were comparable between the two cohorts (ΔR^2 < .10). There were only several exceptions where R^2 was larger for the older cohort (R^2 = .67 vs. .28 for school grades, .35 vs. .09 for educational aspirations, and .60 vs. .31 for global mindedness, See OSF link for more details). For the similarity in the relative importance of the skill domains between age cohorts, we found that, across 20 outcomes, the percentage overlap of the most predictive skill domain between the two age cohorts was 65%, and the percentage overlap of the two most predictive skill domains was 73%. It indicates that the predictive roles of skill domains were largely consistent across the two age cohorts.

Summary

While the domain approach provided a useful, high-level summary, the hypothesized domain-level structure only fit the data marginally with its borderline model fit (M6 in Table 5). It is because some skill facets had stronger relations with the facets in different domains than within the same domains (see Figure S1), which is consistent with the Big five literature (Danner et al., 2021; Soto et al., 2022). Importantly, our facet approach showed a huge variability across different facets within the same domains in terms of the inter-rater agreement, skill-outcome relations, and age cohort differences (see Tables 6-9). Thus, the findings based on the higher-order skill domains should be interpreted with caution.

Discussion

By integrating the facet-focused approach with the multi-informant, multi-cohort design, the current study investigated inter-rater agreement, mean-level, and the unique roles of skill facets on various life outcomes of two Finnish adolescent cohorts. Although the multi-informant, multi-cohort design has been widely used in personality research, particularly when studying childhood and adolescence (e.g., Göllner et al., 2017; Gresham et al., 2010; Luan et al., 2017; Rohrer et al., 2018; Van den Akker et al., 2014), this study advances the literature by focusing on i) 15 nuanced social-emotional skills by modeling skills at the specific facet-level in addition to the broad domain-level; and ii) the unique contribution of each skill facet (from multiple informants' ratings) to the prediction of various life outcomes. Therefore, this study provides a

more comprehensive and deeper understanding of individual differences in thoughts, feelings, and behaviors and how those differences are associated with individual differences in academic and life outcomes of students of different age groups in Finland.

Multi-Informant Approach

Inter-Rater Agreement on Social-Emotional Skills

This study is among the first to assess inter-rater agreement between students, teachers, and parents on a large set of social-emotional skills. Overall, consistent with previous studies, we find a modest level of consensus about student social-emotional skills at both facet and domain levels. Results also demonstrate different levels of correspondence in their ratings of skills, with the student-parent agreement being the highest. However, this finding is contradictory to previous research that has found parent-teacher ratings to be more consistent than either set of adults with the child (Gresham et al., 2010; Renk & Phares, 2004; Rescorla et al., 2014). A potential reason is that most previous studies on cross-informant ratings focus on emotional and behavioral difficulties/problems (e.g., Rescorla et al., 2014). Thus, it may be that emotional and behavioral problems of children and adolescents are much more salient cues for adult observers than are social competencies and skills (see Renk & Phares, 2004 for more discussion).

Interestingly, the correspondence between students and teachers was consistently lower across all skills, compared to that between students and parents. In theory, teachers are in a better position to evaluate more interpersonal and task-oriented skills since they have worked with the children in a more organized context, such as the classroom. Nevertheless, the larger discrepancy between students and teachers may be due to the frame-of-reference effects: Teachers characterize a student's skills by comparing the student with others in the student's class. This effect would be amplified when the skill item involves social comparison (e.g., "This student has less energy than their classmates, see Appendix 1).

Age Cohort Differences in Inter-rater Agreement on Social-Emotional Skills

Overall, the inter-rater agreement across different informants' ratings was quite stable across different age cohorts, with one small exception. The inter-rater agreement between students and teachers was slightly stronger for the older than for the younger cohort. This finding may reflect the greater amount of time that adolescents spend in school-related activities (e.g., Renk & Phares, 2004) compared to younger-

aged children. In Finland, secondary school students typically spend 30 hours a week in the school, compared to 26 hours spent at school by late primary school students (i.e., age-10 cohort; Finnish National Board of Education, 2014). However, our finding of cohort difference in the inter-rater agreement between students and teachers should not be over-interpreted, given that the magnitude of change was small (Δr = .057, 95% CI [.017, .097] at the facet level and Δr = .089, 95% CI [.030, .148] at the domain level).

Contributions and Consistency of Different Informants' Ratings on Predicting Outcomes

One unique contribution of this study is that we not only assess discrepancies on different informants' ratings but also relate cross-informants' ratings to various outcomes. By doing so, we can disentangle the unique effects of different informants' ratings on outcomes and examine cross-informant consistency in the predictive power of social-emotional skills.

This study provides strong evidence that taking three sets of informant ratings together significantly enhances the predictive ability of social-emotional skills for outcome variables. These findings reinforce that students', teachers', and parents' ratings are all informative and provide supplemental perspectives on children's standing and development of social-emotional skills. Specifically, three informants have unique and almost equal contributions in explaining the relations between social-emotional skills and academic achievement, except for teacher-reported performance. Although teacher-rated social-emotional skills are strongly associated with teacher-reported performance, the contribution of teacher-rated skills to students' psychological health and physical health outcomes are very limited. This finding suggests that teachers may at least in part rely on their perception of students' academic performance to characterize their social-emotional skills. Not surprisingly, self-reported social-emotional skills play a major role in predicting psychological health and physical health outcomes, as positive self-conception is the key driver of psychological, mental, and physical well-being (Kankaraš et al., 2019). Compared to teacher-rated skills, parent-rated skills play a larger role in predicting both student- and parent-reported physical health outcomes. A possible reason is that health outcomes are highly associated with students' energy and emotional regulation skills (e.g., Stress Resistance and Optimism). Parents are in a better position to observe these intrapersonal skills than teachers, as parents provide ratings relying on the home context where they spend most of their time communicating with their children and taking care of different aspects of children's

lives. In addition, by employing the Profile Similarity Index approach, our supplemental study illustrates that cross-informant consistency (i.e., agreement) on the rank ordering of the relative importance of social-emotional skills for outcome variables is moderate, but consistently higher than the agreement on skill ratings. Overall, our findings suggest that the multidimensional nature of social-emotional skills would be discredited by assessing them by relying solely on a single informant.

Predicting Educational, Social, Psychological Health, and Physical Health Outcomes

Comparing The Findings on Social-Emotional Skill Domains With Existing Big Five Research

In line with extant personality literature (e.g., Poropat, 2009; Zell & Lesick, 2021), Task Performance (resembling Conscientiousness) was the strongest predictor of educational outcomes, followed by Open-Mindedness (resembling Openness). Consistent with previous studies (Anglim et al, 2020), Collaboration (resembling Agreeableness), Emotional Regulation (resembling Emotional Stability), and Engaging with Others (resembling Extraversion) were better in predicting social outcomes than others (in terms of R^2). However, the differences were small. The predictive pattern was diverse across different social outcomes (see below for more detailed discussion at the facet level). Psychological and physical health outcomes were mainly predicted by Engaging with Others and Emotional Regulation, which is also largely in accordance with the Big Five research (Anglim et al., 2020; Roberts et al., 2007; Steel et al., 2008; Stephan et al., 2018; Wilson & Dishman, 2015). While the findings on higher-order skill domains provided a useful, parsimonious summary, we showed that the facet-focused approach outperformed the domain-focused approach in predicting various life outcomes. More importantly, the facet approach revealed that the skill-outcome relations substantially varied across different facets within the same domains. For example, Engaging with Others was the strongest predictive skill domain of school belonging. But such contribution was largely driven by a single skill facet—Sociability. In the next section, we provide a fine-grained discussion of the findings of skill facets, which could point to effective and precise interventions.

Roles of Social-Emotional Skills on Educational Outcomes

In line with our expectations, most of our hypotheses on social-emotional skills and educational outcomes were confirmed. For the three indicators of academic achievement (i.e., school grades, cognitive

test scores, and teacher-reported performance), but particularly for the first two, Self-Control stood out as the skill with the strongest associations. Our findings also suggested that being able to persist in learning regardless of setbacks (i.e., Persistence) has a strong predictive effect on academic achievement. Persistence is highly likely to result in longer studying hours and higher effort expenditure on learning, which in turn leads to higher academic achievement (Galla et al., 2014). This is in line with earlier findings among Finnish adolescents (Tang et al., 2019). What counters our expectation is that Creativity significantly contributed to the prediction of teacher-reported academic performance, but not of school grades and cognitive test scores. Specifically, teacher-rated Creativity explained the largest amount of variance in teacher-reported academic performance. Given that Creativity tends to affect achievement by having more exploratory behaviors (see Gajda et al., 2017 for a meta-analysis), our finding indicates that Finnish teachers tend to place more value on exploratory learning behaviors when they evaluate students' academic performance.

We also found that social-emotional skills were more strongly associated with school grades for the older cohort than for the younger cohort. This may be because the Finnish school system does not stratify students in terms of their academic competences until the end of middle school (i.e., Grade 9; Salmela-Aro, 2020). School grades are often given much more generously in Finnish primary schools than in middle schools. Our sample showed that the younger cohort had much higher school grades (d = 1.51) with more negative skewness than the older cohort (skewness = -1.71 and -.20 for the younger and older cohorts, respectively). This may make social-emotional skills less predictive of school grades for younger students.

For class engagement, in line with our expectations (Muenks et al., 2017; Steinmayr et al., 2018; Tang et al., 2019), Persistence was among the most important skills (ranked as 2nd of 15). Our findings also suggested that Curiosity was a strong predictor of engagement. Indeed, previous research has shown that Curiosity was associated with extensive explorative behaviors, broad interests, a greater desire to learn new things, and better achievement (von Stumm et al., 2011). One Finnish research study also reported that curiosity predicted the performance in national standardized tests via increased self-efficacy and motivation (Tang & Salmela-Aro, 2021).

Lastly, although Creativity was among the most important skills for educational aspirations, as suggested by Rottinghaus (2002), the overall contribution of all social-emotional skills was very limited.

However, the multi-cohort analysis revealed that the contribution was substantially larger for the older cohort (R^2 = .42) than for the younger cohort (R^2 = .10). A possible reason is that the students in the younger cohort are still exploring their future. Previous research also found that educational aspirations are much less stable for younger Finnish youths than for their older counterparts (Tynkkynen et al., 2012). Consequently, it is hard to observe a strong relation between social-emotional skills and educational aspirations for the younger cohort.

Role of Social-Emotional Skills on Social Outcomes

Our hypotheses on the association between social-emotional skills and social relationships are largely supported. Social and collaborative skills (i.e., Trust, Sociability, or Empathy) were highly associated with relationships with teachers and peers, as well as with school belonging. Specifically, Trust, followed by Sociability, stood out as the most important skills to build and maintain quality relationships with peers and teachers and to make students feel connected with and attached to their school (Anglim et al., 2020, Allen et al., 2017). A previous Finnish study also showed that increasing social engagement would substantially enhance youth's self-esteem (Tuovinen et al., 2020). However, in general, Finnish youths have relatively low levels of social skills, as they are likely regarded as reserved and not very initiative (OECD, 2021b). These findings indicate an urgent need to promote Finnish students' social skills.

Relationships with parents were mostly predicted by emotional regulation skills (i.e., Emotional Control, Optimism, and Stress Resistance) but not by social or collaborative skills. This may be due to the nature of parent-child relationships differing substantially from that of relationships with others (e.g., peers and teachers; Rueger et al., 2014). Given that parent-child relationships are natural bonds, whether children are approaching parents actively or not (e.g., showing concern for and understanding parents' emotions) does not play a critical role in determining the quality of the parent-child relationship. For example, when negative parent-child interactions (e.g., parent-child conflicts) occur owing to children's lack of social skills, parents are most likely to accept and tolerate their children's behavior. Instead, our results suggest that emotional regulation skills play a salient role in gaining and maintaining high-quality parent-child relationships, whereas social skills are pivotal for other types of relationships. Our findings emphasize that

social-emotional skills function differently across different types of social relationships: The most significant skill for social relationships depends on the target person.

For victimization, Cooperation, Trust, and Responsibility were among the most important skills, but not Emotional Control, which is inconsistent with our expectations. Prior research has suggested that victimization experiences are best avoided by having a high level of emotional regulation skills, through which peer conflicts could be prevented (Riley et al., 2019). However, sometimes using regulation strategies (e.g., suppressing own emotions) to smooth social relationships may also trigger further bullying behaviors (Mahady Wilton et al., 2000). Our findings suggest that developing prosocial skills, the capacity to build cooperative and trusted relationships with peers, may be better ways to reduce victimization experiences (Di Stasio et al., 2016; Jenkins et al., 2016). This is also in line with a previous Finnish study that peer acceptance and popularity are associated with lower victimization among adolescents (Sentse et al., 2015).

Role of Social-Emotional Skills on Psychological Health Outcomes

Most of our hypotheses concerning psychological health outcomes were confirmed. Optimism, the ability to maintain positive expectations for self and life in the future, was the most significant skill for subjective well-being and life satisfaction (Anglim et al., 2020; Scheier et al., 2001). In addition to Optimism, Energy and Trust were the other two important skills for psychological health outcomes. Energy, the capacity to be active and enthusiastic in daily pursuits, is closely associated with high levels of physical activities (Soto et al., 2022), thus leading to better subjective well-being (Bell et al., 2019; Hyde et al., 2013). People with high levels of Trust skills tend to have higher subjective well-being and life satisfaction by possessing positive social relationships and high social capital (Helliwell et al., 2016). Furthermore, in line with our expectations, the study showed that regulation skills (e.g., Stress Resistance, Emotional Control, and Self-Control) could reduce anxiety and depression by implementing adaptive coping strategies (Garnefski et al., 2002; Stöber, 2004).

Role of Social-Emotional Skills on Physical Health Outcomes

The findings on physical health outcomes are also highly consistent with our expectations. General health condition, either reported by self or by a parent, was best predicted by Optimism and Energy. Given that Optimism and Energy were substantially beneficial for psychological wellbeing and physical activities

respectively, their significant roles in general health condition were expected. Although, as expected, Stress Resistance was most predictive of sleep trouble than were other skills, the predictive effect of Stress Resistance on sleep hours was limited. A possible reason is that compared to sleep hours, sleep trouble is more strongly associated with mental problems that could be mitigated by Stress Resistance ability (de Zambotti et al., 2018; Owens, 2014). Instead, we found that Optimism and Energy were among the skills associated with a good night's sleep (Anglim et al., 2020; Bell et al., 2019; Hyde et al., 2013; Scheier et al., 2001). Interestingly, Energy also played a much stronger role in predicting eating habits (i.e., a healthy diet) than did Self-Control. This may be because Energy improves good eating habits through its strong effect on physical activity, given the close relationships between eating habits and physical activity (Logi Kristjánsson et al., 2010).

To sum up, our findings provide clear evidence that the skills that can help students focus on the tasks, such as Self-Control, Persistence, and Curiosity, were the most beneficial skills to achieve desired educational outcomes. However, developing and maintaining a high quality of social connection requires different social-emotional skills. This study indicates that Sociability and Trust were the critical skills to fulfill such requirements. Furthermore, skills that maintain positive life experiences such as Optimism and Stress Resistance were the most salient ones to promote psychological health. For physical health, the role of Energy was most pronounced as it directly facilitated the general health conditions and health-related behaviors, although the roles of Optimism and Stress Resistance were still pivotal.

Age Differences in Social-Emotional Skills

Based on the domain-level approach, the older cohort (ages 15), compared to the younger cohort (ages 10), reported lower levels of five skill domains, particularly Engaging with Others, Collaboration, and Open-Mindedness. These findings suggest that Finnish adolescents become less active in building friendships, exploring their surroundings, and engaging in physical activity. These findings are also consistent with research on personality development, which has largely shown Big Five traits generally declined in their mean-level during childhood and early adolescence (e.g., Denissen et al., 2013; Soto, 2016; Soto et al., 2011). This is mainly due to the biological, psychological, and social changes during adolescence (Bleidorn & Hopwood, 2019; Soto & Tackett, 2015). Adolescents become more engaged in risk-taking

behaviors and show more impulsive behaviors, as they are at a stage where individuals seek novel sensational experiences (Steinberg et al., 2008; Steinberg & Morris, 2001). They are, thus, less likely to regulate themselves and be more vulnerable to mental and behavioral problems (Brown et al., 2020; Ng-Knight et al., 2016; Shulman et al., 2015; Soto et al., 2011). One recent study from Finland also showed that adolescents are less likely to hold a firm educational goal, making them less persistent in school learning (Tang et al., 2021). However, the facet-level approach showed that the development trend varied across different skill facets (range from *d*s = -.41 to .15); the statistically significant decreases were only shown on 9 out of 15 facets.

At the facet level, the largest drops were found among Sociability, Trust, and Energy. During adolescence, students start seeking deep friendships and tend to form strong and close peer groups of the same gender, race, and social-economic background (Smetana et al., 2006). The significant decreases were also found in Curiosity and Creativity, which may be related to declines in Finnish adolescents' academic interest and motivation due to learning stress and demands at school (Salmela-Aro, 2020). As a result, adolescents' desire to invest their energy and time in things and people they are unfamiliar with decreases.

Emotional Control and Assertiveness are two exceptions, as both increased during this period. Interestingly, there is a vast discrepancy in student-rated and parent-rated responses in the levels of Emotional Control. Parents reported that the older cohort had higher levels of Emotional Control, whereas students' self-perceptions of this skill were similar for the two age cohorts. The reason might be that parents tend to rate these skills based on the long-term interactions with their children in daily life. In contrast, young people may rate these skills based on their temporal experiences, particularly on failure experiences. They are, thus, more pessimistic about their own emotional skills. Because all these ratings are subjective, future research on objective social-emotional skills (e.g., behavioral tasks) is still needed (Duckworth & Yeager, 2015).

Assertiveness also shows an increasing trend over the two age cohorts. The reason might be that adolescents feel bolder and braver as they tend to engage in more risk-taking behaviors (Shulman et al., 2015; Steinberg et al., 2008). It is important to note that Assertiveness is the skill that is negatively

associated with adaptive outcomes (e.g., school grades) but positively associated with maladaptive outcomes (e.g., victimization). Thus, the increase in Assertiveness should be interpreted with caution.

Limitations

Although we have highlighted many strengths of this study (e.g., a multi-informant multi-cohort design and using a facet-level approach), our study also has limitations that serve as directions for further research. The major limitation is the cross-sectional nature of the study design. As such, we cannot establish whether the associations between social-emotional skills and desirable outcomes represent causal links. Although outcome variables examined in our research can be plausibly portrayed as consequences of social-emotional skills, these skills are dynamic and responsive to ongoing experience; as such, their relations with motivational constructs and outcome variables could be reciprocal over time (e.g., Durlak et al., 2015). Hence, our findings must be interpreted with these issues in mind. Longitudinal, large-scale studies are, at present, aspirational rather than realized; fulfilling this aspiration in the future would yield incredibly valuable theoretical and applied information.

Second, although the social-emotional model proposed by the OECD broadly captures 15 underlying core skills that drive students' success in life, the conceptual model still neglects some skills that have been shown critical for adolescents' academic and life success in other prominent frameworks (see John & De Fruyt, 2015; Soto et al., 2021). For example, the CASEL framework proposed a self-awareness domain that not only includes creativity and curiosity (in the OECD model) but also characterizes the ability to assess personal values and strengths (Durlak et al., 2015). These aspects of self-awareness lay the groundwork for future academic motivation and accomplishments. Therefore, further integrating key skills from other frameworks into the OECD social-emotional model will help portray the full picture of social-emotional skills and their relationships with academic and life outcomes.

Third, the OECD skill-based approach with an emphasis on malleability has some unique features, different from the Big-Five measures (i.e., Big Five Inventory-2, BFI-2, Soto & John, 2017), such as three new facets (Optimism, Self-Control, and Tolerance), more skill/behavior-like terms used in item wording,

and more focus on the school context[3]. However, the OECD measure and the BFI-2 still share many similarities, with a mix of items reflecting capacities, tendencies, and attitudes/preferences. This also exists in many other social-emotional skill and personality measures (see Abrahams et al., 2019 for more discussion). Recently, Soto and his colleagues (2022) developed a social-emotional skill measurement in which skills were identified and measured as functional capacities: how someone is capable of thinking, feeling, or behaving when the situation calls for it (e.g., *how well you can do a specific thing*), which is distinctive from personality traits referring to how someone tends to think, feel, and behave when averaged across situations. They showed that the proposed skills are empirically distinguishable from personality traits. Therefore, this newly developed skill measure provides another direction for researchers who aim to separate social-emotional skills from personality traits.

Lastly, the OECD assessment provides psychometrically strong measures of social-emotional skills from three informants, but neglects the perceptions of peers. Given that social skills include the ability to "engage and respond to peers with positive feelings, to be of interest to peers and be highly regarded by them, to take the lead as well as follow, and to sustain the give-and-take of peer interaction" (Sroufe et al., 1996, p. 378), it is crucial to also assess the peers' perspective on skills in the domain of Collaboration and Engaging with Others. Gathering peer-reported data will undoubtedly increase the time and effort involved in large-scale studies. However, the information gleaned will be vital in cross-validating and supplementing the current results.

Implications

Our study has several practical implications. First, using urban Finnish samples, this study exemplifies that adopting multiple informants' ratings on social-emotional skills is desirable from scientific

[3] In terms of the differences, the OECD framework included three skill facets that were not covered in BFI-2: Optimism, Self-Control, and Tolerance. At the item level, trait-like terms were largely used in the BFI-2, which is not the case in the OECD framework. For example, there is the so-called Sociability scale included in both the BFI-2 and the OECD framework. Sociability was measured by the trait-like terms (i.e., outgoing, sociable, be quiet, shy, introverted, talkative) in BFI-2, whereas in the OECD framework, sociability was assessed by whether students can make friends easily and like to spend their free time with others. Moreover, the OECD framework has a focus on the school context (e.g., I think most of my classmate keep their promises), whereas the BFI-2 usually used "others" or "people" as a reference (e.g., I tend to find fault with others, Is suspicious of others' intentions).

and practical perspectives. Researchers should consider the type of informant, as there is substantial variability among informants' perceptions, stemming from different perspectives, attitudes, and contexts. However, gathering multiple informants requires additional resources. This study, nevertheless, also offers some suggestions for Finnish researchers who lack such resources. Specifically, a multiple-informant design is essential for studying the relations between social-emotional skills and academic achievement. However, for those who are interested in psychological outcomes, focusing on Finnish students' self-reported skills may suffice. Teacher-reported skills may not be particularly useful for studying associations among skills and health-related outcomes.

Second, this study offers suggestions on the most effective skills for specific outcomes, which has important implications for developing precise and tailored interventions, at least for urban Finnish adolescents. Most of the existing interventions on social-emotional skills have taken a holistic approach and focused on the school curriculum (Ashdown & Bernard, 2012; Durlak et al., 2011). Although the holistic approach is still very much needed, our findings provide supplemented suggestions for the group of Finnish students who require extra support to overcome specific challenges in their lives. For example, for a student who generally manages well in their school life but often experiences test anxiety, a particular focus in the intervention should be placed on developing Stress Resistance skills. Moreover, this study outlined the four most essential skills for academic and life success: Self-Control, Trust, Optimism, and Energy (see Figure 3). Such information is valuable to design a brief, scalable, and cost-effective intervention in Finland. If there is a limit on resources that can be used to develop and disseminate a social-emotional skill intervention, focusing on these four skills may still retain the intervention's impact on Finnish students' academic and life achievement.

Finally, this study used representative Helsinki (urban Finnish) adolescent data and compared the levels of social-emotional skills across two age cohorts (ages 10 and 15). Our findings highlight that childhood and adolescence in the urban area of Finland are critical periods to build social-emotional skills as most skills declined during those periods. Early adolescents tend to be more impulsive, risk-taking, and novelty-seeking during puberty (Smetana et al., 2006; Steinberg & Morris, 2001). To some extent, the

decline of social-emotional skills may be inevitable as a part of the natural developmental process (Soto & Tackett, 2015). However, we can buffer against the decline in social-emotional skills by providing tailored and multi-layer support from family, school, and community for early adolescents (Dennehy & Dasgupta, 2017). It should be noted that future studies based on representative samples from other countries/cultures are warranted to replicate or extend our findings.

Reference

Abrahams, L., Pancorbo, G., Primi, R., Santos, D., Kyllonen, P., John, O. P., & De Fruyt, F. (2019). Social-Emotional Skill Assessment in Children and Adolescents: Advances and Challenges in Personality, Clinical, and Educational Contexts. *Psychological Assessment*, *31*(4), 460–473. https://doi.org/10.1037/pas0000591

Allen, K., Vella-Brodrick, D., & Waters, L. (2017). School Belonging and the Role of Social and Emotional Competencies in Fostering an Adolescent's Sense of Connectedness to Their School. In *Social and Emotional Learning in Australia and the Asia-Pacific* (pp. 83–99). Springer Singapore. https://doi.org/10.1007/978-981-10-3394-0_5

Anglim, J., Horwood, S., Smillie, L. D., Marrero, R. J., & Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: A meta-analysis. *Psychological Bulletin*, *146*(4), 279–323. https://doi.org/10.1037/bul0000226

Ashdown, D. M., & Bernard, M. E. (2012). Can Explicit Instruction in Social and Emotional Learning Skills Benefit the Social-Emotional Development, Well-being, and Academic Achievement of Young Children? *Early Childhood Education Journal*, *39*(6), 397–405. https://doi.org/10.1007/s10643-011-0481-x

Bayram Özdemir, S., Özdemir, M., & Boersma, K. (2021). How Does Adolescents' Openness to Diversity Change Over Time? The Role of Majority-Minority Friendship, Friends' Views, and Classroom Social Context. *Journal of Youth and Adolescence*, *50*(1), 75–88. https://doi.org/10.1007/s10964-020-01329-4

Bell, S. L., Audrey, S., Gunnell, D., Cooper, A., & Campbell, R. (2019). The relationship between physical activity, mental wellbeing and symptoms of mental health disorder in adolescents: A cohort study. *International Journal of Behavioral Nutrition and Physical Activity*, *16*(1), 138. https://doi.org/10.1186/s12966-019-0901-7

Berg, J., Osher, D., Same, M. R., Nolan, E., Benson, D., & Jacobs, N. (2017). *Identifying, defining, and measuring social and emotional competencies*. American Institutes for Research.

Bleidorn, W., Hill, P. L., Back, M. D., Denissen, J. J. A., Hennecke, M., Hopwood, C. J., Jokela, M., Kandler, C., Lucas, R. E., Luhmann, M., Orth, U., Wagner, J., Wrzus, C., Zimmermann, J., & Roberts, B. (2019). The policy relevance of personality traits. *American Psychologist, 74*(9), 1056–1067. https://doi.org/10.1037/amp0000503

Bleidorn, W., & Hopwood, C. J. (2019). Stability and change in personality traits over the lifespan. In *Handbook of personality development* (pp. 237–252). The Guilford Press.

Bleidorn, W., & Schwaba, T. (2018). Retirement is associated with change in self-esteem. *Psychology and Aging, 33*(4), 586–594. https://doi.org/10.1037/pag0000253

Borghuis, J., Denissen, J. J. A., Oberski, D., Sijtsma, K., Meeus, W. H. J., Branje, S., Koot, H. M., & Bleidorn, W. (2017). Big Five personality stability, change, and codevelopment across adolescence and early adulthood. *Journal of Personality and Social Psychology*, *113*(4), 641–657. https://doi.org/10.1037/pspp0000138

Brandt, N. D., Becker, M., Tetzner, J., Brunner, M., & Kuhl, P. (2021). What teachers and parents can add to personality ratings of children: Unique associations with academic performance in elementary school. *European Journal of Personality*, *35*(6), 814–832. https://doi.org/10.1177/0890207020988436

Brook, C. A., & Schmidt, L. A. (2020). Lifespan trends in sociability: Measurement invariance and mean-level differences in ages 3 to 86 years. *Personality and Individual Differences*, *152*, 109579. https://doi.org/10.1016/j.paid.2019.109579

Brown, M., Blanchard, T., & McGrath, R. E. (2020). Differences in self-reported character strengths across adolescence. *Journal of Adolescence, 79*, 1–10. https://doi.org/10.1016/j.adolescence.2019.12.008

Brunello, G., & Schlotter, M. (2011). *Non-Cognitive Skills and Personality Traits: Labour Market Relevance and Their Development in Education & Training Systems* (SSRN Scholarly Paper ID 1858066). Social Science Research Network. https://doi.org/10.2139/ssrn.1858066

Callina, K. S., Johnson, S. K., Buckingham, M. H., & Lerner, R. M. (2014). Hope in Context: Developmental Profiles of Trust, Hopeful Future Expectations, and Civic Engagement Across

Adolescence. *Journal of Youth and Adolescence*, *43*(6), 869–883. https://doi.org/10.1007/s10964-014-0096-9

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, *30*(7), 879–889. https://doi.org/10.1016/j.cpr.2010.01.006

CASEL. (2021). *SEL: What Are the Core Competence Areas and Where are they Promoted?* https://casel.org/sel-framework/

Casillas, A., Way, J., & Burrus, J. (2015). *Behavioral Skills (chapter). In W. Camara, R. O'Connor, K. Mattern & M.A. Hanson (Eds.). Beyond academics: A holistic framework for enhancing education and workplace success. Iowa City, IA: ACT Inc.*

Chen, F. F. (2007). Sensitivity of Goodness of Fit Indexes to Lack of Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Chernyshenko, O. S., Kankaraš, M., & Drasgow, F. (2018). Social and emotional skills for student success and well-being: Conceptual framework for the OECD study on social and emotional skills. *OECD Education Working Papers*, *173*, 1–136.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Ciarrochi, J., Atkins, P. W. B., Hayes, L. L., Sahdra, B. K., & Parker, P. (2016). Contextual Positive Psychology: Policy Recommendations for Implementing Positive Psychology into Schools. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.01561

City of Helsinki. (2022). *Education division*. https://www.hel.fi/kasvatuksen-ja-koulutuksen-toimiala/en/

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. Lawrence Erlbaum Associates, Inc.

Collie, R. J. (2020). The development of social and emotional competence at school: An integrated model. *International Journal of Behavioral Development*, *44*(1), 76–87. https://doi.org/10.1177/0165025419851864

Costa, P. T., McCrae, R. R., & Löckenhoff, C. E. (2019). Personality Across the Life Span. *Annual Review of Psychology*, *70*(1), 423–448. https://doi.org/10.1146/annurev-psych-010418-103244

Cracco, E., Goossens, L., & Braet, C. (2017). Emotion regulation across childhood and adolescence: Evidence for a maladaptive shift in adolescence. *European Child & Adolescent Psychiatry*, *26*(8), 909–921. https://doi.org/10.1007/s00787-017-0952-8

Crocetti, E., Moscatelli, S., Kaniušonytė, G., Meeus, W., Žukauskienė, R., & Rubini, M. (2019). Developing Morality, Competence, and Sociability in Adolescence: A Longitudinal Study of Gender Differences. *Journal of Youth and Adolescence*, *48*(5), 1009–1021. https://doi.org/10.1007/s10964-019-00996-2

Danner, D., Lechner, C. M., Soto, C. J., & John, O. P. (2021). Modelling the incremental value of personality facets: The domains-incremental facets-acquiescence bifactor showmodel. *European Journal of Personality*, *35*(1), 67–84. https://doi.org/10.1002/per.2268

Daun, A., Verkasalo, M., & Niit, T. (1994). Universal Values in Estonia, Finland and Sweden. *Ethnologia Europaea*, *24*(1). https://doi.org/10.16995/ee.1828

de Zambotti, M., Goldstone, A., Colrain, I. M., & Baker, F. C. (2018). Insomnia disorder in adolescence: Diagnosis, impact, and treatment. *Sleep Medicine Reviews*, *39*, 12–24. https://doi.org/10.1016/j.smrv.2017.06.009

Demange, P. A., Malanchini, M., Mallard, T. T., Biroli, P., Cox, S. R., Grotzinger, A. D., Tucker-Drob, E. M., Abdellaoui, A., Arseneault, L., van Bergen, E., Boomsma, D. I., Caspi, A., Corcoran, D. L., Domingue, B. W., Harris, K. M., Ip, H. F., Mitchell, C., Moffitt, T. E., Poulton, R., … Nivard, M. G. (2021). Investigating the genetic architecture of noncognitive skills using GWAS-by-subtraction. *Nature Genetics*, *53*(1), 35–44. https://doi.org/10.1038/s41588-020-00754-2

Denissen, J. J. A., Geenen, R., Soto, C. J., John, O. P., & van Aken, M. A. G. (2020). The big five inventory–2: Replication of psychometric properties in a dutch adaptation and first evidence for the discriminant predictive validity of the facet scales. *Journal of Personality Assessment*, *102*(3), 309–324. https://doi.org/10.1080/00223891.2018.1539004

Denissen, J. J. A., Luhmann, M., Chung, J. M., & Bleidorn, W. (2019). Transactions between life events and personality traits across the adult lifespan. *Journal of Personality and Social Psychology*, *116*(4), 612–633. https://doi.org/10.1037/pspp0000196

Denissen, J. J. A., van Aken, M. A. G., Penke, L., & Wood, D. (2013). Self-Regulation Underlies Temperament and Personality: An Integrative Developmental Framework. *Child Development Perspectives*, *7*(4), 255–260. https://doi.org/10.1111/cdep.12050

Dennehy, T. C., & Dasgupta, N. (2017). Female peer mentors early in college increase women's positive academic experiences and retention in engineering. *Proceedings of the National Academy of Sciences*, *114*(23), 5964–5969. https://doi.org/10.1073/pnas.1613117114

Di Stasio, M. R., Savage, R., & Burgos, G. (2016). Social comparison, competition and teacher–student relationships in junior high school classrooms predicts bullying and victimization. *Journal of Adolescence*, *53*, 207–216. https://doi.org/10.1016/j.adolescence.2016.10.002

Dicke, T., Marsh, H. W., Riley, P., Parker, P. D., Guo, J., & Horwood, M. (2018). Validating the Copenhagen Psychosocial Questionnaire (COPSOQ-II) Using Set-ESEM: Identifying Psychosocial Risk Factors in a Sample of School Principals. *Frontiers in Psychology*, *9*(APR), 1–17. https://doi.org/10.3389/fpsyg.2018.00584

DiStefano, C., & Motl, R. W. (2006). Further Investigating Method Effects Associated With Negatively Worded Items on Self-Report Surveys. *Structural Equation Modeling: A Multidisciplinary Journal*, *13*(3), 440–464. https://doi.org/10.1207/s15328007sem1303_6

Dotterer, A. M., McHale, S. M., & Crouter, A. C. (2009). The development and correlates of academic interests from childhood through adolescence. *Journal of Educational Psychology*, *101*(2), 509–519. https://doi.org/10.1037/a0013987

Duckworth, A. L., Taxer, J. L., Eskreis-Winkler, L., Galla, B. M., & Gross, J. J. (2019). Self-Control and Academic Achievement. *Annual Review of Psychology*, *70*(1), 373–399. https://doi.org/10.1146/annurev-psych-010418-103230

Duckworth, A. L., & Yeager, D. S. (2015). Measurement Matters: Assessing Personal Qualities Other Than Cognitive Ability for Educational Purposes. *Educational Researcher*, *44*(4), 237–251. https://doi.org/10.3102/0013189X15584327

Dumith, S. C., Gigante, D. P., Domingues, M. R., & Kohl, H. W. (2011). Physical activity change during adolescence: A systematic review and a pooled analysis. *International Journal of Epidemiology*, *40*(3), 685–698. https://doi.org/10.1093/ije/dyq272

Durlak, J. A., Domitrovich, C. E., Weissberg, R. P., & Gullotta, and T. P. (Eds.). (2015). *Handbook of social and emotional learning: Research and practice*. Guilford Publications.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions. *Child Development*, *82*(1), 405–432. https://doi.org/10.1111/j.1467-8624.2010.01564.x

Dweck, C. S. (2017). From needs to goals and representations: Foundations for a unified theory of motivation, personality, and development. *Psychological Review*, *124*(6), 689–719. https://doi.org/10.1037/rev0000082

Enders, C. (2010). *Applied missing data analysis*. Guilford Press.

Eskin, M. (2003). Self-reported assertiveness in Swedish and Turkish adolescents: A cross-cultural comparison. *Scandinavian Journal of Psychology*, *44*(1), 7–12. https://doi.org/10.1111/1467-9450.t01-1-00315

Farrell, A. H., & Vaillancourt, T. (2020). Adolescent empathic concern and perspective taking: Heterogeneous developmental trajectories and childhood social and psychological factors. *Journal of Personality*, jopy.12607. https://doi.org/10.1111/jopy.12607

Finnish National Board of Education. (2014). *National core curriculum for basic education 2014*. http://www.ebooks.com/2615808/national-core-curriculum-for-basic-education-2014/finnish-national-board-of-education/

Flynn, E., Ehrenreich, S. E., Beron, K. J., & Underwood, M. K. (2015). Prosocial Behavior: Long-term Trajectories and Psychosocial Outcomes. *Social Development*, *24*(3), 462–482. https://doi.org/10.1111/sode.12100

Gajda, A., Karwowski, M., & Beghetto, R. A. (2017). Creativity and academic achievement: A meta-analysis. *Journal of Educational Psychology*, *109*(2), 269–299. https://doi.org/10.1037/edu0000133

Galla, B. M., Plummer, B. D., White, R. E., Meketon, D., D'Mello, S. K., & Duckworth, A. L. (2014). The Academic Diligence Task (ADT): Assessing individual differences in effort on tedious but important schoolwork. *Contemporary Educational Psychology*, *39*(4), 314–325. https://doi.org/10.1016/j.cedpsych.2014.08.001

Garnefski, N., Legerstee, J., Kraaij, V., Van Den Kommer, T., & Teerds, J. (2002). Cognitive coping strategies and symptoms of depression and anxiety: A comparison between adolescents and adults. *Journal of Adolescence*, *25*(6), 603–611. https://doi.org/10.1006/jado.2002.0507

Gaspard, H., Häfner, I., Parrisius, C., Trautwein, U., & Nagengast, B. (2017). Assessing task values in five subjects during secondary school: Measurement structure and mean level differences across grade level, gender, and academic subject. *Contemporary Educational Psychology*, *48*, 67–84. https://doi.org/10.1016/j.cedpsych.2016.09.003

Göllner, R., Roberts, B. W., Damian, R. I., Lüdtke, O., Jonkmann, K., & Trautwein, U. (2017). Whose "Storm and Stress" Is It? Parent and Child Reports of Personality Development in the Transition to Early Adolescence: Personality Development in Early Adolescence. *Journal of Personality*, *85*(3), 376–387. https://doi.org/10.1111/jopy.12246

Gresham, F. M., Elliott, S. N., Cook, C. R., Vance, M. J., & Kettler, R. (2010). Cross-Informant Agreement for Ratings for Social Skill and Problem Behavior Ratings: An Investigation of the Social Skills Improvement System-Rating Scales. *Psychological Assessment*, *22*(1), 157–166. https://doi.org/10.1037/a0018124

Gullone, E., Hughes, E. K., King, N. J., & Tonge, B. (2010). The normative development of emotion regulation strategy use in children and adolescents: A 2-year follow-up study. *Journal of Child Psychology and Psychiatry*, *51*(5), 567–574. https://doi.org/10.1111/j.1469-7610.2009.02183.x

Guo, J., Marsh, H. W., Parker, P. D., Dicke, T., Lüdtke, O., & Diallo, T. M. O. (2019). A systematic evaluation and comparison between exploratory structural equation modeling and bayesian structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal*, *26*(4), 529–556. https://doi.org/10.1080/10705511.2018.1554999

Gutman, L. M., & Schoon, I. (2013). The impact of non-cognitive skills on outcomes for young people: Literature review. *Education Endowment Foundation, London England, November*, 1–59.

Hampel, P., & Petermann, F. (2006). Perceived stress, coping, and adjustment in adolescents. *Journal of Adolescent Health*, *38*(4), 409–415. https://doi.org/10.1016/j.jadohealth.2005.02.014

Helliwell, J. F., Huang, H., & Wang, S. (2016). *New Evidence on Trust and Well-being*. National Bureau of Economic Research. https://doi.org/10.3386/w22450

Hu, D., Ahn, J. N., Vega, M., & Lin-Siegler, X. (2020). Not All Scientists Are Equal: Role Aspirants Influence Role Modeling Outcomes in STEM. *Basic and Applied Social Psychology*, *42*(3), 192–208. https://doi.org/10.1080/01973533.2020.1734006

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hudson, N. W., Fraley, R. C., Chopik, W. J., & Briley, D. A. (2020). Change Goals Robustly Predict Trait Growth: A Mega-Analysis of a Dozen Intensive Longitudinal Studies Examining Volitional Change. *Social Psychological and Personality Science*, *11*(6), 723–732. https://doi.org/10.1177/1948550619878423

Hyde, A. L., Maher, J. P., & Elavsky, S. (2013). Enhancing our understanding of physical activity and wellbeing with a lifespan perspective. *International Journal of Wellbeing*, *3*(1), 98–115. https://doi.org/10.5502/ijw.v3i1.6

Jackson, D. N., & Messick, S. (1958). Content and style in personality assessment. *Psychological Bulletin*, *55*(4), 243.

Jackson, J. J., Beck, E. D., & Mike, A. (2021). Personality interventions. In O. P. John & R. W. Robins (Eds.), *Handbook of personality: Theory and research* (pp. 793–805). The Guilford Press.

Jackson, J. J., Thoemmes, F., Jonkmann, K., Lüdtke, O., & Trautwein, U. (2012). Military Training and Personality Trait Development: Does the Military Make the Man, or Does the Man Make the Military? *Psychological Science*, *23*(3), 270–277. https://doi.org/10.1177/0956797611423545

Jenkins, L. N., Demaray, M. K., Fredrick, S. S., & Summers, K. H. (2016). Associations Among Middle School Students' Bullying Roles and Social Skills. *Journal of School Violence*, *15*(3), 259–278. https://doi.org/10.1080/15388220.2014.986675

John, O. P., & De Fruyt, F. (2015). *Framework for the Longitudinal Study of Social and Emotional Skills in Cities*. OECD Publishing.

John, O. P., & Mauskopf, S. (2015). Self-reported socio-emotional qualities: Five factors for 21st century skills? *Poster Presented at the Bi-Annual Meetings of the Association for Personality Research*.

Kankaraš, M., Drasgow, F., & Chernyshenko, O. S. (2019). Social and emotional skills for student success and well-being. *OECD Education Working Papers*, *173*(January), 1–134.

Kankaraš, M., & Suarez-Alvarez, J. (2019). *Assessment framework of the OECD Study on Social and Emotional Skills*. https://doi.org/10.1787/5007adef-en

Kashima, Y., Yamaguchi, S., Kim, U., Choi, S.-C., Gelfand, M. J., & Yuki, M. (1995). Culture, gender, and self: A perspective from individualism-collectivism research. *Journal of Personality and Social Psychology*, *69*(5), 925–937. https://doi.org/10.1037/0022-3514.69.5.925

Kautz, T., Heckman, J. J., Diris, R., ter Weel, B., & Borghans, L. (2014). *Fostering and Measuring Skills: Improving Cognitive and Non-cognitive Skills to Promote Lifetime Success* (OECD Education Working Papers). OECD Publishing. https://doi.org/10.1787/5jxsr7vr78f7-en

Kleibeuker, S. W., De Dreu, C. K. W., & Crone, E. A. (2013). The development of creative cognition across adolescence: Distinct trajectories for insight and divergent thinking. *Developmental Science*, *16*(1), 2–12. https://doi.org/10.1111/j.1467-7687.2012.01176.x

Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking "big" personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*, *136*(5), 768–821. https://doi.org/10.1037/a0020327

Kulig, T. C., Cullen, F. T., Wilcox, P., & Chouhy, C. (2019). Personality and Adolescent School-Based Victimization: Do the Big Five Matter? *Journal of School Violence*, *18*(2), 176–199. https://doi.org/10.1080/15388220.2018.1444495

Lavrijsen, J., Vansteenkiste, M., Boncquet, M., & Verschueren, K. (2021). Does motivation predict changes in academic achievement beyond intelligence and personality? A multitheoretical perspective. *Journal of Educational Psychology*. https://doi.org/10.1037/edu0000666

Logi Kristjánsson, Á., Dóra Sigfúsdóttir, I., & Allegrante, J. P. (2010). Health Behavior and Academic Achievement Among Adolescents: The Relative Contribution of Dietary Habits, Physical Activity, Body Mass Index, and Self-Esteem. *Health Education & Behavior*, *37*(1), 51–64. https://doi.org/10.1177/1090198107313481

Luan, Z., Hutteman, R., Denissen, J. J. A., Asendorpf, J. B., & van Aken, M. A. G. (2017). Do you see my growth? Two longitudinal studies on personality development from childhood to young adulthood from multiple perspectives. *Journal of Research in Personality*, *67*, 44–60. https://doi.org/10.1016/j.jrp.2016.03.004

Luan, Z., Poorthuis, A. M. G., Hutteman, R., Asendorpf, J. B., Denissen, J. J. A., & van Aken, M. A. G. (2018). See me through my eyes: Adolescent–parent agreement in personality predicts later self-esteem development. *International Journal of Behavioral Development*, *42*(1), 17–25. https://doi.org/10.1177/0165025417690263

Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students. *Journal of Adolescent Health*, *46*(2), 124–132. https://doi.org/10.1016/j.jadohealth.2009.06.016

Mahady Wilton, M. M., Craig, W. M., & Pepler, D. J. (2000). Emotional Regulation and Display in Classroom Victims of Bullying: Characteristic Expressions of Affect, Coping Styles and Relevant Contextual Factors. *Social Development*, *9*(2), 226–245. https://doi.org/10.1111/1467-9507.00121

Marsh, H. W., Abduljabbar, A. S., Abu-Hilal, M. M., Morin, A. J. S., Abdelfattah, F. a., Leung, K. C., Xu, M. K., Nagengast, B., & Parker, P. D. (2013). Factorial, convergent, and discriminant validity of

timss math and science motivation measures: A comparison of Arab and Anglo-Saxon countries. *Journal of Educational Psychology*, *105*(1), 108–128. https://doi.org/10.1037/a0029907

Marsh, H. W., Guo, J., Dicke, T., Parker, P. D., & Craven, R. G. (2019). Confirmatory Factor Analysis (CFA), Exploratory Structural Equation Modeling (ESEM), and Set-ESEM: Optimal Balance Between Goodness of Fit and Parsimony. *Multivariate Behavioral Research*, *0*(0), 1–18. https://doi.org/10.1080/00273171.2019.1602503

Marsh, H. W., Guo, J., Parker, P. D., Nagengast, B., Asparouhov, T., Muth?n, B., & Dicke, T. (2017). What to do When Scalar Invariance Fails: The Extended Alignment Method for Multi-Group Factor Analysis Comparison of Latent Means Across Many Groups. *Psychological Methods*, *21*(4), 1–22. https://doi.org/10.1037/met0000113

Marsh, H. W., Lüdtke, O., Muthén, B. O., Asparouhov, T., Morin, A. J. S., Trautwein, U., & Nagengast, B. (2010). A new look at the big five factor structure through exploratory structural equation modeling. *Psychological Assessment*, *22*(3), 471–491. https://doi.org/10.1037/a0019227

Marsh, H. W., Morin, A. J. S., Parker, P. D., & Kaur, G. (2014). Exploratory Structural Equation Modeling: An Integration of the Best Features of Exploratory and Confirmatory Factor Analysis. *Annual Review of Clinical Psychology*, *10*(1), 85–110. https://doi.org/10.1146/annurev-clinpsy-032813-153700

Martin, A. J., Colmar, S. H., Davey, L. A., & Marsh, H. W. (2010). Longitudinal modelling of academic buoyancy and motivation: Do the 5Cs hold up over time? *British Journal of Educational Psychology*, *80*(3), 473–496. https://doi.org/10.1348/000709910X486376

Ministry of Education and Culture, F. (2022). *Finnish education system*. Opetus- Ja Kulttuuriministeriö. https://okm.fi/en/education-system

Mitsopoulou, E., & Giovazolias, T. (2015). Personality traits, empathy and bullying behavior: A meta-analytic approach. *Aggression and Violent Behavior*, *21*, 61–72. https://doi.org/10.1016/j.avb.2015.01.007

Muenks, K., Wigfield, A., Yang, J. S., & O'Neal, C. R. (2017). How true is grit? Assessing its relations to high school and college students' personality characteristics, self-regulation, engagement, and

achievement. *Journal of Educational Psychology*, *109*(5), 599–620. https://doi.org/10.1037/edu0000153

Murray, A. L., & Booth, T. (2015). Personality and physical health. *Current Opinion in Psychology*, *5*, 50–55. https://doi.org/10.1016/j.copsyc.2015.03.011

Muthén, L. K., & Muthén, B. O. (2021). *Mplus users guide and Mplus version 8.6*. http://www.statmodel.com/index.shtml

Nantel-Vivier, A., Kokko, K., Caprara, G. V., Pastorelli, C., Gerbino, M. G., Paciello, M., Côté, S., Pihl, R. O., Vitaro, F., & Tremblay, R. E. (2009). Prosocial development from childhood to adolescence: A multi-informant perspective with Canadian and Italian longitudinal studies. *Journal of Child Psychology and Psychiatry*, *50*(5), 590–598. https://doi.org/10.1111/j.1469-7610.2008.02039.x

Negru-Subtirica, O., Pop, E. I., & Crocetti, E. (2015). Developmental trajectories and reciprocal associations between career adaptability and vocational identity: A three-wave longitudinal study with adolescents. *Journal of Vocational Behavior*, *88*, 131–142. https://doi.org/10.1016/j.jvb.2015.03.004

Ng-Knight, T., Shelton, K. H., Riglin, L., McManus, I. C., Frederickson, N., & Rice, F. (2016). A longitudinal study of self-control at the transition to secondary school: Considering the role of pubertal status and parenting. *Journal of Adolescence, 50,* 44–55. https://doi.org/10.1016/j.adolescence.2016.04.006

Niemi, H., Toom, A., & Kallioniemi, A. (Eds.). (2016). *Miracle of Education: The Principles and Practices of Teaching and Learning in Finnish Schools*. SensePublishers. https://doi.org/10.1007/978-94-6300-776-4

OECD. (2013). *OECD Guidelines on Measuring Subjective Well-being*. OECD. https://doi.org/10.1787/9789264191655-en

OECD. (2015). *Skills for social progress: The power of social and emotional skills*. OECD Publishing. https://doi.org/10.1787/9789264226159-en

OECD. (2017). *PISA 2015 Results (Volume V): Collaborative Problem Solving*. OECD. https://doi.org/10.1787/9789264285521-en

OECD. (2019). *PISA 2018 results (Volume I): What students know and can do*. OECD. https://doi.org/10.1787/5f07c754-en

OECD. (2020). *Education at a Glance 2020*. OECD. https://doi.org/10.1787/69096873-en

OECD. (2021a). *OECD Survey on Social and Emotional Skills Technical Report*. https://www.oecd.org/education/ceri/social-emotional-skills-study/sses-technical-report.pdf

OECD. (2021b). *Beyond Academic Learning: First Results from the Survey of Social and Emotional Skills*. OECD. https://doi.org/10.1787/92a11084-en

Owens, J. (2014). Insufficient Sleep in Adolescents and Young Adults: An Update on Causes and Consequences. *PEDIATRICS*, *134*(3), e921–e932. https://doi.org/10.1542/peds.2014-1696

Park, D., Tsukayama, E., Yu, A., & Duckworth, A. L. (2020). The development of grit and growth mindset during adolescence. *Journal of Experimental Child Psychology*, *198*, 104889. https://doi.org/10.1016/j.jecp.2020.104889

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin*, *135*(2), 322–338. https://doi.org/10.1037/a0014996

Primi, R., Santos, D. D. dos, Hauck, N., Fruyt, F. D., & John, O. P. (2019). Mapping self-report questionnaires for socio-emotional characteristics: What do they measure? *Estudos de Psicologia (Campinas)*, *36*. https://doi.org/10.1590/1982-0275201936e180138

Rammstedt, B., & Farmer, R. F. (2013). The impact of acquiescence on the evaluation of personality structure. *Psychological Assessment*, *25*(4), 1137–1145. https://doi.org/10.1037/a0033323

Renk, K., & Phares, V. (2004). Cross-informant ratings of social competence in children and adolescents. *Clinical Psychology Review*, *24*(2), 239–254. https://doi.org/10.1016/j.cpr.2004.01.004

Rescorla, L. A., Bochicchio, L., Achenbach, T. M., Ivanova, M. Y., Almqvist, F., Begovac, I., Bilenberg, N., Bird, H., Dobrean, A., Erol, N., Fombonne, E., Fonseca, A., Frigerio, A., Fung, D. S. S., Lambert, M. C., Leung, P. W. L., Liu, X., Marković, I., Markovic, J., … Verhulst, F. C. (2014). Parent–Teacher Agreement on Children's Problems in 21 Societies. *Journal of Clinical Child & Adolescent Psychology*, *43*(4), 627–642. https://doi.org/10.1080/15374416.2014.900719

Rhodes, R. E., & Smith, N. E. I. (2006). Personality correlates of physical activity: A review and meta-analysis. *British Journal of Sports Medicine*, *40*(12), 958–965. https://doi.org/10.1136/bjsm.2006.028860

Riley, T. N., Sullivan, T. N., Hinton, T. S., & Kliewer, W. (2019). Longitudinal relations between emotional awareness and expression, emotion regulation, and peer victimization among urban adolescents. *Journal of Adolescence*, *72*, 42–51. https://doi.org/10.1016/j.adolescence.2019.02.005

Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspectives on Psychological Science*, *2*(4), 313–345. https://doi.org/10.1111/j.1745-6916.2007.00047.x

Roberts, B. W., Luo, J., Briley, D. A., Chow, P. I., Su, R., & Hill, P. L. (2017). A systematic review of personality trait change through intervention. *Psychological Bulletin*, *143*(2), 117–141. https://doi.org/10.1037/bul0000088

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*(1), 1–25. https://doi.org/10.1037/0033-2909.132.1.1

Rohrer, J. M., Egloff, B., Kosinski, M., Stillwell, D., & Schmukle, S. C. (2018). In your eyes only? Discrepancies and agreement between self- and other-reports of personality from age 14 to 29. *Journal of Personality and Social Psychology*, *115*(2), 304–320. https://doi.org/10.1037/pspp0000142

Ross, K. M., Kim, H., Tolan, P. H., & Jennings, P. A. (2019). An exploration of normative social and emotional skill growth trajectories during adolescence. *Journal of Applied Developmental Psychology*, *62*, 102–115. https://doi.org/10.1016/j.appdev.2019.02.006

Rottinghaus, P. J., Lindley, L. D., Green, M. A., & Borgen, F. H. (2002). Educational Aspirations: The Contribution of Personality, Self-Efficacy, and Interests. *Journal of Vocational Behavior*, *61*(1), 1–19. https://doi.org/10.1006/jvbe.2001.1843

Rueger, S. Y., Chen, P., Jenkins, L. N., & Choe, H. J. (2014). Effects of Perceived Support from Mothers, Fathers, and Teachers on Depressive Symptoms During the Transition to Middle School. *Journal of Youth and Adolescence*, *43*(4), 655–670. https://doi.org/10.1007/s10964-013-0039-x

Said-Metwaly, S., Fernández-Castilla, B., Kyndt, E., Van den Noortgate, W., & Barbot, B. (2021). Does the Fourth-Grade Slump in Creativity Actually Exist? A Meta-analysis of the Development of Divergent Thinking in School-Age Children and Adolescents. *Educational Psychology Review*, *33*(1), 275–298. https://doi.org/10.1007/s10648-020-09547-9

Salmela-Aro, K. (2020). The Role of Motivation and Academic Wellbeing – the Transition from Secondary to Further Education in STEM in Finland. *European Review*, *28*(S1), S121–S134. https://doi.org/10.1017/S1062798720000952

Scheier, M. F., Carver, C. S., & Bridges, M. W. (2001). Optimism, pessimism, and psychological well-being. In E. C. Chang (Ed.), *Optimism & pessimism: Implications for theory, research, and practice.* (pp. 189–216). American Psychological Association. https://doi.org/10.1037/10385-009

Schoon, I. (2021). Towards an Integrative Taxonomy of Social-Emotional Competences. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.515313

Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive Psychology Progress: Empirical Validation of Interventions. *American Psychologist*, *60*(5), 410–421. https://doi.org/10.1037/0003-066X.60.5.410

Sentse, M., Kretschmer, T., & Salmivalli, C. (2015). The Longitudinal Interplay between Bullying, Victimization, and Social Status: Age-related and Gender Differences. *Social Development*, *24*(3), 659–677. https://doi.org/10.1111/sode.12115

Shulman, E. P., Harden, K. P., Chein, J. M., & Steinberg, L. (2015). Sex Differences in the Developmental Trajectories of Impulse Control and Sensation-Seeking from Early Adolescence to Early Adulthood. *Journal of Youth and Adolescence*, *44*(1), 1–17. https://doi.org/10.1007/s10964-014-0116-9

Smetana, J. G., Campione-Barr, N., & Metzger, A. (2006). Adolescent Development in Interpersonal and Societal Contexts. *Annual Review of Psychology*, *57*(1), 255–284. https://doi.org/10.1146/annurev.psych.57.102904.190124

Smithers, L. G., Sawyer, A. C. P., Chittleborough, C. R., Davies, N. M., Davey Smith, G., & Lynch, J. W. (2018). A systematic review and meta-analysis of effects of early life non-cognitive skills on academic, psychosocial, cognitive and health outcomes. *Nature Human Behaviour*, *2*(11), 867–880. https://doi.org/10.1038/s41562-018-0461-x

Soland, J., Hamilton, L. S., & Stecher, B. M. (2013). *Measuring 21st century competencies: Guidance for educators* (p. 70). Asia Society/RAND Corporation.

Soto, C. J. (2016). The Little Six Personality Dimensions From Early Childhood to Early Adulthood: Mean-Level Age and Gender Differences in Parents' Reports. *Journal of Personality*, *84*(4), 409–422. https://doi.org/10.1111/jopy.12168

Soto, C. J. (2019). How Replicable Are Links Between Personality Traits and Consequential Life Outcomes? The Life Outcomes of Personality Replication Project. *Psychological Science*, *30*(5), 711–727. https://doi.org/10.1177/0956797619831612

Soto, C. J., & John, O. P. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology*, *113*(1), 117–143. https://doi.org/10.1037/pspp0000096

Soto, C. J., John, O. P., Gosling, S. D., & Potter, J. (2011). Age Differences in Personality Traits From 10 to 65: Big Five Domains and Facets in a Large Cross-Sectional Sample. *Journal of Personality and Social Psychology*, *100*(2), 330–348. https://doi.org/10.1037/a0021717

Soto, C. J., Napolitano, C. M., & Roberts, B. W. (2021). Taking Skills Seriously: Toward an Integrative Model and Agenda for Social, Emotional, and Behavioral Skills. *Current Directions in Psychological Science*, *30*(1), 26–33. https://doi.org/10.1177/0963721420978613

Soto, C. J., Napolitano, C. M., Sewell, M. N., Yoon, H. J., & Roberts, B. W. (2022). An integrative framework for conceptualizing and assessing social, emotional, and behavioral skills: The BESSI. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/pspp0000401

Soto, C. J., & Tackett, J. L. (2015). Personality Traits in Childhood and Adolescence. *Current Directions in Psychological Science*, *24*(5), 358–362. https://doi.org/10.1177/0963721415589345

Sroufe, L. A., Cooper, R. G., & DeHart, G. B. (1996). *Child development: Its nature and course*. McGraw-Hill.

Statistics Finland. (2020). *Finland in Figures 2020* (p. 60).

Steel, P., Schmidt, J., & Shultz, J. (2008). Refining the relationship between personality and subjective well-being. *Psychological Bulletin*, *134*(1), 138–161. https://doi.org/10.1037/0033-2909.134.1.138

Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology*, *44*(6), 1764–1778. https://doi.org/10.1037/a0012955

Steinberg, L., & Morris, A. S. (2001). Adolescent Development. *Annual Review of Psychology*, *52*(1), 83–110. https://doi.org/10.1146/annurev.psych.52.1.83

Steinmayr, R., Weidinger, A. F., & Wigfield, A. (2018). Does students' grit predict their school achievement above and beyond their personality, motivation, and engagement? *Contemporary Educational Psychology*, *53*, 106–122. https://doi.org/10.1016/j.cedpsych.2018.02.004

Stephan, Y., Sutin, A. R., Bayard, S., Križan, Z., & Terracciano, A. (2018). Personality and sleep quality: Evidence from four prospective studies. *Health Psychology*, *37*(3), 271–281. https://doi.org/10.1037/hea0000577

Stieger, M., Flückiger, C., Rüegger, D., Kowatsch, T., Roberts, B. W., & Allemand, M. (2021). Changing personality traits with the help of a digital personality change intervention. *Proceedings of the National Academy of Sciences*, *118*(8), e2017548118. https://doi.org/10.1073/pnas.2017548118

Stöber, J. (2004). Dimensions of test anxiety: Relations to ways of coping with pre-exam anxiety and uncertainty. *Anxiety, Stress & Coping*, *17*(3), 213–226. https://doi.org/10.1080/10615800412331292615

Strickhouser, J. E., Zell, E., & Krizan, Z. (2017). Does personality predict health and well-being? A metasynthesis. *Health Psychology*, *36*(8), 797–810. https://doi.org/10.1037/hea0000475

Sun, J., & Stewart, D. (2007). Age and Gender Effects on Resilience in Children and Adolescents. *International Journal of Mental Health Promotion*, *9*(4), 16–25. https://doi.org/10.1080/14623730.2007.9721845

Sutin, A. R., Gamaldo, A. A., Stephan, Y., Strickhouser, J. E., & Terracciano, A. (2020). Personality Traits and the Subjective and Objective Experience of Sleep. *International Journal of Behavioral Medicine*, *27*(4), 481–485. https://doi.org/10.1007/s12529-019-09828-w

Tang, X., & Salmela-Aro, K. (2021). The prospective role of epistemic curiosity in national standardized test performance. *Learning and Individual Differences*, *88*, 102008. https://doi.org/10.1016/j.lindif.2021.102008

Tang, X., Wang, M.-T., Guo, J., & Salmela-Aro, K. (2019). Building grit: The longitudinal pathways between mindset, commitment, grit, and academic outcomes. *Journal of Youth and Adolescence*, *48*(5), 850–863. https://doi.org/10.1007/s10964-019-00998-0

Tang, X., Wang, M.-T., Parada, F., & Salmela-Aro, K. (2021). Putting the Goal Back into Grit: Academic Goal Commitment, Grit, and Academic Achievement. *Journal of Youth and Adolescence*, *50*(3), 470–484. https://doi.org/10.1007/s10964-020-01348-1

Thomson, K. C., Schonert-Reichl, K. A., & Oberle, E. (2015). Optimism in Early Adolescence: Relations to Individual Characteristics and Ecological Assets in Families, Schools, and Neighborhoods. *Journal of Happiness Studies*, *16*(4), 889–913. https://doi.org/10.1007/s10902-014-9539-y

Tonidandel, S., & LeBreton, J. M. (2011). Relative Importance Analysis: A Useful Supplement to Regression Analysis. *Journal of Business and Psychology*, *26*(1), 1–9. https://doi.org/10.1007/s10869-010-9204-3

Tonidandel, S., & LeBreton, J. M. (2015). RWA Web: A Free, Comprehensive, Web-Based, and User-Friendly Tool for Relative Weight Analyses. *Journal of Business and Psychology*, *30*(2), 207–216. https://doi.org/10.1007/s10869-014-9351-z

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. Jossey-Bass.

Tuovinen, S., Tang, X., & Salmela-Aro, K. (2020). Introversion and Social Engagement: Scale Validation, Their Interaction, and Positive Association With Self-Esteem. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.590748

Tynkkynen, L., Tolvanen, A., & Salmela-Aro, K. (2012). Trajectories of educational expectations from adolescence to young adulthood in Finland. *Developmental Psychology*, *48*(6), 1674–1685. https://doi.org/10.1037/a0027245

Välijärvi, J., Kupari, P., Linnakylä, P., Reinikainen, P., Sulkunen, S., Törnroos, J., & Arffman, I. (2007). *The Finnish success in PISA – and some reasons behind it 2: PISA 2003*. Institute for Educational Research, University of Jyväskylä. https://ktl.jyu.fi/julkaisut/julkaisuluettelo/julkaisut/2007/d084

Van den Akker, A. L., Deković, M., Asscher, J., & Prinzie, P. (2014). Mean-level personality development across childhood and adolescence: A temporary defiance of the maturity principle and bidirectional associations with parenting. *Journal of Personality and Social Psychology*, *107*(4), 736–750. https://doi.org/10.1037/a0037248

Van der Graaff, J., Carlo, G., Crocetti, E., Koot, H. M., & Branje, S. (2018). Prosocial Behavior in Adolescence: Gender Differences in Development and Links with Empathy. *Journal of Youth and Adolescence*, *47*(5), 1086–1099. https://doi.org/10.1007/s10964-017-0786-1

van Scheppingen, M. A., Jackson, J. J., Specht, J., Hutteman, R., Denissen, J. J. A., & Bleidorn, W. (2016). Personality Trait Development During the Transition to Parenthood: A Test of Social Investment Theory. *Social Psychological and Personality Science*, *7*(5), 452–462. https://doi.org/10.1177/1948550616630032

van Zalk, M. H. W., & Kerr, M. (2014). Developmental Trajectories of Prejudice and Tolerance Toward Immigrants from Early to Late Adolescence. *Journal of Youth and Adolescence*, *43*(10), 1658–1671. https://doi.org/10.1007/s10964-014-0164-1

Vazire, S., & Carlson, E. N. (2011). Others Sometimes Know Us Better Than We Know Ourselves. *Current Directions in Psychological Science*, *20*(2), 104–108. https://doi.org/10.1177/0963721411402478

von Stumm, S., Hell, B., & Chamorro-Premuzic, T. (2011). The Hungry Mind: Intellectual curiosity is the third pillar of academic performance. *Perspectives on Psychological Science*, *6*(6), 574–588. https://doi.org/10.1177/1745691611421204

Walton, K. E., Murano, D., Burrus, J., & Casillas, A. (2021). Multimethod Support for Using the Big Five Framework to Organize Social and Emotional Skills. *Assessment*, 107319112110457. https://doi.org/10.1177/10731911211045744

Werner, K. M., Milyavskaya, M., Klimo, R., & Levine, S. L. (2019). Examining the unique and combined effects of grit, trait self-control, and conscientiousness in predicting motivation for academic goals: A commonality analysis. *Journal of Research in Personality*, *81*, 168–175. https://doi.org/10.1016/j.jrp.2019.06.003

Wigfield, A., Eccles, J. S., Fredricks, J. A., Simpkins, S., Roeser, R. W., & Schiefele, U. (2015). Development of achievement motivation and engagement. In R. M. Lerner & M. E. Lamb (Eds.), *Handbook of Child Psychology and Developmental Science, Volume 3* (pp. 1–44). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118963418.childpsy316

Wilson, K. E., & Dishman, R. K. (2015). Personality and physical activity: A systematic review and meta-analysis. *Personality and Individual Differences*, *72*, 230–242. https://doi.org/10.1016/j.paid.2014.08.023

Wray-Lake, L., Syvertsen, A. K., & Flanagan, C. A. (2016). Developmental change in social responsibility during adolescence: An ecological perspective. *Developmental Psychology, 52*(1), 130–142. https://doi.org/10.1037/dev0000067

Zell, E., & Lesick, T. L. (2021). Big five personality traits and performance: A quantitative synthesis of 50+ meta-analyses. *Journal of Personality*. https://doi.org/10.1111/jopy.12683

Zimmermann, P., & Iwanski, A. (2014). Emotion regulation from early adolescence to emerging adulthood and middle adulthood. *International Journal of Behavioral Development*, *38*(2), 182–194. https://doi.org/10.1177/0165025413515405

Zou, R., Zhang, D.-J., Niu, G.-F., Xie, X.-C., Fan, C.-Y., Tian, Y., & Zhou, Z.-K. (2016). Cross-sectional age differences in dispositional optimism in Chinese children and adolescents. *Personality and Individual Differences*, *102*, 133–138. https://doi.org/10.1016/j.paid.2016.06.063

Table 1

Skill Domains and Facets in The OECD Social-Emotional Skill Model

Skill Domain	Facet	Definition	Example items
Task performance	Self-Control	able to avoid distractions and focus attention on the current task in order to achieve personal goals	thinks carefully before doing something
	Responsibility	able to honor commitments and be punctual and reliable	is reliable and can always be counted on
	Persistence	persevering in tasks and activities until they get done.	keeps working on a task until it is finished
Emotional regulation	Stress Resistance	Able to deal with anxiety and calmly solve problems (is relaxed, handles stress well).	often feels nervous (R)
	Optimism	positive and optimistic expectations for self and life in general	always positive about the future
	Emotional Control	effective strategies for regulating temper, anger, and irritation in the face of frustrations	keeps their emotions under control
Collaboration	Empathy	kindness and caring for others and their well-being that leads to valuing and investing in close relationships	understands what others want
	Trust	Belief that others generally have good intentions and forgiving those who have done wrong.	thinks most of their classmates keep their promises
	Cooperation	living in harmony with others and valuing interconnectedness among all people	likes to help others
Open-mindedness	Tolerance	open to different points of view, values diversity, appreciative of foreign people and cultures	likes hearing about other cultures and religions
	Curiosity	interest in ideas and love of learning, understanding, and intellectual exploration; an inquisitive mindset	loves learning new things in school
	Creativity	generating novel ways to do or think about things through exploring, learning from failure, insight, and vision	is original, comes up with new ideas
Engaging with Others	Sociability	able to approach others, both friends and strangers, initiating and maintaining social connections	likes to spend their free time with others
	Assertiveness	able to confidently voice opinions, needs, and feelings, and exert social influence	enjoys leading others
	Energy	approaching life with energy, excitement, and spontaneity	is full of energy

Table 2

Hypotheses on the Most Significant Social-Emotional Skill for Each Outcomes

Outcomes	Hypotheses on the most significant Social-Emotional Skill
Educational outcomes	
Achievement	Self-Control (Muenks et al., 2017; Werner et al., 2019) in Task Performance (Poropat, 2009)
Class Engagement	Persistence (Muenks et al., 2017; Tang et al., 2019) in Task Performance (Steinmayr et al., 2018)
Educational aspirations	Non-identified skills in Open-Mindedness Skills (Rottinghaus, 2002)
Social outcomes	
Relationship with teacher/parents/friends	Sociability and Trust (Anglim et al., 2020) in Engaging with Others and Collaboration, respectively (Anglim et al., 2020)
School Belonging	Sociability (Allen et al., 2017) in Engaging with Others (Allen et al., 2017)
Victimization	Emotional Control (Riley et al., 2019) in Emotional Regulation (Mitsopoulu &Giovazolias, 2015)
Global Mindedness	Tolerance (Kankaraš et al., 2019) in Open-Mindedness (Kankaraš et al., 2019)
Psychological health outcomes	
Psychological wellbeing	Optimism (Scheier et al., 2001) in Emotional Regulation (Anglim et al., 2020)
Life satisfaction	Optimism (Scheier et al., 2001) in Emotional Regulation (Anglim et al., 2020)
Test anxiety	Stress Resistance (Anglim et al., 2020) in Emotional Regulation (Kotov et al., 2010)
Physical health outcomes	
Health	Optimism (Carver et al., 2010) in Emotional Regulation (Strickhouser, et al., 2017)
Sleep quality (sleep hours and sleep troubles)	Stress Resistance (Lund et al., 2010) in Emotional Regulation (Stephan et al., 2018; Sutin et al., 2020)
Eating habit	Self-Control (Murray & Booth, 2015) in Task Performance (Strickhouser, et al., 2017)
Physical Activity	Energy (Soto et al., 2022) in Engaging with Others (Rhodes & Smith, 2006)

Table 3

Hypotheses for Mean-level Comparison between the Younger and Older Cohorts

	Hypotheses for mean-level comparison between the younger (i.e., age 10) and older (i.e., age 15) cohorts
Task Performance	
Self-Control	Younger cohort = Older cohort (Brown et al., 2020) or Younger cohort > Older cohort (Ng-Knight et al., 2016; Shulman et al., 2015)
Responsibility	Younger cohort > Older cohort (Shulman et al., 2015; Soto et al., 2011; Steinberg et al., 2008)
Persistence	Younger cohort > Older cohort (Brown et al., 2020; Park et al., 2020; Tang et al., 2021)
Emotional Regulation	
Stress Resistance	Younger cohort > Older cohort (Hampel & Petermann, 2006; Martin et al., 2010)
Optimism	Younger cohort = Older cohort (Callina et al., 2014; Thomson et al., 2015) or Younger cohort > Older cohort (Brown et al., 2020; Zou et al., 2016)
Emotional Control	Younger cohort > Older cohort (Cracco et al., 2017; Gullone et al., 2010; Zimmermann & Iwanski, 2014)
Collaboration	
Empathy	Mixed findings: Younger cohort = Older cohort (Thomson et al., 2015) or Younger cohort < Older cohort(Farrell & Vaillancourt, 2020; Van der Graaff et al., 2018), or Younger cohort > Older cohort (Sun & Stewart, 2007)
Trust	Younger cohort > Older cohort (Callina et al., 2014; Wray-Lake et al., 2016)
Cooperation	Younger cohort = Older cohort (Brown et al., 2020) or Younger cohort > Older cohort (Flynn et al., 2015; Nantel-Vivier et al., 2009)
Open-Mindedness	
Tolerance	Younger cohort < Older cohort(Bayram Özdemir et al., 2021; van Zalk & Kerr, 2014)
Curiosity	Younger cohort > Older cohort (Dotterer et al., 2009; Gaspard et al., 2017) or Younger cohort = Older cohort (Negru-Subtirica et al., 2015)
Creativity	Mixed findings: Younger cohort > Older cohort (Brown et al., 2020; Soto et al., 2011) or Younger cohort < Older cohort (Kleibeuker et al., 2013; Said-Metwaly et al., 2021)
Engaging with Others	
Sociability	Younger cohort > Older cohort (Brook & Schmidt, 2020; Crocetti et al., 2019)
Assertiveness	Mixed findings: Younger cohort = Older cohort(Brown et al., 2020) or Younger cohort > Older cohort (Soto et al., 2011) or Younger cohort < Older cohort (Eskin, 2003)
Energy	Younger cohort > Older cohort (Dumith et al., 2011; Soto et al., 2011)

Table 4

Descriptive Information of The Studied Sample

Characteristic	N	Overall, N = 5,537	Younger cohort, N = 3,071	Older cohort, N = 2,466
Grade level	5,537			
3		0.4% (20/5,537)	0.7% (20/3,071)	-
4		38% (2,101/5,537)	68% (2,101/3,071)	-
5		17% (949/5,537)	31% (949/3,071)	-
6		<0.1% (1/5,537)	<0.1% (1/3,071)	-
7		<0.1% (3/5,537)	-	0.1% (3/2,466)
8		1.6% (90/5,537)	-	3.6% (90/2,466)
9		31% (1,738/5,537)	-	70% (1,738/2,466)
10		11% (635/5,537)	-	26% (635/2,466)
Gender	5,366			
Girls		51% (2,759/5,366)	50% (1,494/2,974)	53% (1,265/2,392)
Boys		49% (2,607/5,366)	50% (1,480/2,974)	47% (1,127/2,392)
Home language	5,381			
Finnish or Swedish		84% (4,546/5,381)	86% (2,532/2,945)	83% (2,014/2,436)
Other languages		16% (835/5,381)	14% (413/2,945)	17% (422/2,436)
Age	5,537			
Mean (SD)		12.89 (2.50)	10.67 (.30)	15.66 (.29)
Range		10.17-16.25	10.17-11.25	15.17 -16.25
Highest level of education (father or male guardian)	4,535			
ISCED level 3 or lower		39% (1,783/4,535)	39% (887/2,289)	40% (896/2,246)
ISCED level 4 or 5		29% (1,294/4,535)	31% (701/2,289)	26% (593/2,246)
ISCED level 6 or higher		32% (1,458/4,535)	31% (701/2,289)	34% (757/2,246)
Highest level of education (Mother or female guardian)	4,691			
ISCED level 3 or lower		41% (1,929/4,691)	43% (1,014/2,367)	39% (915/2,324)
ISCED level 4 or 5		27% (1,282/4,691)	27% (636/2,367)	28% (646/2,324)
ISCED level 6 or higher		32% (1,480/4,691)	30% (717/2,367)	33% (763/2,324)
Socio-economic status[1] (SES)	5,161			
Mean (SD)		.54 (.76)	.53 (.74)	.56 (.79)
Range		-3.76, 3.21	-2.02, 3.21	-3.76, 2.94

Note. [1] Socio-economic status (SES) is a composite index based on data from parental education, parental occupation and home possessions, derived as factor scores from principal component analyses (OECD, 2021a).

Table 5

Fit Statistics for the Models Used in the Present Study

Model	Description	χ^2	*df*	CFI	TLI	RMSEA
Total group analysis						
M1	CFA with 45 facets (15 for each student/teacher/parent-reported SESs)	31482	7920	.897	.883	.023
M2	Set-ESEM with 45 facets (15 for each student/teacher/parent-reported SESs)	22311	7740	.937	.926	.018
M3	M2+CUs for parallel-worded items	21694	7605	.939	.927	.018
M4	M3+CUs for negatively worded items	19769	7449	.946	.935	.017
M5	M4+3 latent acquiescence variables	19059	7446	.949	.939	.017
M6	M5+five second-order CFA factors	35067	8286	.883	.873	.024
M7	M5+factor loading invariance across the three raters	21040	7626	.942	.931	.018
M8	M7+factor variance invariance across the three raters	22371	7656	.936	.924	.019
M9	M8+20 outcome variables	26498	9456	.935	.918	.018
M10	M9+20 outcome variables+covariates	26462	9816	.938	.917	.018
Multiple-group analysis						
MG1	ESEM with 45 facets+CUs+3 latent acquiescence variables+CUs	28652	14892	.944	.932	.018
MG2	MG1+ factor loadings invariance across cohort	29782	15162	.940	.929	.019
MG3	MG2+ factor loadings invariance across raters	31565	15342	.934	.922	.020
MG4	MG3+ factor variance invariance across cohorts	32205	15387	.931	.919	.020
MG5	MG4+ factor variance invariance across raters	33567	15417	.926	.913	.021
MG6	MG5+intercept invariance across cohorts	35305	15507	.919	.906	.021
MG7	MG6+intercept invariance across raters	35734	15597	.918	.905	.022

Notes. CU = correlated uniquenesses; Covariates included gender, year levels, socioeconomic status, and home languages.

Table 6

Inter-Rater Agreement (Correlations) Among Students, Teachers, and Parents on 15 Social-Emotional Skills

Convergent correlations between raters		Task Performance			Emotional Regulation			Collaboration			Open-Mindedness			Engaging with Others			
		SEL	RES	PER	STR	OPT	EMO	EMP	TRU	COO	TOL	CUR	CRE	SOC	ASS	ENE	**Ave.**
Students vs. Teachers	*r*	.308	.145	.324	.239	.271	.238	.215	.212	.297	.122	.331	.233	.347	.232	.332	.256
	95% CI	[.265,.351]	[.108,.182]	[.283,.365]	[.200,.278]	[.228,.314]	[.238,.019]	[.164,.266]	[.167,.257]	[.254,.340]	[.077,.167]	[.292,.370]	[.190,.276]	[.306,.388]	[.201,.263]	[.293,.371]	[.236,.276]
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Students vs. Parents	*r*	.398	.275	.359	.401	.029	.374	.405	.433	.406	.360	.446	.396	.552	.386	.479	.411
	95% CI	[.298,.498]	[.201,.349]	[.294,.424]	[.350,.452]	[.435,.549]	[.276,472]	[.315,.495]	[.341,.525]	[.332,.480]	[.289,.431]	[.381,.511]	[.298,.494]	[.485,.619]	[.325,.447]	[.416,.542]	[.376,.446]
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Teachers vs. Parents	*r*	.540	.342	.457	.220	.266	.358	.301	.191	.384	.190	.390	.284	.387	.399	.287	.333
	95% CI	[.469,.611]	[.271,.413]	[.406,.508]	[.151,.289]	[.205,.327]	[.301,.415]	[.223,.379]	[.111,.271]	[.317,.451]	[.135,.245]	[.335,.445]	[.202,.366]	[.311,.463]	[.344,.454]	[.214,.360]	[.306,.360]
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001

Note. Ave. = Average; SEL = Self-Control, RES = Responsibility, PER = Persistence, STR = Stress Resistance, OPT = Optimism, EMO = Emotional Control, EMP = Empathy, TRU = Trust, COO = Cooperation, TOL = Tolerance, CUR = Curiosity, CRE = Creativity, SOC = Sociability, ASS = Assertiveness, ENE = Energy.

Table 7

Means, Standard Deviation (SD), and Correlations of Social-Emotional Skills from Three Informants' Ratings with 20 Outcomes.

	Task Performance			Emotional Regulation			Collaboration			Open-Mindedness			Engaging with Others		
	SEL	RES	PER	STR	OPT	EMO	EMP	TRU	COO	TOL	CUR	CRE	SOC	ASS	ENE
	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA	ST/TC/PA
Mean	3.53/3.46/3.44	3.91/3.71/3.94	3.72/3.72/3.78	3.04/2.54/2.56	3.81/3.65/4.09	3.34/3.68/3.39	3.98/3.58/3.91	3.52/3.48/3.68	4.14/3.83/4.16	3.44/3.42/3.82	3.81/3.89/4.18	3.74/3.44/3.97	3.92/3.69/3.92	2.37/2.65/2.73	3.58/3.50/3.82
SD	.60/.90/.68	.62/.89/.71	.77/1.03/.88	.92/.76/.87	.81/.72/.62	.71/1.00/.84	.59/.66/.61	.76/.60/.59	.59/.82/.59	.84/.76/.77	.76/.78/.58	.69/.79/.66	.76/.75/.78	.95/1.00/.88	.83/.93/.75
Correlation with															
Educational outcomes															
School grades	**.20/.22/**.04	**.09/.28/.11**	**.31/.34/.20**	**.14/.08/**.07	**.23/.20/.21**	**.09/.13/**.01	**.13/.20/.15**	**.27/.16/.23**	**.15/.15/.12**	.03/**.22/.08**	**.22/.31/.29**	**.17/.24/.23**	**.18/.12/.14**	**-.17/.08/**.03	**.28/.19/.23**
OECD test	**.10/.19/.28**	**.13/.20/.09**	**.08/.23/.21**	-.02/**.10/-.05**	**.04/.08/-**.05	**.10/.16/.14**	**.13/.04/**-.03	**.06/**.02/.02	**.12/.15/**.06	**.17/.09/.07**	**.16/.21/.14**	**.12/.18**.00	.05/**.06/-.06**	**.13/.14/**.05	-.03/**.14/-.10**
Teacher-reported performance	**.14/.46/.29**	**.10/.52/.22**	**.17/.60/.37**	-.01/**.15/**.04	**.06/.28/.08**	.04/**.32/.11**	**.14/.34/.07**	**.09/.20/**.07	**.14/.39/.16**	**.12/.36/.14**	**.19/.55/.32**	**.16/.53/.16**	**.05/.21/-**.03	.00/**.23/**.02	**.05/.31/.08**
Class engagement	**.44/.14/.13**	**.45/.20/.14**	**.60/.22/.21**	**.23/.15/.10**	**.51/.24/.28**	**.40/.14/.18**	**.42/.19/.17**	**.45/.14/.20**	**.52/.19/.20**	**.33/.16/.13**	**.60/.26/.34**	**.45/.18/.10**	**.48/.18/.18**	**.09/.12/.12**	**.42/.24/.26**
Educational aspirations	-.01/**.07/.13**	.01/**.04/.07**	-.03/**.07/.09**	**-.13/-**.01/**-.08**	**-.06/-.04/-**.03	-.04/**.05/**.05	**.09/-**.02/.04	**-.06/-.06/-**.03	**.05/.04/.08**	**.12/**.02/.04	.04/**.03/**.05	**.05/.06/-**.03	**-.04/-**.03/-.03	**.12/.03/**.02	**-.09/**.02/-.06
Social outcomes															
Relationship with teachers	**.30/.18/.09**	**.31/.21/.11**	**.33/.19/.15**	**.14/.08/**.02	**.35/.14/.16**	**.25/.16/.11**	**.35/.12/.13**	**.36/.10/.20**	**.39/.19/.14**	**.28/.10/.15**	**.37/.22/.22**	**.30/.11/.11**	**.32/.07/.10**	-.01/.02/.03	**.21/.11/.10**
Relationship with parents	**.47/.10/.13**	**.40/.11/.19**	**.46/.10/.16**	**.41/.17/.18**	**.54/.18/.31**	**.55/.12/.24**	**.19/.08/.17**	**.47/.13/.20**	**.40/.11/.27**	**.18/.06/.12**	**.38/.12/.27**	**.28/.06/.11**	**.39/.10/.17**	**-.07/-**.01/.04	**.33/.11/.23**
Relationship with friends	**.29/.12/.07**	**.47/.09/.13**	**.33/.10/.10**	**.22/.11/.13**	**.47/.10/.22**	**.33/.11/.16**	**.45/.09/.14**	**.60/.06/.31**	**.49/.12/.18**	**.28/**-.01/**.12**	**.35/.07/.17**	**.32/**.03/.04	**.55/.13/.29**	.03/**.06/**.04	**.29/.10/.17**
School Belonging	**.41/.08/**.03	**.50/.12/.10**	**.49/.13/.11**	**.44/.20/.21**	**.67/.22/.34**	**.51/.14/.16**	**.43/.14/.17**	**.64/.15/.26**	**.56/.14/.16**	**.30/.04/.11**	**.50/.14/.24**	**.42/.06/**.00	**.76/.24/.33**	.01/**.09/.12**	**.51/.18/.27**
Victimization	**-.27/-.21/-.20**	**-.28/-.13/-.20**	**-.15/-.12/-.17**	**-.19/-.10/-.07**	**-.24/-.07/-.12**	**-.26/-.23/-.18**	**-.11/-.05/-.09**	**-.31/-.07/-.17**	**-.30/-.18/-.22**	**-.13/.04/**-.03	**-.16/-.06/-.11**	**-.06/.05/**.04	**-.21/-.05/-.08**	**.06/.07/.09**	**-.07/**-.01/-.03
Global Mindedness	**.20/.06/.14**	**.29/.05/**.01	**.20/.07/.10**	**-.06/-**.01/-.04	**.12/-**.03/-.01	**.18/.04/.09**	**.40/-**.01/.03	**.06/-.06/-.10**	**.36/.06/.09**	**.45/.07/.22**	**.29/.06/.12**	**.35/.08/**.05	**.16/-**.02/**-.07**	**.22/.08/.09**	.03/**.06/-**.02
Psychological health outcomes															
WHO-Wellbeing	**.38/**.03/-.01	**.42/.07/.07**	**.54/.07/.07**	**.47/.19/.21**	**.74/.22/.35**	**.50/.08/.14**	**.33/.11/.11**	**.57/.15/.23**	**.45/.07/.12**	**.24/.06/.07**	**.52/.12/.26**	**.42/.04/**.06	**.60/.16/.23**	.02/**.05/.11**	**.59/.17/.32**
Life satisfaction	**.35/.06/**.04	**.35/.11/.12**	**.45/.13/.10**	**.44/.21/.20**	**.79/.25/.38**	**.42/.10/.15**	**.26/.10/.10**	**.54/.14/.32**	**.37/.07/.13**	**.17/.05/**.05	**.44/.15/.22**	**.34/.06/**.04	**.55/.18/.22**	-.02/**.08/.07**	**.53/.20/.26**
Test anxiety	**-.15/**.02/-.04	**-.10/-**.01/-.04	**-.15/-**.01/-.04	**-.54/-.16/-.26**	**-.29/-.07/-.18**	**-.33/-.04/-**.06	**.07/-**.01/.05	**-.18-**.04/**-.10**	-.04/.01/-.01	.04/-.02/**-.07**	**-.11/-**.03/**-.20**	**-.11/-.07/-**.06	**-.19/-.05/-**.06	**-.05/-.04/-**.05	**-.23/-.03/-.14**
Physical health outcomes															
Self-reported															
Health	**.35/.06/.08**	**.35/.12/.10**	**.44/.13/.09**	**.41/.19/.18**	**.60/.21/.28**	**.40/.09/.12**	**.24/.12/.12**	**.45/.12/.25**	**.36/.09/.10**	**.15/.08/.09**	**.41/.16/.26**	**.31/.01/**.05	**.47/.17/.19**	-.01/**.08/.08**	**.47/.19/.27**
Sleeping trouble	**-.33/-.09/-.11**	**-.22/-.08/-.13**	**-.32/-.12/-.11**	**-.39/-.14/-.23**	**-.45/-.14/-.25**	**-.35/-.10/-.10**	**-.06/-.04/-**.01	**-.31/-.09/-.12**	**-.21/-.06/-.09**	**-.05/-**.01/.01	**-.25/-.09/-.15**	**-.16/.03/**.02	**-.29/-.08/-.11**	.01/-.02/.04	**-.30/-.10/-.18**
Parent-reported															
Health	**.19/.09/.16**	**.13/.13/.26**	**.20/.13/.21**	**.17/.17/.31**	**.31/.16/.47**	**.21/.10/.25**	**.12/.12/.19**	**.23/.10/.28**	**.16/.09/.26**	.03/.03/**.10**	**.13/.11/.28**	**.14/**.04/**.10**	**.25/.15/.29**	.00/**.08/.08**	**.25/.18/.42**
Eating habit	**.15/.09/.09**	**.07/.14/.17**	**.21/.19/.20**	**.11/**.03/.06	**.21/.11/.22**	**.10/.07/.10**	**.12/.14/.21**	**.14/.12/.17**	**.14/.11/.19**	**.10/.08/.22**	**.19/.18/.27**	**.22/.08/.25**	**.17/.08/.17**	.01/**.07/.09**	**.24/.17/.29**
Physical activity	**.11/-**.04/.01	.06/.06/**.12**	**.21/.10/.16**	**.16/.12/.19**	**.28/.15/.31**	**.15/**.02/**.10**	**.10/.10/.17**	**.19/.15/.19**	**.10/**.02/**.15**	.02/-.01/**.08**	**.15/.08/.21**	**.16/-**.03/**.09**	**.27/.16/.31**	.07/**.11/.16**	**.37/.20/.47**
Sleeping hours	.07/.03/-.05	-.04/**.09/.12**	**.19/.10/.07**	**.25/.08/.17**	**.27/.19/.30**	**.09/**.02/.02	-.04/**.15/.13**	**.21/.16/.20**	.01/.04/**.09**	**-.13/.15/**.04	**.07/.15/.21**	**.10/.12/.15**	**.17/.09/.15**	**-.14/**.00/.05	**.32/.12/.25**

Notes. The correlation coefficients are based on Model M9 in Table 5. Bolded values indicate that the coefficients were statistically significant at $p < .05$. See OSF link for 95%CI and exact p-value. SEL= Self-Control; RES= Responsibility; PER= Persistence; STR= Stress Resistance; OPT=Optimism; EMO= Emotional Control; EMP= Empathy; TRU= Trust; COO= Cooperation; TOL= Tolerance; CUR= Curiosity; CRE= Creativity; SOC= Sociability; ASS= Assertiveness; ENE= Energy.

Table 8

*Summary of Percentage of Explained Variance (%) among Best Five Predictive Skills for Outcomes by **Three Raters Together***

	First	Second	Third	Fourth	Fifth			
	%(ST/TC/PA)	%(ST/TC/PA)	%(ST/TC/PA)	%(ST/TC/PA)	%(ST/TC/PA)	Best five skills R^2	Total R^2	Hit
Educational outcomes								
School grades	**SEL** 13.1(3.2/8.6/1.3)	**PER** 12.6(5.4/5.6/1.6)	**ENE** 9.5(6/1.2/2.3)	**CRE** 9.2(1.2/2.8/5.2)	**EMO** 8.4(2.2/5.4/0.8)	.25	.41	1
Cognitive test (OECD)	**SEL** 16.8(1.9/2.5/12.4)	**PER** 9.4(1.2/3.6/4.6)	**ASS** 9.2(3.1/4.1/2)	**CUR** 8.0(1.9/3.2/2.9)	**ENE** 7.4(1.2/2.6/3.6)	.16	.27	1
Teacher-reported performance	**CRE** 17.1(0.9/15.6/0.6)	**PER** 15.5(0.6/10.2/4.7)	**SEL** 14.3(1.3/9.8/3.2)	**CUR** 10.9(0.5/8.2/2.2)	**EMO** 7.6(0.9/5.4/1.3)	.43	.66	1
Class engagement	**CUR** 16.2(11.7/1.1/3.4)	**PER** 14.9(13.1/0.8/1)	**SEL** 7.9(6.4/0.8/0.7)	**OPT** 7.2(5.2/0.7/1.3)	**SOC** 7.0(5.8/0.5/0.7)	.26	.49	1
Educational aspirations	**ASS** 11.6(9.5/0.6/1.5)	**SEL** 11.4(1.1/2/8.3)	**CRE** 10.0(2.4/3/4.6)	**STR** 8.9(5.6/0.9/2.4)	**ENE** 7.6(5/1.5/1.1)	.05	.10	N/A
Social outcomes								
Relationship with teachers	**TRU** 10.9(6.4/0.5/4)	**EMP** 10.6(7.5/1.6/1.5)	**SEL** 9.7(5.9/1.7/2.1)	**CUR** 9.8(4.9/2.5/2.4)	**COO** 9.3(4.7/2.9/1.7)	.16	.31	1
Relationship with parents	**EMO** 17.0(13.6/0.6/2.8)	**OPT** 11.5(9.2/0.6/1.7)	**STR** 11.3(9.1/1.3/0.9)	**TRU** 8.9(7.8/0.3/0.8)	**SEL** 8.6(6.2/0.6/1.8)	.29	.50	0
Relationship with friends	**TRU** 25.7(21.1/0.3/4.3)	**SOC** 13.6(9.3/0.5/3.8)	**EMP** 8.8(7.3/0.3/1.2)	**OPT** 8.0(6.7/0.4/0.9)	**RES** 7.6(6.4/0.5/0.7)	.33	.52	1
School Belonging	**SOC** 23.6(19.3/1.3/3)	**TRU** 12.0(10.6/0.2/1.2)	**OPT** 10.8(8.4/0.5/1.9)	**STR** 7.5(6.2/0.6/0.7)	**ENE** 6.4(5/0.3/1.1)	.41	.68	1
Victimization	**COO** 14.7(8.4/3.1/3.2)	**TRU** 12.1(8.7/0.5/2.9)	**RES** 11.2(6.7/1.4/3.1)	**SEL** 10.1(5.4/3.1/1.6)	**EMO** 8.9(2.9/5/1)	.16	.28	0
Global Mindedness	**TOL** 23.0(16.5/0.5/6)	**EMP** 15.4(12.9/0.8/1.7)	**CRE** 8.7(7.2/0.5/1)	**ASS** 8.6(7.1/0.5/1)	**COO** 7.5(5.5/0.7/1.3)	.25	.40	1
Psychological health outcomes								
WHO-Wellbeing	**OPT** 21.5(18/0.9/2.6)	**ENE** 12.5(10/0.5/2)	**TRU** 9.5(8.2/0.4/0.9)	**STR** 9.3(7.9/0.7/0.7)	**SOC** 8.0(6.9/0.3/0.8)	.37	.61	1
Life satisfaction	**OPT** 35.3(30.9/1.1/3.3)	**TRU** 10.4(7/0.3/3.1)	**ENE** 10.1(8.2/0.8/1.1)	**SOC** 8.9(7.5/0.5/0.9)	**STR** 7.6(6.1/0.7/0.8)	.51	.70	1
Test anxiety	**STR** 32.5(27.8/1.3/3.4)	**EMO** 18.6(8.9/5.6/4.1)	**SEL** 12.4(3.2/5.5/3.7)	**OPT** 5.4(3.2/0.5/1.7)	**COO** 4.6(1/2.1/1.5)	.41	.56	1

Table 8 continue

*Summary of Percentage of Explained Variance (%) among Best Five Skills on Outcomes by **Three Raters Together***

	First	Second	Third	Fourth	Fifth			
	%(ST/TC/PA)	%(ST/TC/PA)	%(ST/TC/PA)	%(ST/TC/PA)	%(ST/TC/PA)	Best five skills R^2	Total R^2	Hit
Physical health outcomes								
Self-reported								
Health	**OPT** 18.5(16/0.5/2)	**ENE** 10.6(6.9/0.9/2.8)	**STR** 8.5(6.1/0.6/1.8)	**SEL** 7.7(3.7/0.5/3.5)	**TRU** 7.9(4.4/0.2/3.3)	0.30	0.56	1
Sleep trouble	**STR** 17.2(10.6/0.5/6.1)	**OPT** 16.1(12.3/0.8/3)	**SEL** 14.1(9.1/0.8/4.2)	**EMO** 9.4(4.9/0.6/3.9)	**ENE** 8.4(5/1.4/2)	0.25	0.38	1
Parent-reported								
Health	**ENE** 23.3(3.1/2.8/17.4)	**OPT** 17.7(3.7/0.7/13.3)	**SEL** 9.6(1.3/1.3/7)	**STR** 8.7(0.9/0.9/6.9)	**SOC** 6.5(2.3/0.8/3.4)	0.26	0.39	1
Eating habit	**ENE** 18.5(5.5/3.4/9.6)	**CRE** 12.1(4.9/0.7/6.5)	**SEL** 8.9(5.6/1.1/2.2)	**PER** 8.6(2.6/4/2)	**TOL** 7.0(0.6/0.3/6.1)	0.14	0.25	0
Physical activity	**ENE** 36.8(10.4/2.3/24.1)	**SOC** 9.1(3.2/0.9/5)	**OPT** 7.8(2.9/0.9/4)	**SEL** 7.5(1.3/2.7/3.5)	**PER** 4.9(1.9/1.6/1.4)	0.25	0.38	1
Sleep hours	**OPT** 14.0(4.1/2.9/7)	**ENE** 13.9(10.2/0.9/2.8)	**STR** 7.7(5.6/0.6/1.5)	**RES** 6.8(4.5/1/1.3)	**EMP** 6.7(2.6/3.2/0.9)	0.18	0.36	0

Note. ST= Student's rating; TC= Teacher's rating; PA= Parents' rating. SEL= Self-Control; RES= Responsibility; PER= Persistence; STR= Stress Resistance; OPT=Optimism; EMO= Emotional Control; EMP= Empathy; TRU= Trust; COO= Cooperation; TOL= Tolerance; CUR= Curiosity; CRE= Creativity; SOC= Sociability; ASS= Assertiveness; ENE= Energy.

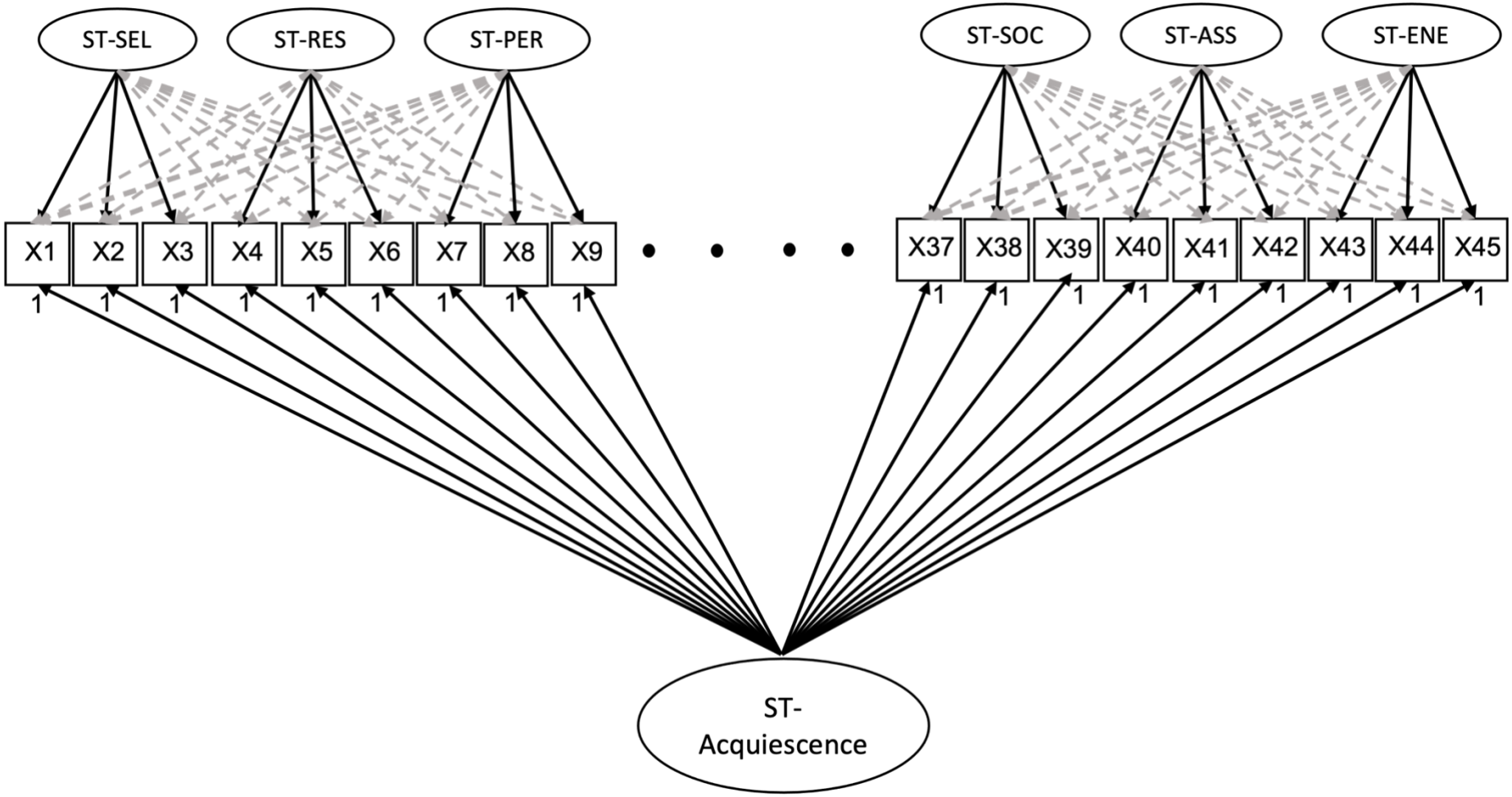
Table 9

Cohort Mean Differences on Social-Emotional Skills

	Mean difference: Old - Young												
	Average (across three raters)			Student-rated skills			Teacher-rated skills			Parent-rated skills			Hit
	d	95%CI	*p*	*d*	95%CI	*p*	*d*	95%CI	*p*	*d*	95%CI	*p*	
Task Performance													
Self-Control	.062	[-.026, .150]	.166	-.068	[-.158,.022]	.143	.047	[-.067, .161]	.416	.206	[.094, .318]	<.001	1
Responsibility	.031	[-.040, .102]	.395	.124	[.053,.195]	.001	-.067	[-.165, .031]	.179	.035	[-.085, .155]	.559	0
Persistence	-.163	[-.239, -.087]	<.001	-.264	[-.342,-.186]	<.001	-.160	[-.252, -.068]	.001	-.065	[-.179, .049]	.262	1
Emotional Regulation													
Stress Resistance	-.296	[-.372, -.220]	<.001	-.424	[-.524,-.324]	<.001	-.257	[-.349, -.165]	<.001	-.206	[-.320, -.092]	<.001	1
Optimism	-.409	[-.489, -.329]	<.001	-.434	[-.518,-.350]	<.001	-.393	[-.501, -.285]	<.001	-.399	[-.524, -.274]	<.001	1
Emotional Control	.119	[.050, .188]	.001	.027	[-.046,.100]	.471	.104	[.018, .190]	.018	.227	[.111, .343]	<.001	0
Collaboration													
Empathy	-.189	[-.277, -.101]	<.001	-.020	[-.118,.078]	.696	-.325	[-.452, -.198]	<.001	-.223	[-.343, -.103]	<.001	N/A
Trust	-.492	[-.580, -.404]	<.001	-.508	[-.586,-.430]	<.001	-.488	[-.631, -.345]	<.001	-.479	[-.587, -.371]	<.001	1
Cooperation	.040	[-.060, .140]	.438	.086	[-.030,.202]	.142	-.002	[-.120, .116]	.977	.035	[-.094, .164]	.601	1
Open-Mindedness													
Tolerance	-.023	[-.109, .063]	.602	.207	[.111,.303]	<.001	-.220	[-.342, -.098]	<.001	-.056	[-.183, .071]	.386	0
Curiosity	-.335	[-.429, -.241]	<.001	-.253	[-.343,-.163]	<.001	-.338	[-.438, -.238]	<.001	-.415	[-.556, -.274]	<.001	1
Creativity	-.245	[-.339, -.151]	<.001	-.110	[-.202,-.018]	.019	-.305	[-.409, -.201]	<.001	-.32	[-.471, -.169]	<.001	N/A
Engaging with Others													
Sociability	-.370	[-.450, -.290]	<.001	-.392	[-.470,-.314]	<.001	-.339	[-.435, -.243]	<.001	-.38	[-.519, -.241]	<.001	1
Assertiveness	.150	[.077, .223]	<.001	.379	[.297,.461]	<.001	.027	[-.059, .113]	.540	.044	[-.074, .162]	.467	N/A
Energy	-.453	[-.537, -.369]	<.001	-.546	[-.628,-.464]	<.001	-.323	[-.421, -.225]	<.001	-.49	[-.625, -.355]	<.001	1

Figure 1

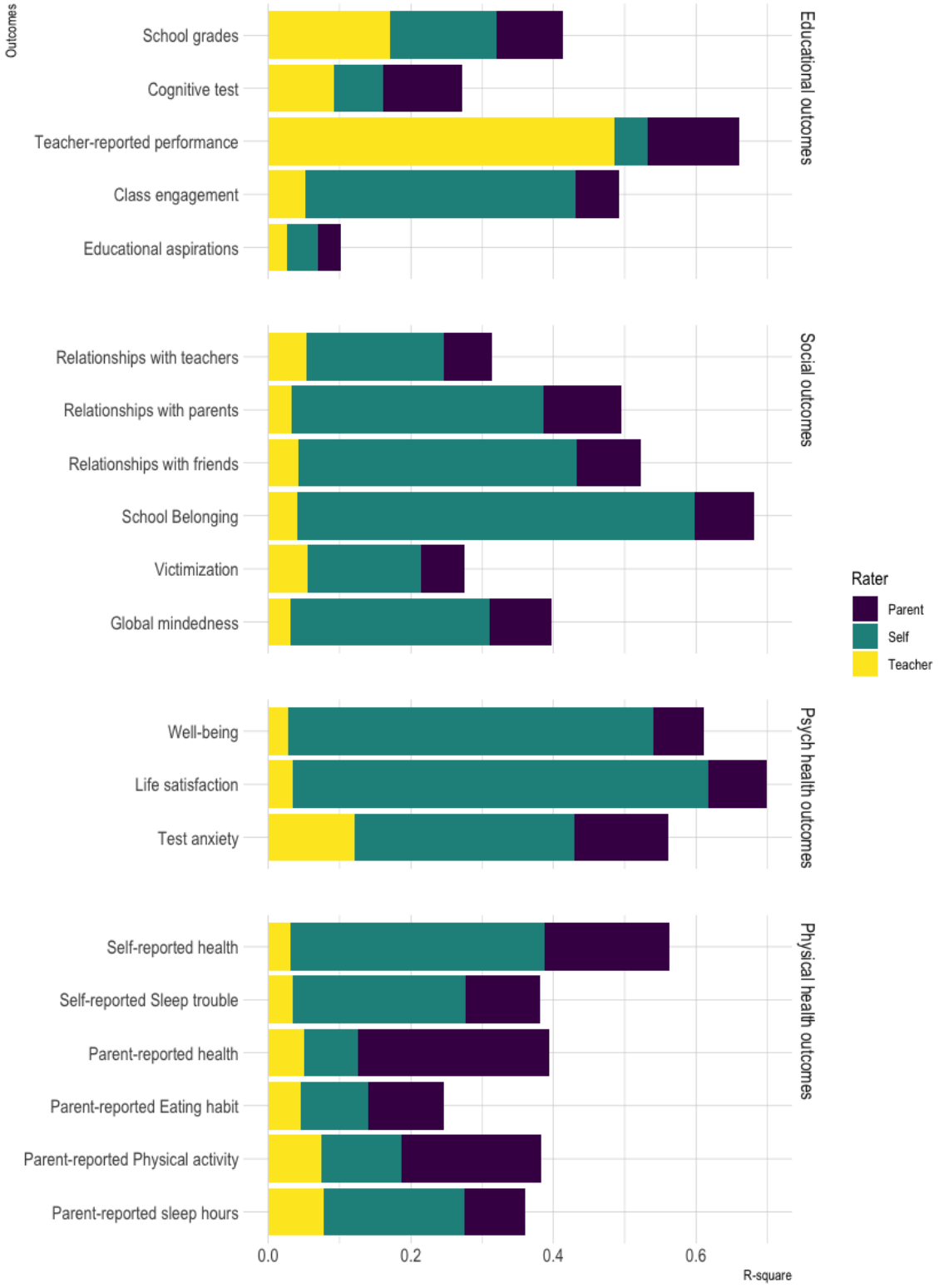
Set-ESEM Factor Structure for Student-Rated Factors



Note. ST= student-rated scales. This figure presented a Set-ESEM factor structure with an acquiescence method factor for 15 student-rated social-emotional factors (45 items). Our model also included the Set-ESEM factor structure for teacher-rated and parent-rated factors. In total, 45 factors from three informants' ratings (135 items) and three acquiescence method factors were simultaneously modeled. Note that the negatively worded items have been reversed in this study, so that the factor loadings of those items on the acquiescence method factors were fixed to -1 rather than 1 (Soto & John, 2017). SEL=Self-Control; RES = responsibility; PER=persistence; STR=stress(R); OPT= optimism; TRU=Trust; COO=collaboration; TOL=Tolerance; CUR=curiosity; CRE=creativity; SOC=sociability; ASS=assertiveness; ENE=energy.

Figure 2

Joint Predictive Effects of Three Sets of Social-Emotional Skills on 20 Outcomes



Note. The stacked bar plot was based on the model where three sets of social-emotional skills from different informants were included simultaneously (in total 45 predictors). X-axis indicates R-squared from each informant' ratings for each outcome.

Figure 3

Relative Importance of the Best Four Predictive Skills

Note. Relative importance indicates the percentages of explained variance for each outcome accounted for by the skill. X-axis indicates the relative importance (%) from each informant's ratings for each outcome.