Effects of Structural and Process Qualities on Chinese Students' Social and Emotional Skills: A Multilevel Secondary Data Analysis

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Abstract

Social and emotional skills (SES), also known as non-cognitive abilities, are crucial for both individual development and societal functioning and have long been a focus of psychological and educational research. However, compared to cognitive skills, SES has been less studied, despite its greater malleability especially in the early years. This underscores the importance of understanding the factors that influence children's SES development. Given the consistently high academic performance of Chinese students in assessments like PISA and the limited knowledge about their SES development, this study aims to explore the factors affecting SES in younger Chinese students.

While most SES research has concentrated on general SES development, leaving gaps in understanding specific SES domains or their combinations, this study examines distinct domains and sub-domains of SES. By combining self-reports with reports from parents and teachers, the study gains comprehensive insights and accounts for variations in student behaviours across different contexts. To investigate the complex interplay of individual, class, and school factors on SES development, a multilevel model was employed.

The research investigates, firstly the relationships and variances in different domains and sub-domains of SES among Chinese students, as reported by students, parents, and teachers. Secondly, it examines the multilevel factors influencing SES at the individual, class, and school levels, within the context of structural and process quality.

A multilevel secondary data analysis was conducted using the Suzhou (China) data from the Survey on Social and Emotional Skills (SSES) 2019, with a sub-sample of 3633 students, 3578 parents, 1380 teachers, and 76 principals. The study reveals distinct perceptions of students' SES across various domains and sub-domains among students, parents, and teachers. Additionally, individual-level process quality significantly influences students' SES across all five domains, more so than class-level structural and process quality and school-level structural quality. However, incorporating structural and process quality factors from individual, class, and school levels also helps explain variations in SES. For example, school-level structural quality factors such as school SES education predicted students' engagement with others, and both school activity richness and school promotion of SES predicted students' collaboration skills. Implications of the findings of the study were also discussed.

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1. Introduction

Social and emotional skills (SES), also referred to as non-cognitive abilities, have long been acknowledged as essential 21st-century competencies due to their crucial roles in fostering prosperous personal development and sustaining positive societal functioning (De Fruyt et al., 2015; OECD, 2023). Nowadays more than ever, children are growing up in an increasingly diverse and rapidly changing world, making it imperative for education systems to enhance their support for the development of SES in children (Kankaraš & Suarez-Alvarez, 2019), as success in education now relies on more than just cognitive abilities (OECD, 2021a).

The study of SES has deep roots in psychological and educational research (Kankaraš & Suarez-Alvarez, 2019). Research has shown that SES significantly impacts key life outcomes such as academic performance, career success, health, and wellbeing (OECD, 2015; Farrington et al., 2012; Kankaraš, 2017; Kautz et al., 2014). Furthermore, cultivating SES has been found to reduce anti-social and criminal behaviours within society (Heckman & Kautz, 2014). Indeed, previous studies suggested that the development of SES is as important, or even more crucial than cognitive intelligence (Author & Areepattamannil, 2016).

Despite the recognized importance of SES, there remains a notable lack of emphasis on their development compared to cognitive skills, both in practice and research. Specifically, while the development of SES is acknowledged as a key objective for schools alongside academic achievement, it is less frequently assessed (OECD, 2023). Additionally, large-scale studies, whether conducted nationally or internationally, often concentrate on cognitive skills, with the Programme for International Student Assessment (PISA) being the most notable example, which focuses on the cognitive skills of reading, mathematics, and science (OECD, 2016; OECD, 2019). In contrast, there is considerably less focus on SES in these assessments (Kankaraš & Suarez-Alvarez, 2019).

Although less studied, SES are highly malleable, even more so than cognitive skills (Cunha et al., 2010). Being so malleable, this highlights the importance of studying contextual factors in SES development since like cognitive skills, SES can be shaped by various contextual factors (Chernyshenko et al., 2018), particularly in the early years (Cunha et al., 2010). In discussions about the quality of factors involving early development and education, the framework of dividing quality into structural quality and process quality is commonly used (Slot, 2018). This framework can be helpful in organizing and understanding the complex factors that effectively promote SES.

Given these considerations, this study aimed to explore the effects of structural and process qualities on children's SES. The decision to focus on Chinese children stemmed from

their consistently high performance in cognitive skills, as evidenced by PISA rankings (OECD, 2019), while there remains limited knowledge about their SES development (OECD, 2022). This highlights the need for a deeper understanding of the factors influencing SES in the Chinese context. The structure of SES was adapted from the Big Five Model of SES chosen since it is the most well-established framework with wide acceptance and a strong empirical foundation (John et al., 2008). Although extensively used, most research employing this model focuses on the overarching Big Five dimensions, leaving uncertainty about specific SES or their combinations (Kankaraš & Suarez-Alvarez, 2019). Therefore, specific domains and sub-domains of SES were examined in this study.

In addition to the focus on domains and sub-domains of SES, the study also aimed to compare the perceptions of children's SES from different reporters and analyse the factors influencing SES in a multilevel manner. Specifically, while self-reports are commonly used and tend to closely approximate objective measures (Connelly & Ones, 2010), integrating self-reports with other reports can provide complementary insights, since the integration can correct for measurement errors (Connelly & Ones, 2010) and account for variations in student behaviours across different settings, such as home with parents versus at school with teachers (Kankaraš, 2023). However, only a limited number of studies integrate perspectives from teachers, parents, and students (Kankaraš et al., 2019). Furthermore, since SES development can be influenced by a complex interplay of individual, class and school factors (Chernyshenko et al., 2018), using a multilevel model to investigate these factors can enhance understanding of how they interact and contribute to SES development.

To address the research aims and focus, a secondary data analysis was conducted using data from the Survey on Social and Emotional Skills (SSES) 2019. This dataset is well-suited for this study as it represents the first significant international effort to rigorously assess students' SES, including specific domains and sub-domains (OECD, 2021a). It encompasses data reported by different sources, enabling comparisons between reporters, and features a hierarchical data structure suitable for multilevel analysis.

To summarize, this study aimed to explore how different factors influence Chinese children's social and emotional skills (SES) through secondary data analysis. It advanced previous research by categorizing the factors affecting SES development within both structural and process quality frameworks and across multiple levels of individual, class, and school, comparing perceptions of children's SES from various reporters, and analysing key factors influencing specific domains and sub-domains of SES. By doing so, this research seeks to provide insights into the characteristics and practices that foster or hinder SES development,

therefore establishing an empirical foundation to inform policies and interventions, contributing to the promotion of more effective educational programs that support the holistic wellbeing of children.

Unfolding into five chapters, this dissertation starts with this chapter introducing the research background, aims, methodology, and contributions. Chapter 2 presents a literature review, defining and structuring SES, exploring the perceptual differences of SES among various reporters and the structural and process quality influencing SES, identifying gaps in the literature, and proposing the theoretical framework for this study. Chapter 3 details the methodological approach, beginning with research questions and hypotheses, followed by the research sample, analytical approach, measurements used for analysis, analytical procedures, and ethical considerations. Chapter 4 reports the statistical findings, starting with descriptive statistics of SES across different levels and reporters, followed by the results related to the research questions. Finally, chapter 5 discusses the key findings, along with the limitations and implications of this study.

2. Literature Review

To contextualize the research, identify gaps in existing literature, and develop a theoretical framework for formulating research questions and hypotheses, as well as to inform the research design (Boote & Beile, 2005), a literature review on social and emotional skills (SES) was conducted on. This review starts with defining and structuring SES, followed by examining how these skills are perceived by different reporters, therefore exploring the relationships between these perceptual differences. Subsequently, the review explores the influential factors of SES, framed within the concepts of structural and process quality. Following this analysis, the research identifies context of the study and existing gaps in the literature. Finally, the theoretical framework, research questions, and hypotheses are presented.

2.1 Definition and Structure of SES

In the field of education, the term 'social and emotional skills' (SES) refers to the development of non-cognitive or non-academic skills, behaviours, and attitudes (Lippman et al., 2015). Despite the variation in terminology, these terms all refer to the same conceptual domain (OECD, 2021a, p. 20), the individual abilities expressed through thoughts, emotions, and behaviours that can evolve over a lifetime and lead to significant outcomes (Kankaraš & Suarez-Alvarez, 2019).

2.1.1 The Definition of SES

This study adopted the SES concept from the Organisation for Economic Cooperation and Development (OECD), defining these skills as individual abilities that (a) are demonstrated through consistent patterns of thinking, feeling, and behaving, (b) can be cultivated through both formal and informal learning experiences, and (c) significantly influence socio-economic outcomes throughout one's life (OECD, 2015, p. 35).

2.1.2 The Structure of SES

Since research has indicated that personality traits can be structured hierarchically, with higher-level traits dividing into lower-level ones (Markon, 2009), SES, as a subset of personality characteristics (Kankaraš, 2017), also benefit from a hierarchal approach in research. There are empirical overlaps among different SES frameworks (Primi et al., 2016), and the Big Five Model not only aligns with the hierarchical structure but also serves as the most well-established framework in this field (John et al., 2008). This model is also replicable across various countries and cultures (McCrae & Terracciano, 2005) and applicable to school-age children (De Fruyt & De Clercq, 2014).

Despite the widespread acceptance of the Big Five Model, there are varied perspectives on the lower-order structure within the Big Five domains (Primi et al., 2016). This study

utilized the OECD framework (OECD, 2021b, p. 17) to classify the domains and sub-domains of SES from the Big Five Model, focusing on criteria such as reliability, validity, and cross-cultural comparability (Kankaraš, 2023). The selected skills, which have been extensively studied in both academic research and practical applications, are conceptually consistent across various cultures and countries (Kankaraš, 2023).

Figure 1

The Domains and Sub-Domains of SES

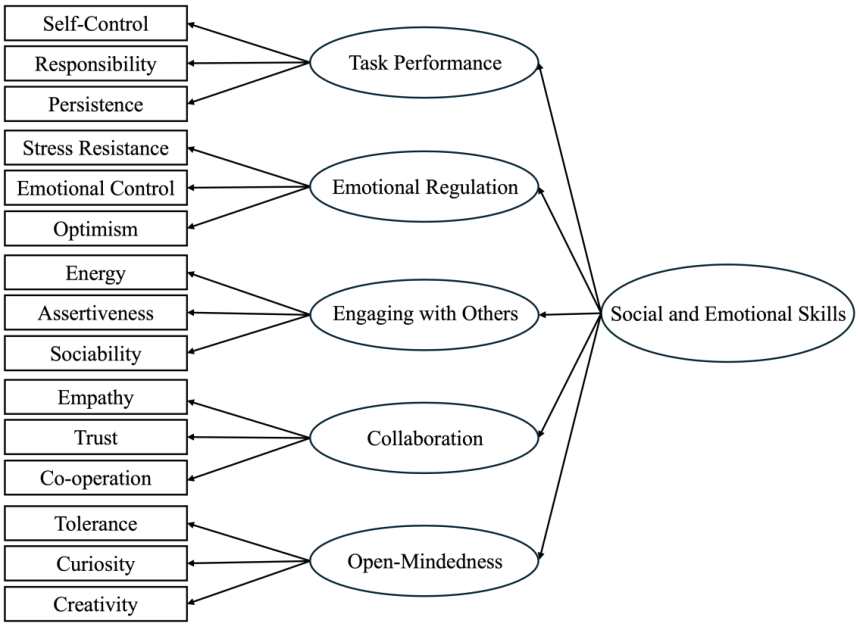


Table 1

Definitions of Each Domain and Sub-Domain of SES

(Sub)Domain	Definition
Task Performance	Completing tasks as required and within deadlines
Self-Control	Managing impulses, delaying gratification, and sustaining focus
Responsibility	Keeping promises and commitments to others
Persistence	Continuously working on tasks without being easily distracted
Emotional Regulation	Exhibiting a calm and positive emotional manner
Stress Resistance	Managing anxiety and responding effectively to stress
Emotional Control	Maintaining control over one's emotions and temper
Optimism	Holding positive expectations for oneself and life in general
Engaging with Others	Thriving and excelling in social interactions
Energy	Maintaining high levels of activity and vigor throughout the day
Assertiveness	Taking pleasure in leadership roles and assertive behaviors
Sociability	Social interactions and engagements
Collaboration	Caring for others' wellbeing
Empathy	Understanding others' perspectives and caring for their wellbeing
Trust	Believing that others generally have good intentions
Co-operation	Getting along harmoniously with others
Open-Mindedness	Exploring various ideas and experiences
Tolerance	Being receptive to diverse perspectives and valuing diversity
Curiosity	Strong interest in ideas, learning, and intellectual exploration
Creativity	Creating original ideas or products

The domains and sub-domains of SES from the Big Five Model are presented in Figure 1. The 15 lower-order constructs (sub-domains) are positioned on the left and comprise 5 higher-order constructs (domains). These 5 higher-order constructs are subsequently grouped under an overarching 'umbrella-concept' construct (SES). The definitions of each domain and sub-domain are shown in Table 1 (Kankaraš & Suarez-Alvarez, 2019).

2.2 Perceptions of SES from Different Reporters

After defining SES and its domains and sub-domains, it is also essential to consider the perceptions of SES from different reporters. This is because integrating perspectives from different reporters can not only correct measurement errors (Connelly & Ones, 2010) but also account for variations in student behaviour when observed by different reporters (Kankaraš, 2023).

2.2.1 The Role of Multiple Reporters in Assessing SES

To begin with, while self-report questionnaires are widely used, they have certain limitations. These questionnaires, where participants provide information about themselves rather than using external sources (Gonyea, 2005), can often approximate objective measures (Connelly & Ones, 2010). Indeed, individuals usually respond to questionnaires reasonably and characterize the behaviour as intended (Krosnick, 1999). However, relying solely on self-reports can lead to a significant rater effect, which refers to the bias and influence the rater has on the assessments they provide (Stanger & Lewis, 1993). Ratings provided by others are also susceptible to challenges such as limited knowledge and memory bias (Connelly & Ones, 2010). Although alternative methods to questionnaires exist, such as performance tasks and behavioural observations (Kankaraš, 2023), each has its own limitations that restrict their widespread adoption for assessing SES (Duckworth & Yeager, 2015). In contrast, questionnaires and scales facilitate quick and efficient administration across numerous respondents and settings, making them the most used tools for evaluating psychological traits (Kankaraš, 2023).

Therefore, employing multiple reports from questionnaires or scales may represent the most effective approach to studying SES. Specifically, integrating self-reports with other reports can provide a more thorough assessment, addressing specific measurement issues (Connelly & Ones, 2010) and enhancing the validity of self-reports and other reports (Liu et al., 2022). Additionally, this method can increase the reliability of the reports from different raters. Since students may act differently across various settings, which reporters cannot fully observe, combining multiple reports helps to improve the accuracy of the assessments (Renk & Phares, 2004).

2.2.2 Utilization of Self-Report, Parent-Report, and Teacher-Report

When studying children's SES, it is valuable to integrate reports from both parents and teachers with the self-reports from children, considering the significant roles parents and teachers play in children's SES development.

Firstly, parents' insights are particularly valuable during childhood due to their close relationships and continuous access to their children's growth and development over time (Kankaraš & Suarez-Alvarez, 2019). However, research reveals discrepancies in whether children's and parents' perceptions differ. Specifically, one study indicates small differences in how personality traits are perceived by parents and children ($r = .58$, $p < .05$; Göllner et al., 2016), while others suggest that children often view their behaviours more positively than their parents do (Newgent et al., 2009). This disagreement can be attributed to children's age, as the gap between children's and parents' perceptions tends to widen during adolescence (Göllner et al., 2016). Moreover, children can behave differently in different contexts, which may lead to varied observations of children's behaviours (Marsh & Byrne, 1993; Kankaraš, 2023). Therefore, it is important to examine these perceptual differences across various domains and sub-domains.

In addition to the importance of parents' perceptions, teachers' reports provide another essential perspective on students' SES. To be specific, teachers' extensive experience with numerous students allows them to assess students' SES more comparatively than caregivers in the home environment (Kankaraš & Suarez-Alvarez, 2019). Furthermore, because teachers observe students in a structured classroom setting, they have more opportunities to notice some specific skills (Kankaraš, 2023). Research also indicates that teachers' assessments can predict various student behaviours across different age groups (Segal, 2012), therefore complementing students' self-report and enhancing the overall predictive value (MacCann et al., 2010).

Similar to the relationship between children's and parents' reports, there can be differences between students' and teachers' perceptions of SES. While research shows that teachers and students often rate students' SES similarly for most SES, discrepancies can arise in areas such as self-management skills (Tsolou & Margaritis, 2013). Therefore, examining the perceptual differences between students and teachers across different SES domains and sub-domains is important in better understanding its multidimensional nature.

To summarize, given the importance of combining self-reports, parent-reports, and teacher-reports in assessing SES, and the relatively limited focus on comparing these perspectives across specific domains and sub-domains of SES, it is crucial for research to

explore the relationships between students', parents', and teachers' reports on students' SES in specific dimensions.

2.3 Structural and Process Quality in SES

Following the discussion on the definition, structure, and perceptual differences of SES, attention shifted to the contextual factors that can influence SES. SES are found to be shaped by various contextual factors (Chernyshenko et al., 2018). These factors were examined within the framework of structural and process quality, a model frequently employed to evaluate quality in early education settings (Slot, 2018). This framework aids in organizing and understanding the complex factors that effectively influence SES.

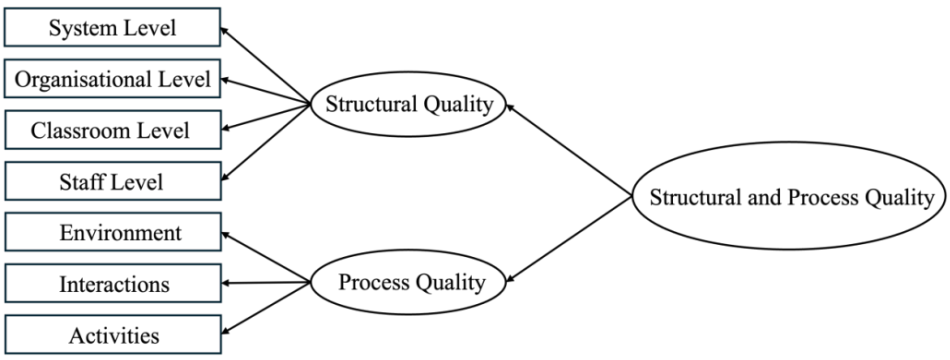
2.3.1 The Model of Structural Quality and Process Quality

In educational quality assessment, a common distinction is made between structural quality and process (NICHD Early Child Care Research Network, 2002). Structural quality refers to more distant factors in the educational environment, such as teachers' qualifications and class size (Early et al., 2007), which are often influenced by policy and legislation (Slot, 2018). In contrast, process quality involves the more immediate experiences of children (Slot, 2018) and is closely related to their development (Bigras et al., 2009).

Structural quality and process quality can be further divided into several levels. This study employed the conceptual framework proposed by Slot (2018) for structural quality, which was developed through a comprehensive literature review. This framework categorizes structural quality into system level, organisational level, classroom level, and staff level. Regarding process quality, there is a widespread consensus on the core elements of process quality (Lamb & Ahnert, 2007), which are typically classified into environment, interactions, and activities (Cryer et al., 2002). The application of the structural quality and process quality model (see Figure 2) facilitates the organisation of the complex factors influencing SES.

Figure 2

The Structural and Process Quality Model in this Study



2.3.2 Structural Quality in SES

The factors of SES categorized under structural quality are examined first. These factors are discussed sequentially at the system, organisational, classroom, and staff levels.

2.3.2.1 The System Level

At the system level of structural quality, improvement systems and quality ratings were identified as effective components (Slot, 2018). When these factors are considered in the context of SES, SES promotion and evaluation can serve as a structural quality measure at the system level to enhance SES development. Specifically, research indicates that SES training in schools is effective not only in elementary schools ($F(4, 2252) = 3.71$, $P < .005$; Kimber et al., 2008) but also in secondary schools (Cohen's $d = .579$, $p < .05$; Sande et al., 2019). Beyond immediate benefits, SES promotion has been shown to have long-term positive effects ($U = 1936.5$; $p = .03$; Moreira et al., 2014). Additionally, establishing SES promotion as a school aim (OECD, 2023) and incorporating specific SES curricula (Restad & Mølstad, 2020) have also been linked to positive outcomes for students (Richard Albrecht & Brunner, 2019; $ES = .241$, $p < .05$, Yang et al., 2018). However, some research suggests that the benefits of SES curricula may be limited (Wallender et al., 2020), possibly due to variations between specific schools, which this research can further explore. Furthermore, the evaluation of SES as a general school practice has been found to positively influence students' SES development (OECD, 2023) and inform policy and practice changes within schools (OECD, 2013).

2.3.2.2 The Organisational Level

At the organisational level of structural quality, evidence is relatively limited, though organisational climate and conditions have been identified as effective elements (Slot, 2018). In the context of SES, several school organisational factors have been analysed in previous research. To be specific, SES activities, which are varied, can have different impacts on students' SES development, such as art activities (Blatt-Gross, 2010) and physical activities (Morales et al., 2016; Lubans, 2012). In addition to the richness of school activities, diversity in SES education has also been found to be important (Murray-Larrier & NCSC, 2021).

2.3.2.3 The Classroom Level

At the classroom level of structural quality, group size or child-staff ratio has been identified as having a significant impact (Slot, 2018). In the context of SES, the effects of class size appear to be mixed. Specifically, research generally suggests that smaller class sizes positively influence students' SES development, such as improving interpersonal skills (Konstantopoulos & Shen, 2023). Some research indicates that class size can affect the relationship between bullying behaviour and the SES-related skill of self-esteem ($\beta = -.74$, p

< .05, Coelho & Sousa, 2021). However, other research suggests that class size does not significantly impact the occurrence of students' SES problems (r = -.03, p < .05; Boyesen & Bru, 1999). This discrepancy in the effect of class size may be due to the different roles it plays in various domains of SES, which requires further exploration. In addition to class size, the promotion, evaluation, and feedback on SES within the classroom are also of great importance. Research has shown that teachers are crucial in promoting SES (Jones et al., 2018) and in providing tailored evaluation and feedback to students within classrooms (OECD, 2021c). Further studies are needed to examine the specific domains and conditions under which these classroom SES initiatives most effectively contribute to SES development.

2.3.2.4 The Staff Level

At the staff level of structural quality, pre-service and professional development have been revealed as effective (Slot, 2018). Considering these factors in SES development, teachers' educational level and SES training can serve as important factors. To be specific, research has shown that training teachers have a significant impact on students' SES development (Alvarez, 2007). Beyond the direct effect on students, teachers' training also indirectly enhances the quality of programs designed to promote SES. Research has found that effective SES programs frequently include a component focused on teacher training (Oliveira et al., 2021). These findings underscore the crucial role of teacher's education and training in fostering students' SES development.

To summarize, when considering the factors that influence SES within the framework of structural quality, key elements include SES promotion and evaluation at the system level, the school organisation at the organisational level, classroom SES initiatives at the classroom level, and teacher qualifications and training at the staff level. Each of these factors plays a crucial role in their perspective domains.

2.3.3 Process Quality in SES

Following the examination of factors under structural quality, the influential factors of SES within the framework of process quality were analysed. These factors are discussed sequentially across the domains of the environment, interactions, and activities.

2.3.3.1 The Domain of Environment

In the process quality domain of environment, the individual's internal environment, perceived school environment, and home and extracurricular environment can serve as effective factors. For the internal environment, research has shown that some SES like task performance and emotional regulation are significantly correlated with students' subjective psychological wellbeing (Strickhouser & Zell, 2017). Meanwhile, other aspects of SES, such

as tolerance, are closely related to global mindedness (Guo et al., 2023). Additionally, a growth mindset regarding SES (Huang et al., 2023) can be identified as an internal environmental factor that can enhance students' SES development. Therefore, students' subjective wellbeing, global mindedness, and growth mindset about SES, may serve as important influential factors in developing different SES skills. For the perceived school environment, studies have shown that a positive school climate is associated with improved student performance and reduced SES difficulties (Wang & Degol, 2016). Moreover, the sense of belonging within a school has also been identified as a crucial determinant of positive SES outcomes (Korpershoek et al., 2019). Furthermore, students' lower levels of anxiety experienced at school have been found to be positively linked to their better SES (Magelinskaitė et al., 2014). As a result, students' perceptions of school climate, school belonging, and school anxiety levels are significant factors influencing their SES development. For home and extracurricular environments, research has shown a positive association between the home literacy environment and emotional regulation (Jia-Lin et al., 2023), a component of SES. Furthermore, the richness of the extracurricular environment has also been found to significantly promote students' SES (Farb & Matjasko, 2012; OECD, 2015; OECE, 2023). These findings indicate the critical role that both home and extracurricular environments play in developing children's SES.

2.3.3.2 The Domain of Interactions

In the process quality domain of interactions, students' relationships and interactions with friends, parents, teachers, and their surroundings can significantly influence the development of their SES. Research has found that friendships can facilitate the growth of SES from childhood through adolescence (Parker & Gottman, 1989). Beyond friendships, children's interactions and relations with parents serve as another important role. It has been found that a nurturing family and warm parental relationship can provide engaging activities that help improve children's SES (Cunha et al., 2010; Frosch et al., 2019; Tang et al., 2023). Regarding the relationship between teachers and students, although research has established a positive correlation between the quality of teacher-student relationships and students' SES (Poulou, 2015), discrepancies exist in perceptions of these relationships between teachers and students (Poulou, 2016). Both parties recognize that conflicts can hinder SES development, but they also interpret these difficulties differently (Poulou, 2017). This highlights the need to consider both teacher and student perspectives when assessing the impact of teacher-student relationships on SES. In addition to the specific relationship with friends, parents, and teachers, research indicates that maintaining close relationships with others generally supports the

development of SES, like emotion regulation (English et al., 2013), which this study aims to further explore.

2.3.3.3 The Domain of Activities

In the process quality domain of activities, class activity atmosphere and the implementation of active learning pedagogy are significant factors influencing students' SES development. Studies have demonstrated that a positive classroom activity atmosphere fosters the development of students' SES, both in early childhood (Rocío García-Peinado, 2023) and secondary school (Ahmeda, 2020). Conversely, other research indicates that SES can predict the quality of the class activity atmosphere (LeGrand, 2023), which possibly suggests a reciprocal relationship between these two variables. Moreover, Ahmeda (2020) further highlighted that a positive classroom atmosphere serves as a crucial context for interactions, indirectly promoting the development of SES. In addition to the class activity atmosphere, active learning teaching methods have been identified as particularly effective in cultivating students' SES (OECD, 2018). These findings underscore the importance of fostering a conducive class activity atmosphere and utilizing active learning strategies to support the development of students' SES.

To summarize, within the framework of process quality, several key factors influence SES development. These factors include the individual's internal environment, the perceived school environment, and the home and extracurricular environment within the domain of the environment. In the domain of interactions, significant elements are social relationships which include the relationships and interactions students have with friends, parents, teachers, and their surroundings. Lastly, in the domain of activities, the classroom dynamics, which include the atmosphere of class activities and the use of active learning pedagogy, are crucial components.

2.4 Context of the Study

The study's context is important because research indicates that SES can be influenced by cultural contexts (Chen & French, 2008). This study examined SES development among Chinese children, focusing on China due to its consistently high performance in cognitive skills as shown in PISA rankings (OECD, 2019), while knowledge about SES development in this context remains limited (OECD, 2022). The study targeted younger children because SES are particularly malleable during the early years (Cunha et al., 2010) and does not follow a consistent upward trajectory like academic learning (OECD, 2021a). Therefore, investigating SES development in younger students within the Chinese context is essential.

Moreover, research has shown that the Chinese government has integrated SES development into the national curriculum (OECD, 2022). Suzhou, a city in Jiangsu province

known for its strong performance in PISA studies (OECD, 2019), also offers additional support for students' SES (OECD, 2022). Consequently, Suzhou is an ideal area for this study.

Despite the global consensus on the significance of SES (De Fruyt et al., 2015), studies revealed differing values regarding SES in Chinese and Western contexts (Chen et al., 2006). While Western individualistic cultures prioritize self-reliance and assertive skills, these traits are less valued in the Chinese, group-oriented society, which prioritizes harmony and cohesion (Chen et al., 2006). Therefore, this study aims to provide a culturally specific perspective on children's SES development by focusing on the context of Suzhou, China.

2.5 Gaps in the Literature

A review of the existing literature reveals several critical research gaps in the study of SES, particularly within the context of China. Firstly, there is a discernible imbalance in the focus of research, with cognitive skills receiving significantly more attention than SES, especially in Chinese educational research (OECD, 2022). Additionally, existing studies that address SES often treat it as a broad category without exploring the specific domains of SES or the interactions among them (Kankaraš & Suarez-Alvarez, 2019).

Moreover, previous research methodologies have predominantly relied on single-perspective approaches, typically using self-reports to measure SES development. This is despite the limitations of self-reporting (Stanger & Lewis, 1993) and the benefits of utilizing multiple perspectives, including those of teachers, parents, and students (Connelly & Ones, 2010; Liu et al., 2022; Renk & Phares, 2004). There is limited research exploring how these different groups perceive and report on students' SES, as well as the potential discrepancies in these perceptions (Göllner et al., 2016; Newgent et al., 2009). Additionally, the existing literature does not adequately address which specific domains of SES are subject to perceptual differences (Tsolou & Margaritis, 2013). These gaps highlight the need for further investigation into the relationship and variances among students', parents', and teachers' reports on SES across distinct dimensions.

In terms of predictors of SES, the literature has largely focused on examining one or two variables in isolation, with only a limited number of studies employing multilevel modelling to assess the impact of multiple predictors simultaneously. Furthermore, there is also debate regarding the influence of specific factors on SES development, including the effectiveness of SES curricula (Restad & Mølstad, 2020; Wallender et al., 2020), class size (Coelho & Sousa, 2021; Boyesen & Bru, 1999), perceptions of teacher-student relationships (Poulou, 2016), and the classroom activity atmosphere (Ahmeda, 2020; LeGrand, 2023). These

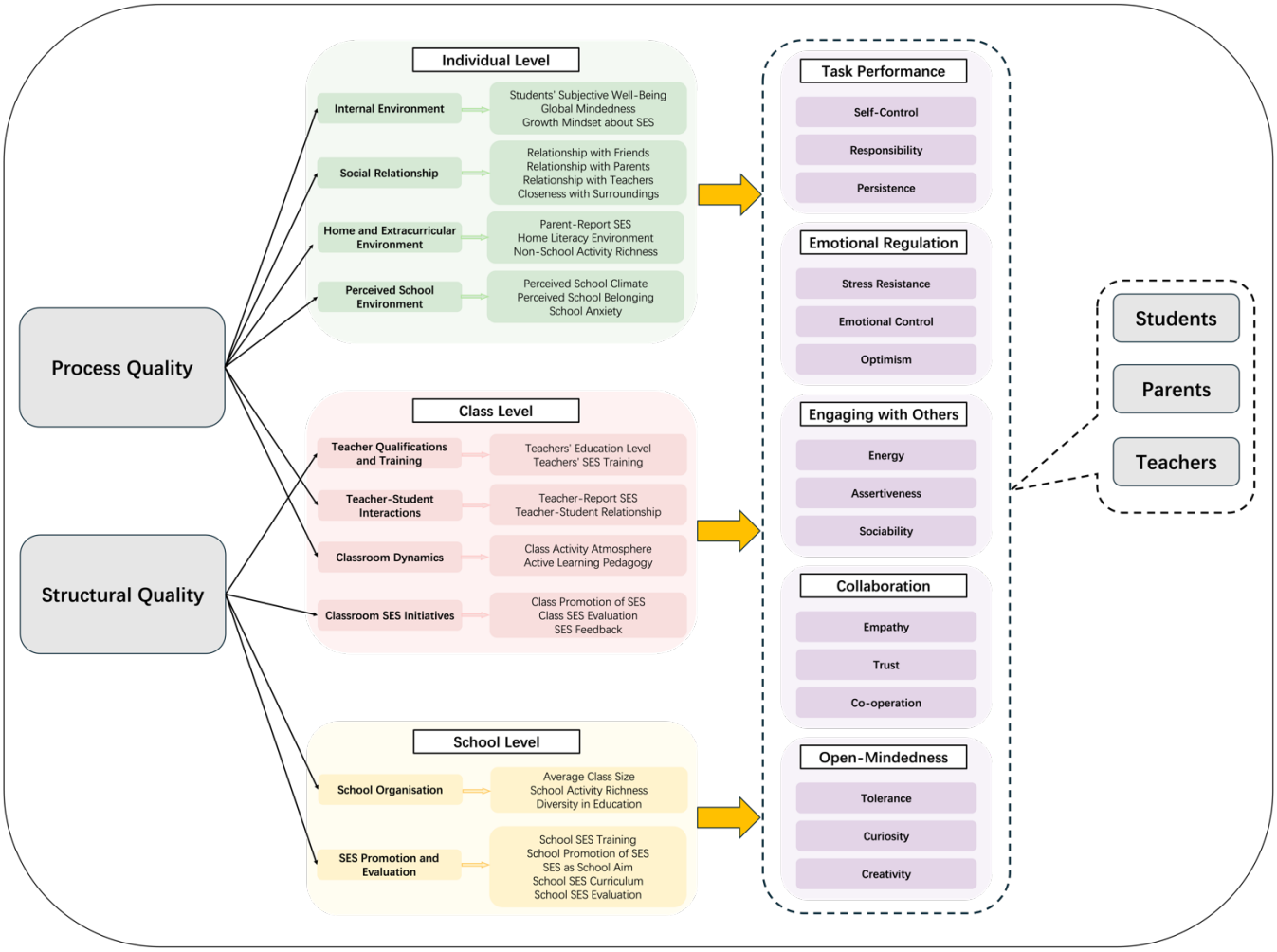
inconsistencies in the literature point to the need to examine how different structural and process quality predictors influence various domains of SES in diverse contexts.

2.6 Theoretical Framework in this Study

Building on previous research and addressing identified research gaps, this study proposed a theoretical model designed to meet the research aim. The model explored the relationships and discrepancies in SES as reported by students, parents, and teachers, considering distinct dimensions and sub-dimensions of SES. It also examined various multilevel influential factors of SES at the individual, class, and school levels, within the context of structural and process quality.

Figure 3

Theoretical Framework of this Study



Note. Class Size was replaced by Average Class Size in the final model since the original dataset did not report class size. Therefore, it was categorized under School Organisation.

As depicted in Figure 3, factors within the framework of structural quality were categorized into school-level (SES promotion and evaluation, school organisation) and class-level (classroom SES initiatives, teacher qualifications and training) influences. Process quality factors were categorized into individual-level (individual's internal environment, perceived school environment, home and extracurricular environment, social relationships) and class-level (classroom dynamics, teacher-student interactions) influences. Notably, since there remain discrepancies in how teachers and students perceive their relationships (Poulou, 2016), this model also accounted for differences in perceptions of student-teacher relationships between students and teachers, with teacher-perceived student-teacher relationships specifically noted at the teacher-student interactions at the class level. Furthermore, given the evidence of differing perceptions of SES among students, parents, and teachers, the model incorporates parent-report and teacher-report SES. These were considered within the contexts of the home and extracurricular environment and teacher-student interactions, respectively.

3. Methodology

In this chapter, the methodological approach unfolds in six sections. It starts with the research questions and hypotheses of this research. Then, to answer the research question, the research sample is addressed first, followed by the analytical approach. After that, the measurements adopted for analysis are explained. The next section outlines the analytical procedures in this study. Finally, the ethical considerations involved in this study are presented.

3.1 Research Questions and Hypotheses

Based on previous research and identified gaps in the literature, the following research questions and corresponding hypotheses were proposed.

Research Question 1: What are the correlations and differences in the perceptions of students' social and emotional skills among students, parents, and teachers?

For the first research question, four hypotheses were formulated based on the previous research, labelled H1, H2, H3, and H4: Firstly, the different domains of SES will have a strong positive correlation with each other within students' self-perceptions, parents' perceptions, and teachers' perceptions, respectively (H1; Kankaraš et al., 2019). Secondly, students', parents', and teachers' perceptions of SES will have a moderate correlation with each other across the five domains (H2; Marsh, 2008). Thirdly, the different domains of SES will differ within students' self-perceptions, parents' perceptions, and teachers' perceptions, respectively (H3; OECD, 2021b). Finally, students', parents', and teachers' perceptions of SES will differ from each other across the five domains (H4; Newgent et al., 2009; Tsolou & Margaritis, 2013).

Research Question 2: To what extent do individual, class, and school-level process and structural quality predict students' social and emotional skills in the five domains?

For the second research question, the hypotheses based on the previous research were as follows which are labelled H5, H6, and H7. At the individual-level process quality, internal environment (see in section 2.3.3.1), positive social relationships (see in section 2.3.3.2), positive perceived school environment (see in section 2.3.3.1), and positive home and extracurricular environment (see in section 2.3.3.1) will positively predict students' social and emotional development in the five domains (H5). For the class-level structural and process quality, teacher qualifications and training (see in section 2.3.2.4), positive teacher-student interactions (see in section 2.3.3.2), positive classroom dynamics (see in section 2.3.3.3), and classroom SES initiatives (see in section 2.3.2.3) will positively predict students' social and emotional development in the five domains (H6). For the school-level structural quality, a positive school organisation (see in section 2.3.2.2) and SES promotion and evaluation (see in section 2.3.2.1) will positively predict students' social and emotional development (H7).

3.2 The Sample

The data utilized in this study was obtained from the first round of the Survey on Social and Emotional Skills (SSES) conducted by the Organisation for Economic Co-operation and Development (OECD) in 2019. It is a comprehensive, international, multidisciplinary, age-based survey that measures the characteristics and practises involved in the development of SES in children aged 10 and 15 (OECD, 2021a, p. 18).

The SES in this survey were measured by a psychometrically sound tool tailored under a rigorous instrument development process (Kankaraš, 2023, p. 4). It collected reports from students, parents, and teachers from 10 cities worldwide using 45 scales to assess students' 15 SES, which were categorized into 5 broad domains (OECD, 2021a, p. 18). Besides students' SES, contextual information about students' socio-demographic background, peers, family, school, and community environment was also assessed through questionnaires reported by students, parents, teachers, and principals.

The following section will first introduce the sample design of SSES 2019, followed by the recruitment of SSES 2019. After that, the extracted analytic sample drawn from SSES 2019 utilized in this study will be explicated.

3.2.1 Sample Design

The target student populations in SSES 2019 were age 10 and age 15 student cohorts in the 10 cities selected worldwide (see in Table 2). The older student cohort included students aged between 15 years and 3 months and 16 years and 2 months when the survey began, and the younger cohort consisted of students aged between 10 years and 3 months and 11 years and 2 months (OECD, 2021b, p. 34-35). In addition to students, the target populations in this study included their parents, teachers, and school principals.

Table 2

The Target Population and Sample of Students in SSES 2019

City	Population		Sample		Student Age	
	School	Student	School	Student	M	SD
Bogota	1685	98144	87	3415	10.92	.54
Daegu	229	20421	77	3008	10.97	.36
Helsinki	94	5348	83	3034	10.73	.49
Houston	207	15770	74	3333	10.86	.65
Manizales	85	3898	83	3226	10.95	.60
Moscow	644	104366	77	3363	10.89	.44
Ottawa	229	11040	89	3250	10.88	.43
Sintra	52	3473	48	2224	10.90	.41
Suzhou	387	103049	76	3633	10.85	.69
Istanbul	3074	220500	91	2701	10.94	.52

Note. The average and standard deviation of the students' age at the time of administration.

A two-stage stratified cluster sampling design was adopted for each student cohort, with schools sampled at the first stage and students within those sampled schools at the second stage. The sampling method combined a probability proportional to size (PPS) sampling and an equal probability sampling (OECD, 2021b, p. 37). The target student sample size in each city was a minimum of 3000 students from 75 schools (OECD, 2021b, p. 39).

3.2.2 Recruitment

To assure the representation quality of the populations, population exclusions were first determined at the school level and within-school level for each of the cities (OECD, 2021b, p. 35) and were expected to be under 5% of the targeted population (OECD, 2021b, p. 39). After that, the sampling frame was formed based on the list of schools provided by each city, which included unique school identification numbers and the number of eligible students within each school for drawing the sample (OECD, 2021b, p. 37). At the first sampling stage, PPS sampling was adopted based on stratification variables and the enrolment size of the schools (OECD, 2021b, p. 38). At the second sampling stage, eligible students were selected from those sampled schools with equal probability (OECD, 2021b, p. 39). After the selection of sampled student participants, one parent, one nominated teacher, and the school principal of each sampled student were then invited to participate in the survey.

Overall, the SSES 2019 datasets included a total of 31205 sampled students for the age 10 group and a total of 29805 sampled students for the age 15 group. For the younger cohort, the sample consisted of 31205 students, 18229 parents, 6346 teachers, and 719 principals. For the older cohort, the sample consisted of 29805 students, 16421 parents, 7552 teachers, and 576 principals.

3.2.3 Extracted Analytic Sample in this Study

Since SSES 2019 corresponds with the requirements of this study in consisting of SES assessed by students themselves, parents, and teachers, as well as including comprehensive contextual factors in the development of SES, this study took advantage of the SSES dataset conducted in 2019. Given that SES are particularly malleable during the early years (Cunha et al., 2010) and that their development does not follow a consistent upward trajectory like academic learning (OECD, 2021a), it is crucial to examine SES development in younger students. Consequently, the sample selection criteria focused on data from the younger cohort in Suzhou City, China.

The population exclusion rate of the younger cohort in Suzhou is 0.42% (OECD, 2021b, p. 103) and this target population contains 387 schools and 10349 students in total (OECD, 2021b, p. 105). The response rates for students, parents, teachers, and principals were 96.5%,

95.4%, 96.4%, and 98.7% respectively (OECD, 2021b, p.102; p. 110; p.111; p.112). The extracted sample analysed in this study includes data reported by 3633 students, 3578 parents, 1380 teachers, and 76 principals. The average age of students in this sample students is 10.7.

3.3 Analytical Approach: Secondary Data Analysis

The analytical approach of this research is secondary data analysis since it utilized SSES 2019 data collected by OECD to analyse the perceptions and predictors of SES across reporters and levels, which fell into the definition of secondary data analysis as using existing data that were collected by others for creative analytical purposes (Kiecolt & Nathan, 1985, p. 10). Before conducting research involving secondary data analysis, it is important to be aware of both the advantages and disadvantages associated with this approach.

3.3.1 Advantages of Secondary Data Analysis

Secondary data analysis offers many advantages, making it valuable across various disciplines (Trzesniewski et al., 2011, p. 13). One of the most important advantages is that it tends to include more individuals or entities and tends to represent a larger population and a wide variety of subjects (Vartanian, 2010, p. 13). This is true with SSES 2019 data since the target population and the sample size are large and highly representative, which can add to the power of this research (Field et al, 2012, p. 871). Additionally, secondary data analysis can provide researchers with access to rich information and address research questions different from those for which the data were originally collected (Vartanian, 2010, p. 3). Indeed, SSES 2019 datasets provide extensive information on various SES domains and comprehensive contextual factors. These resources support secondary data analysis and offer insights that are challenging to obtain through alternative approaches. Therefore, using secondary data approaches allows researchers to access datasets that are often of the highest quality.

3.3.2 Disadvantages of Secondary Data Analysis

Admittedly, despite the advantages of secondary data analysis, there are also some limitations of this analytical approach. One primary criticism of using secondary data is the potential for misunderstanding the dataset. It is sometimes very complicated and time-consuming for the researchers to fully understand the dataset collected by others (Vartanian, 2010, p. 17) and researchers who are absent during the data collection process may have insufficient knowledge of the original dataset, leading to potential errors in interpreting specific variables (Cheng & Phillips, 2014). Another critique of secondary data analysis involves the compromises required to align with the research questions and hypotheses. Specifically, secondary data analysis often faces limitations due to the absence of variables closely aligned with researchers' specific questions (Vartanian, 2010, p. 17), restricting the available

information for use (Thygesen & Ersboll, 2014). Therefore, adjustments must be considered for the analytical decisions that differ from those made when researchers collect the data themselves (Smith, 2008, p. 61).

3.3.3 Addressing the Challenges in Secondary Data Analysis in this Study

To mitigate potential issues in secondary data analysis, certain steps were taken before analysing the SSES 2019 dataset. Regarding the understanding of variables, considerable time was dedicated to studying the codebooks and the technical report of SSES 2019, where the technical report is particularly noteworthy for its detailed study design and quality. In terms of the limited variables from the original dataset in secondary analysis, the SSES 2019 dataset was chosen and merged because it corresponded with the specific requirements of this study, which encompassed diverse domains of SES and comprehensive contextual factors at different levels and from different reporters. Additionally, latent variables aligned with the research questions were computed from the observable variables in the original dataset and Confirmatory Factor Analysis (CFA) was used for the construct validity (Colliver et al., 2012).

3.4 Measurements

The study utilized various measurements, including SES reported by different reporters (students, parents, teachers, and principals) and contextual factors involved in the development of these skills. SES were treated as outcome measurements, while the contextual factors served as explanatory measurements.

3.4.1 Outcome Measurements

The SES were assessed based on the framework of the 'Big Five' in the dataset (John & De Fruyt, 2015), which could be categorized into five domains: Task Performance, Emotional Regulation, Collaboration, and Open-Mindedness (Kankaraš & Suarez-Alvarez, 2019).

Each of the five domains was further divided into three scales, resulting in a total of 15 scales. The domain of Task Performance encompasses Self-Control, Responsibility, and Persistence. The domain of Emotional Regulation comprises Stress Resistance, Emotional Control, and Optimism. The domain of Engaging with Others includes Energy, Assertiveness, and Sociability. The domain of Collaboration involves Empathy, Trust, and Co-operation. The domain of Open-Mindedness includes Tolerance, Curiosity, and Creativity. (OECD, 2021b, p. 17)

Each of the 15 scales consists of several different items, which served as observed variables in the study to represent latent scale-level and domain-level SES. The items were presented as simple statements such as 'I stay calm even in tense situations' and used the 5-

point Likert scale style, with responses ranging from 1 (completely disagree) to 5 (completely agree). Positively and negatively worded items were included in all 15 scales. Students provided self-reports and one parent provided a report of their child, while teachers reported on multiple students. The number of items for each scale was reduced for teachers to reduce the response burden (OECD, 2021b, p. 19). Therefore, the scales for students and parents have 8 items each, while the scales for teachers have 3 items each.

The latent scale-level and domain-level social and emotional variables were computed based on the observed items. First, all the responses from negatively worded items were recoded as follows: 1 = 5, 2 = 4, 3 =3, 4 = 2, 5 = 1. All the responses from negatively worded items were reverse-recoded before computing into new variables. All the dummy variables were recoded as follows: 0 = No, 1 = Yes. The sum score of the items was used when computing new variables because of its value in predicting practically relevant events and behaviours in psychometric testing and survey research (Klaas Sijtsma et al., 2024).

Then, the scale-level social and emotional variables were computed by averaging the items within each scale. Subsequently, the domain-level social and emotional variables were calculated by averaging the scales within each domain. Table 3 presents the domains and scales of SES, along with their corresponding Cronbach's Alpha. The values of Cronbach's Alpha were between .622 and .915, which indicated acceptable reliability (Field et al., 2012, p. 799).

Table 3

Reliability of SES at Domain and Scale Levels

Domain	Scale	Student-Report	Parent-Report	Teacher-Report
Task Performance	Self-control	.677	.755	.635
	Responsibility	.766	.803	.791
	Persistence	.812	.860	.915
	Average	.856	.859	.910
Emotional Regulation	Stress resistance	.868	.848	.672
	Emotional control	.806	.808	.714
	optimism	.811	.778	.791
	Average	.830	.817	.622
Engaging with Others	Energy	.745	.701	.673
	Assertiveness	.820	.860	.843
	Sociability	.738	.781	.849
	Average	.706	.751	.767
Collaboration	Empathy	.780	.801	.861
	Trust	.874	.807	.773
	Co-operation	.842	.843	.701
	Average	.812	.844	.887
Open-Mindedness	Tolerance	.757	.786	.829
	Curiosity	.771	.832	.817
	Creativity	.777	.823	.866
	Average	.837	.877	.876

Note. Cronbach's Alpha was reported.

3.4.2 Explanatory Measurements

Explanatory measurements were selected from contextual factors related to social and emotional development assessed in the study. Given the hierarchical structure of the data, with students nested within classes and classes nested within schools, these measurements were classified into three levels: student, class, and school.

3.4.2.1 Individual-Level Process Quality

Individual-level process quality was derived from student self-report questionnaires and encompass aspects related to internal environment, social relationships, perceived school environment, and home and extracurricular environment. According to the theoretical framework of this study (refer to section 2.5, Figure 3), these elements fall under individual-level process quality.

Internal Environment. Students' Subjective Wellbeing, Global Mindedness, and Growth Mindset about SES were included in this aspect. Subjective Wellbeing was calculated by adding the scores from five items, each presented as a simple statement like 'I have felt cheerful and in good spirits.' Each item was rated on a 5-point scale measuring the degree of wellbeing (1 = Never, 2 = Some of the time, 3 = More than half of the time, 4 = Most of the time, 5 = All of the time). Global Mindedness was computed by adding the scores from five items, each rated on a 4-point scale measuring the knowledge of global problems such as 'How informed are you about climate change and global warming?' (1 = I have never heard of this, 2 = I know little about this, 3 = I know something about it, 4 = I know a lot about this). Growth Mindset about SES was the sum score of two items, each rated on a 5-point scale measuring the attitude towards the SES development such as 'Your social skills are something about yourself that you cannot change very much.' (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree).

Social Relationships. Students' Relationship with Friends, Relationship with Parents, Relationship with Teachers, and Closeness with Surroundings were included in this aspect. Relationship with Friends was computed by adding the scores from four items, each presented as a simple statement like 'My friends understand me.' Relationship with Parents was calculated by adding the scores from three items, each presented as a simple statement like 'I get upset easily with my parents.' Each item was rated on a 4-point scale (1 = Almost never or never true, 2 = Sometimes true, 3 = Often true, 4 = Almost always or always true). Relationship with Teachers was calculated by adding the scores from three items, each presented as a simple statement like 'I got along well with most of my teachers.' Each item was rated on a 4-point scale measuring the interaction with teachers (1 = Never or almost never, 2 = A few times a

year, 3 = A few times a month, 4 = Once a week or more). Closeness with Surroundings was the sum score from eight items, each rated on a 5-point scale measuring the closeness to the surrounding people and environment such as 'How close are you to your neighbours' (1 = Not at all, 2 = Slightly or somewhat close, 3 = Moderately close, 4 = Quite close, 5 = Very close).

Home and Extracurricular Environment. Parent-Report SES, Home Literacy Environment, and Non-School Activity Richness were included in this aspect. Parent-Report SES referred to the domain-level SES skills reported by parents. Home Literacy Environment was computed by adding the scores from sixteen items such as 'Which of the following are in your home? A desk to study at.' Each item was scored as 0 = NO and 1 = Yes. Non-School Activity Richness was calculated by adding the scores from five items such as 'Do you participate in any of the following extracurricular activities outside of school? Sports, e.g. clubs, lessons, etc.' Each item was scored as 0 = No and 1 = Yes.

Perceived School Environment. Perceived School Climate, Perceived School Belonging, and School Anxiety were included in this aspect. Perceived School Climate was computed by adding the scores from four items, each presented as a simple statement like 'Students seem to value cooperation in my school.' Each item was rated on a 4-point scale measuring students' perceptions of school climate (1 = Almost never or never true, 2 = Sometimes true, 3 = Often true, 4 = Almost always or always true). Perceived School Belonging was calculated by adding the scores from six items, each presented as a simple statement like 'I feel like an outsider at school.' Each item was rated on a 4-point scale measuring students' sense of belonging in school (1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree). School Anxiety was computed by adding the scores from three items, each presented as a simple statement like 'I often worry that it will be difficult for me taking a test.' Each item was rated on a 5-point scale measuring students' anxiety in school (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree).

3.4.2.2 Class-Level Structural and Process Quality

Class-level structural and process quality were derived from teacher-report questionnaires and encompass aspects related to teacher qualifications and training, teacher-student interactions, classroom dynamics, and classroom SES initiatives. According to the theoretical framework of this study (refer to section 2.5, Figure 3), teacher qualifications and training and classroom SES initiatives fall under class-level structural quality, while teacher-student interactions and classroom dynamics fall under class-level process quality.

Teacher Qualifications and Training. Teachers' Education Level and Teachers' SES training were included in this aspect. Teachers' Education Level referred to the highest level of formal education attained by the teacher, scored on a scale from 1 to 7 according to the ISCED 2011 framework (International Standard Classification of Education; Schneider, 2013). For example, 1 = Below ISCED 2011 Level 3. Teachers' SES training referred to the SES training opportunity a teacher can get, presented as 'Did you have the opportunity of dealing with developing social and emotional skills in children during your in- and pre-service training and professional development?' (1 = Not at all, 2 = A little, 3 = Somewhat, 4 = A lot, 5 = Very much).

Teacher-Student Interactions. Teacher-Report SES and Teacher-Student Relationship were included in this aspect. Teacher-Report SES referred to the domain-level SES skills reported by teachers. Teacher-Student Relationship was computed by adding the scores from four items, each presented as a simple statement like 'In this school, teachers and students usually get on well with each other.' Each item was rated on a 5-point scale measuring the teachers' perceived relationship harmony with students (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree).

Classroom Dynamics. Class Activity Atmosphere and Active Learning Pedagogy were included in this aspect. Class Activity Atmosphere was computed by adding the scores from six items, each rated on a 5-point scale measuring the teachers' perceived harmonious atmosphere such as 'There is a collaborative school culture which is characterized by mutual support.' (1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree). Active Learning Pedagogy was computed by adding the scores from six items, each presented as a simple statement like 'Students are given opportunities to explain their ideas.' Each item was rated on a 4-point scale measuring the active learning opportunities in class (1 = Never or almost never, 2 = Some lessons, 3 = Many lessons, 4 = Every lesson or almost every lesson).

Classroom SES Initiatives. Class Promotion of SES, Class SES Evaluation, and SES feedback were included in this aspect. Class Promotion was calculated by adding the scores from eight items, each presented as a simple statement like 'Teachers are requested to promote the development of students' social and emotional skills as part of their work.' Each item was scored as 0 = No and 1 = Yes. Class Evaluation referred to the process of evaluating students' achievement, presented as 'Is students' achievement in social and emotional skills evaluated in your school?' (1 = Without evaluation, 2 = For informal evaluation, 3 = For formal evaluation). SES feedback was computed by adding the scores from four items, each rated on a 4-point

scale measuring the teachers' SES feedback to students such as 'I collect data from classroom assignments or homework.' (1 = Never or almost never, 2 = Some lessons, 3 = Many lessons, 4 = Every lesson or almost every lesson).

3.4.2.3 School-Level Structural Quality

School-level structural quality was derived from principle-report questionnaires and encompass aspects related to school organisation and SES promotion and evaluation. According to the theoretical framework of this study (refer to section 2.5, Figure 3), these elements fall under school-level structural quality.

School Organisation. Average Class Size, School Activity Richness, and Diversity in Education were included in this aspect. Average Class Size referred to the average number of students in each class in this school (1 = less than 15, 2 = 16-20, 3 = 21-25, 4 = 26-30, 5 = 31-35, 6 = 36-40, 7 = 41-45, 8 = 46-50, 9 = more than 50). Note that Average Class Size was used since the original dataset did not report class size. Therefore, it was categorized under School Organisation. School Activity Richness was calculated by adding the scores from nine items, each presented as 'In this school year, which of the following activities are provided to students? Band, orchestra or choir.' Diversity in Education was computed by adding the scores from four items, each presented as 'In this school, are the following policies and practises in relation to diversity implemented? Organizing multicultural events.' Each item was scored as 0 = No and 1 = Yes.

SES Promotion and Evaluation. School SES Training, School Promotion of SES, SES as School Aim, School SES Curriculum, and School SES Evaluation were included in this aspect. School SES Training was computed by adding the scores from two items, each presented as 'Does your school offer formal training on social and emotional skill development for teachers in the following ways? It sponsors training on social and emotional skills taken outside the school.' Each item was rated on a 4-point scale measuring SES training at the school level (1 = Without training, 2 = A short training, a training lasting between a month and a year, 3 = an extensive training lasting more than a year). School Promotion of SES was calculated by adding the scores from two items, each presented as a simple statement like 'Teachers are requested to promote the development of students' social and emotional skills as part of their work' Each item was scored as 0 = No and 1 = Yes. SES as School Aim referred to the extent to which setting SES as one of the school's aims is agreed on, presented as 'To what extent do you agree that your school has the aim of students' social and emotional skills?' (1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly Agree). School SES Curriculum was calculated by adding the scores from three items, each presented as a

simple statement like 'Our curriculum includes techniques students can use to deal with stress.' Each item was scored as 0 = Does not apply to our school and 1 = Applies to our school. School SES Evaluation referred to the assessment of SES within the school, presented as 'Is students' achievement in social and emotional skills evaluated in your school?' (1 = Without evaluation, 2 = Using informal evaluation, 3 = Using formal evaluation).

3.5 Analytical Procedures

The analytical procedures were addressed in this section, which included the preparation and set-up for data analysis, Structural Equation Modelling (SEM) for Confirmatory Factor Analysis (CFA), Pearson Correlation Coefficients and General Linear Model for comparing the correlations and differences, and Multilevel Modelling for exploring hierarchical predictors.

This section offered a rationale for the analytical methods and statistical models used to address the research questions. The data management and analytical procedures were carried out using SPSS version 29, as well as R and RStudio. In R, the analysis utilized several packages including psych, haven, lavaan, lavaanPlot, lme4, and lmerTest.

3.5.1 Preparation and Setup for Data Analysis

Preparatory tasks were taken before data analysis which was encouraged when managing large-scale datasets in doing secondary data analysis (Smith, 2008, p. 89). The preparation in this study included data extraction, data cleaning, merging datasets, data recoding, computing latent variables, and conducting reliability checks.

Firstly, after downloading the original datasets, the data of the younger cohort in Suzhou City (China) were extracted from each five datasets by filtering the site ID and cohort ID. Secondly, the codes for missing values were reviewed during the data cleaning process, with omitted missing values coded as 9 and missing-by-design data coded as 7. Thirdly, the five datasets were merged in SPSS to integrate and pair data from different reporters across various levels. Student-report, parent-report, and teacher-report SES datasets were matched by student ID. The resulting merged dataset was then matched with two contextual datasets: one reported by teachers (matched by teacher ID) and one reported by principals (matched by school ID). After that, all responses from negatively worded items were reversely recoded, followed by the computation of latent variables and the reliability check.

3.5.2 Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) was conducted to analyse the dimensions and subdimensions of SES after the computation of latent variables since it has been widely used in psychological assessment for testing the validity of scales based on theoretical foundations

(DiStefano, 2005). A standardized factor loading greater than .3 is considered an adequate indicator of a construct (OECD, 2021b, p.767). The most used fit indices are the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) (DiStefano, 2005). CFI > .90, RMSEA < .05, SRMR < .05 indicate good model fit (Bentler, 1990; Hu & Bentler, 1999).

CFA was used to assess SES in this study based on the 'Big Five' framework (John & De Fruyt, 2015). Since CFA is a subset of the Structural Equation Model (SEM) and each latent variable can function as a small CFA in SEM (Streiner, 2006), lavaan and lavaanPlot packages were used in R for this analysis. Since the original SSES 2019 utilized robust maximum likelihood (MLR) as the estimator in the model (OECD, 2021b, p.127), this study also employed this estimator when modelling the younger cohort of the Chinese data only.

The CFI, RMSEA, and SRMR for each domain were shown in Table 4 and the factor loadings for each scale were also shown in Figure 4 to Figure 8. Although some model fit indices failed to meet standards for a good model fit when using Suzhou data, the model fit indices for all the scales demonstrated satisfactory fit when using data from all 10 cities together (CFI > .95 for good fit, > .90 for acceptable fit, RMSEA and SRMR < .08 for acceptable fit and < .05 for good fit; Field et al, 2012, p.128). Moreover, almost all the factor loadings for each scale were greater than .3 ($p < .001$) except item 01 and item 05 in the self-control scale, which could nevertheless also be considered statistically meaningful in very large samples (sample size > 1000; Field et al, 2012, p.767). Therefore, the dimensions and subdimensions of SES in the original dataset were considered valid for use in this study and all internal consistencies were adequate.

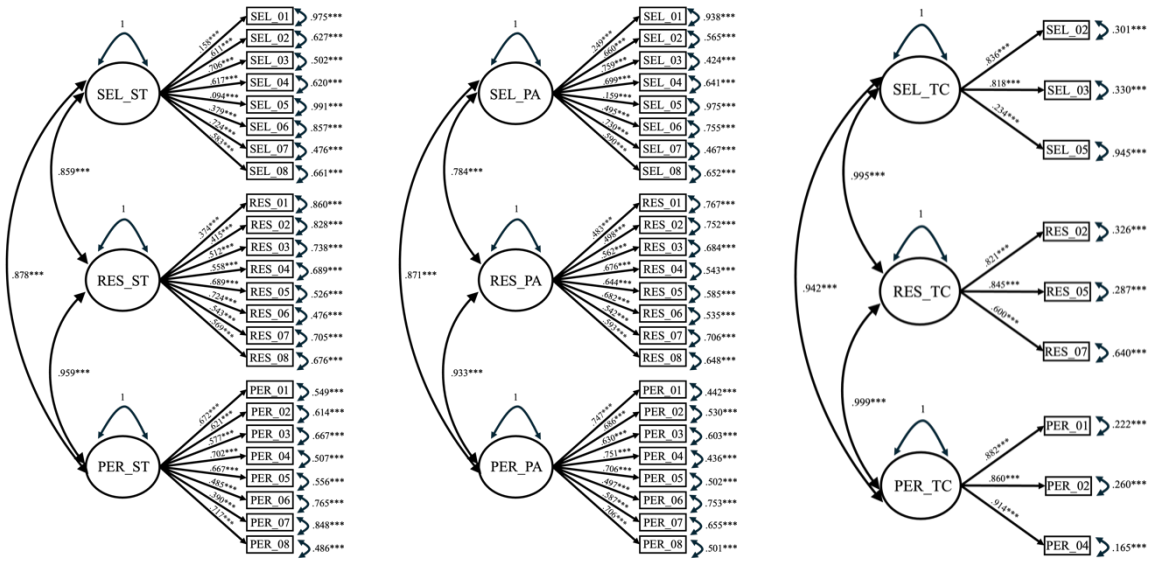
Table 4

Confirmatory Factor Analysis of SES at the Domain Level

Reporter	Scale	CFI	RMSEA	SRMR
Student Scale	Task Performance	.873	.063	.051
	Emotional Regulation	.858	.073	.074
	Engaging with Others	.858	.060	.056
	Collaboration	.915	.057	.042
	Open-Mindedness	.858	.063	.048
Parent Scale	Task Performance	.828	.082	.068
	Emotional Regulation	.806	.084	.090
	Engaging with Others	.804	.079	.068
	Collaboration	.864	.070	.051
	Open-Mindedness	.854	.073	.054
Teacher Scale	Task Performance	.951	.119	.037
	Emotional Regulation	.864	.126	.089
	Engaging with Others	.923	.117	.062
	Collaboration	.946	.115	.035
	Open-Mindedness	.973	.083	.031

Figure 4

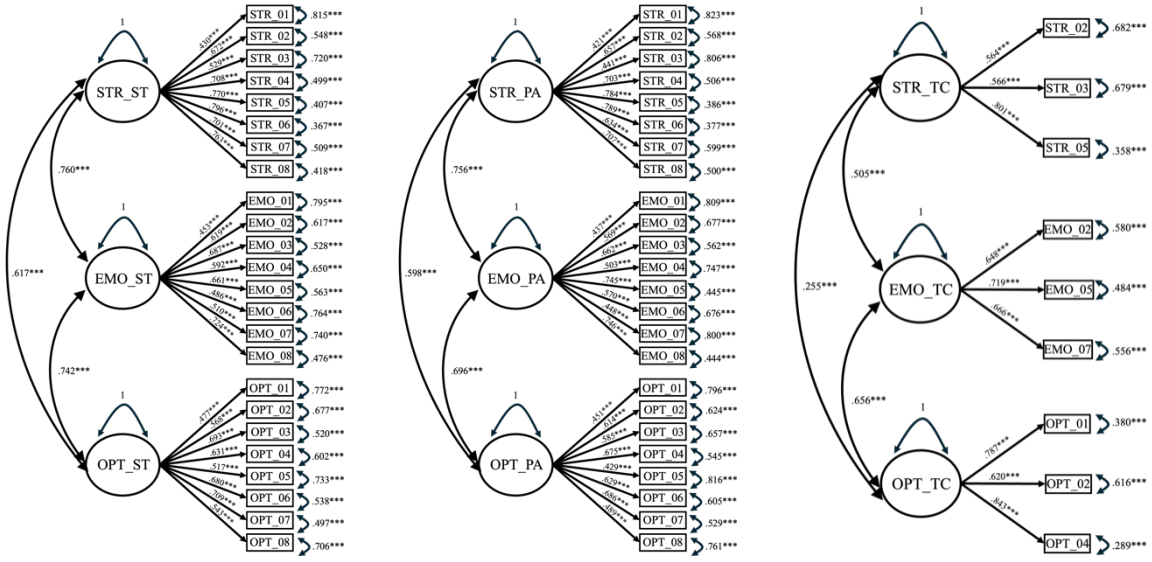
Confirmatory Factor Analysis of Task Performance



Note. SEL = Self-control, RES = Responsibility, PER = Persistence, ST = Student, PA = Parent, TC = Teacher.

Figure 5

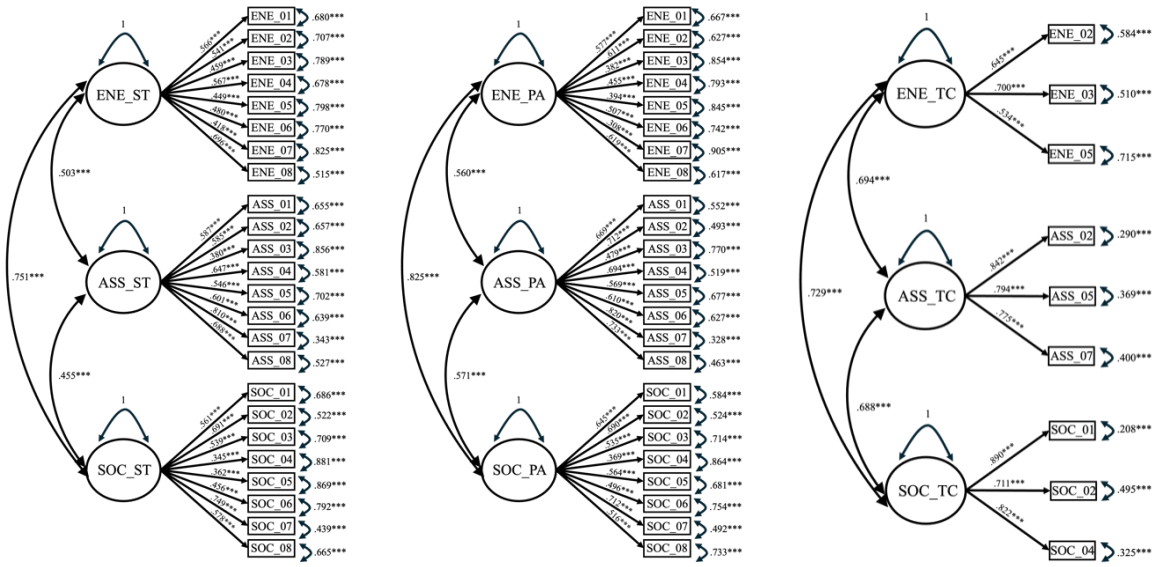
Confirmatory Factor Analysis of Emotional Control



Note. STR = Stress resistance, EMO = Emotional control, OPT = Optimism, ST = Student, PA = Parent, TC = Teacher.

Figure 6

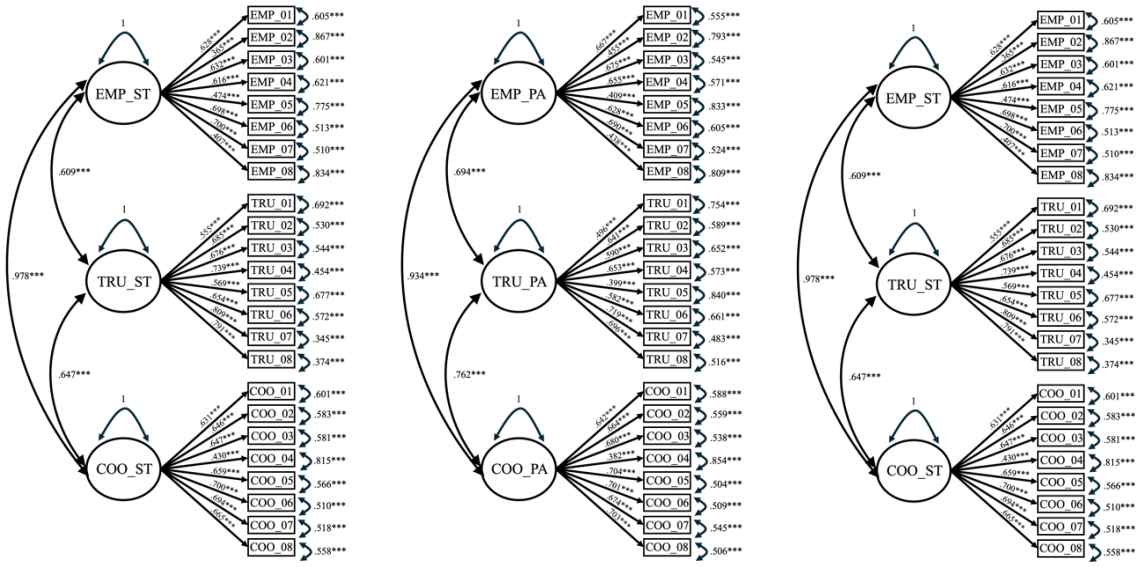
Confirmatory Factor Analysis of Engaging with Others



Note. ENE = Energy, ASS = Assertiveness, SOC = Sociability, ST = Student, PA = Parent, TC = Teacher.

Figure 7

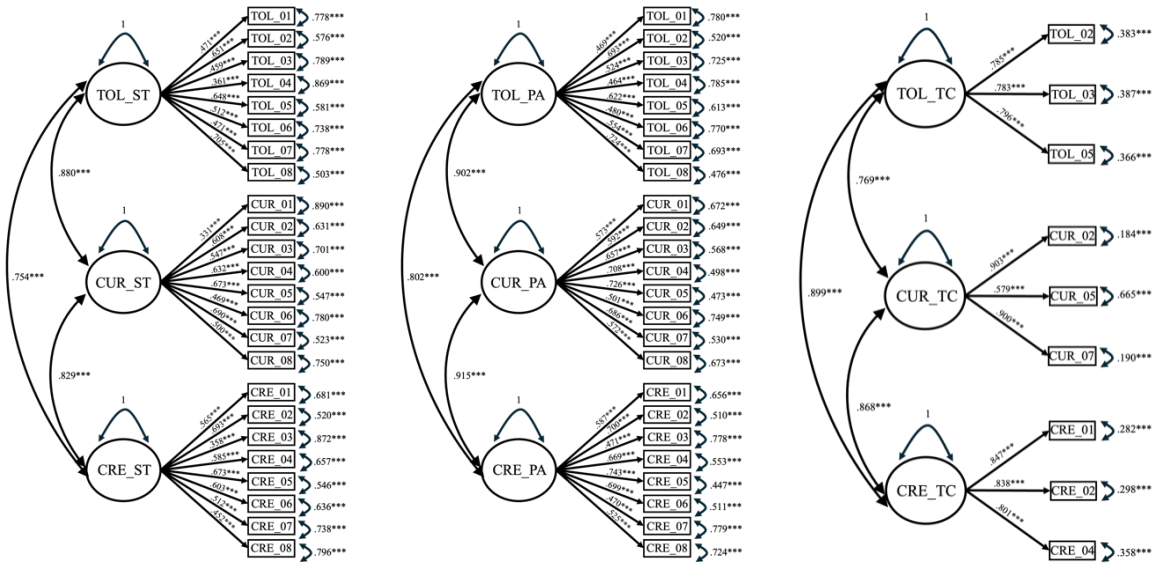
Confirmatory Factor Analysis of Collaboration



Note. EMP = Empathy, TRU = Trust, COO = Co-operation, ST = Student, PA = Parent, TC = Teacher.

Figure 8

Confirmatory Factor Analysis of Open-Mindedness



Note. TOL = Tolerance, CUR = Curiosity, CRE = Creativity, ST = Student, PA = Parent, TC = Teacher.

3.5.3 Pearson Correlation Coefficients and General Linear Model

Pearson correlation coefficients and a general linear model were used to answer the first research question.

Since correlation analysis is used to explore whether two variables are associated and the Pearson correlation coefficient is commonly used for interval variables (Field 2018, p. 454; p. 473), person correlation coefficients were used the explore the correlations between different scales of SES to students' self-perceptions, parents' perceptions, and teachers' perceptions, respectively. Additionally, the correlations between the perceptions of SES among students, parents, and teachers across the five domains were examined. The correlation coefficient values of ± 0.1 indicate a small effect, ± 0.3 indicate a medium effect and ± 0.5 indicate a large effect (Field 2018, p. 462).

For comparing the variances, since there were more than two independent means, analysis of variance (ANOVA) was chosen (Field 2018, p. 680). Since the same entities were tested multiple times (Field 2018, p. 790), a repeated measure of ANOVA was required. A general linear model (GLM) was then adopted in SPSS since a repeated measure of ANOVA can be included in the general linear model (Field 2018, p. 844). The result of pairwise comparisons in the general linear model was reported since it can control the familywise error to keep the overall Type I error rate across all comparisons at 0.05 (Field 2018, p. 715).

3.5.4 Multilevel Modelling

Multilevel modelling was conducted in this study to answer the second research question since it algins with analysing hierarchically structured data (Field et al, 2012, p. 865). Since students were nested within classes and classes were nested within schools in this study, individual-level process quality predictors were treated as level 1 observations, class-level structural and process quality predictors were treated as level 2 observations, and school-level structural quality predictors were treated as level 3 observations. The baseline model contains no predictors and attributes the proportion of variability to different levels. The structural and process quality predictors at three different levels were entered into the baseline model in three sequential steps, as suggested by Twisk (2006, p. 29). Therefore, four models were constructed for each five SES domains.

To be noticed, standard scores (Z-Score) for all the predictors and outcome variables were computed before entering the model since they were rated on different scales, which was one way of centring variables to make the predictors more stable (Field et al, 2012, p. 871-872). The results are read as standardized coefficients.

3.5.4.1 Effect Size

Fixed standardized regression coefficients (β) were used to interpret the effect in multilevel modelling (Field et al, 2012, p. 892). The value of these coefficients indicated the relationship between predictors and the outcome variable (Field et al, 2012, p. 260) and the direction of these coefficients indicated whether the relationship between each predictor and outcome was positive or negative (Field et al, 2012, p. 892). Intraclass correlation (ICC) was also utilized to indicate the proportion of the overall variability in the outcome that can be attributed to the different classes (Field et al, 2012, p. 859).

3.5.4.2 Model Fit

The AIC and BIC were commonly used to indicate the model fit, with smaller values meaning a better fit (Field et al, 2012, p. 868). Log-likelihood was another indicator of the model fit but more used as -2LL (-2LL = -2 × log-likelihood; Field et al, 2012, p. 316), which indicated the amount of information that remains unexplained after fitting the model (Field et al, 2012, p. 315). Therefore, -2LL was also reported in this study. Since -2LL requires maximum likelihood (ML) instead of restricted maximal likelihood estimate (REML) as estimator in the multilevel modelling (Field et al, 2012, p. 868), ML, which can generate more precise estimates of fixed regression coefficients (Twisk, 2006, p. 29), was chosen in this study.

3.5.4.3 Comparing Models

Since nested models were conducted in this study, Incremental -2-Log-Likelihood (I -2LL) were computed as $\chi^2_{change} = -2LL_{old} - -2LL_{new}$ to compare the change between models (Field et al, 2012, p. 868). Pseudo-R^2 was also employed, since it can represent the proportion of variance in the outcome variable that the explanatory variables accounted for, with a larger value indicating a better model (Cohen et al., 2013, p. 502).

3.5.5 Assumption Checks

All assumptions were checked before conducting Pearson correlation coefficients, general linear model, and multilevel modelling. Since multilevel modelling is the extension of regression, all the assumptions for regression apply to the multilevel models (Field et al, 2012, p. 870). Variable types and non-zero variance, normality, no perfect multicollinearity, homoscedasticity, and independent errors (Field et al, 2012, p. 219; p. 271; p. 412) were found to be without violations. The details of assumption checks are in Appendix A and B.

3.6 Ethical Considerations

The original SSES 2019 database is an open database available on the OECD website (https://www.oecd.org/en/data/datasets/SSES-Round-1-Database.html) and is permitted to download, extract from, and analyse without additional request and approval (Terms & Conditions, n.d.). Anonymous data were then downloaded in its original format and stored securely on an encrypted computer and the Nexus 365 OneDrive for backup. The analytic data extracted from the original data and the syntax for running the dataset were also saved on that computer and were accessible only to the researcher and the supervisor of this study.

The original data collection was managed by the OECD Secretariat and conducted under the ethical approval granted by the Australian Council for Educational Research (ACER). In addition, consent forms, cover letters, and assignment forms were distributed by the school coordinators to the parents of the sampled students, as well as the sampled teachers and school principals in the SSES 2019 study (OECD, 2021b, p.14; p. 66; p.69).

4. Result

In this chapter, the statistical findings are reported to answer the research question. Firstly, descriptives of SES across levels and reporters are presented, followed by the results for the first research question. Specifically, correlations between domains of SES within students', parents', and teachers' perceptions (H1), correlations between the perceptions of SES among students, parents, and teachers (H2), differences between domains of SES within students', parents', and teachers' perceptions (H3), and differences between the perceptions of SES among students, parents, and teachers (H4) are reported. Finally, the results for the second research question are presented, which are individual-level process quality (internal environment, positive social relationships, positive perceived school environment, and positive home and extracurricular environment, H5), class-level structural and process quality (teacher qualifications and training, positive teacher-student interactions, positive classroom dynamics, and classroom SES initiatives, H6), and school-level structural quality (positive school organisation and SES promotion and evaluation, H7) predictors of students' task performance, Emotional regulation, engaging with others, collaboration, and open-mindedness are addressed, respectively.

4.1 The Descriptives of SES across Domains and Reporters

The descriptives of students' SES across domains and reporters are shown in Table 5.

Table 5

Descriptives of SES across Domains and Reporters

Domain	Scale	Students		Parents		Teachers	
		M	SD	M	SD	M	SD
Task Performance	Self-control	3.65	.59	3.18	.53	3.42	.73
	Responsibility	4.00	.61	3.61	.58	3.62	.77
	Persistence	4.14	.63	3.55	.61	3.61	.90
	Average	3.93	.54	3.45	.51	3.55	.74
Emotional Regulation	Stress resistance	3.46	.89	3.39	.64	3.25	.70
	Emotional control	3.75	.74	3.40	.58	3.69	.75
	optimism	4.05	.69	3.86	.49	3.76	.67
	Average	3.75	.67	3.55	.49	3.57	.53
Engaging with Others	Energy	3.77	.68	3.64	.52	3.52	.75
	Assertiveness	3.28	.79	3.40	.61	3.11	.85
	Sociability	4.07	.63	3.90	.51	3.78	.68
	Average	3.71	.56	3.65	.45	3.47	.63
Collaboration	Empathy	4.06	.59	3.70	.51	3.66	.70
	Trust	4.10	.77	3.91	.47	3.73	.61
	Co-operation	4.28	.58	4.09	.50	3.88	.68
	Average	4.15	.56	3.90	.43	3.75	.60
Open-Mindedness	Tolerance	4.05	.62	3.76	.51	3.25	.80
	Curiosity	4.11	.59	3.90	.53	3.73	.79
	Creativity	4.02	.63	3.68	.55	3.46	.82
	Average	4.06	.53	3.78	.48	3.48	.72

Note. M = Mean, SD = Standard deviation.

When comparing different reporters, students perceived their SES more positively than parents and teachers did, except for assertiveness ($M_{student}$ = 3.28, $SD_{student}$ = .79; $M_{student}$ = 3.40, $SD_{student}$ = .61; $M_{student}$ = 3.11, $SD_{student}$ = .85). Parents and teachers showed varying perceptions across different scales and domains. When comparing different domains within one reporter, students (M = 4.15, SD = .56), parents (M = 3.90, SD = .43), and teachers (SD = 3.75, SD = .60) all agreed that collaboration skills are the strongest among students' SES. For other skills, their perceptions varied. The general linear model (GLM) was subsequently employed to further investigate the statistically significant mean-level differences across different SES domains and among different reporters in later paragraphs.

4.2 Results for Are there Associations and Differences in the Perceptions of Students' Social and Emotional Skills among Reporters? (RQ1)

To answer the first research question, correlations between different domains of SES as perceived by students, parents, and teachers, as well as correlations between their perceptions of SES were examined. Additionally, differences between pairs of SES domains in the perceptions of students, parents, and teachers, as well as differences in their perceptions of SES were analysed.

4.2.1 Correlations between Domains of SES as Perceived by Students, Parents, and Teachers

As shown in Table 6, strong positive correlations between all domains of SES were observed in the perceptions of all reporters ($r > .5$, $p < .001$). Specifically, students ($r = .735$, $p < .001$), parents ($r = .725$, $p < .001$), and teachers ($r = .841$, $p < .001$) consistently identified the correlation between engaging with others and open-mindedness as the strongest among all SES domain pairs.

Table 6

Correlations between Different Domains of SES within Students', Parents', and Teachers' Perceptions

Correlation	Students	Parents	Teachers
Task Performance and Emotional Regulation	.677***	.624***	.616***
Task Performance and Engaging with Others	.640***	.536***	.723***
Task Performance and Collaboration	.690***	.616***	.810***
Task Performance and Open-Mindedness	.692***	.626***	.768***
Emotional Regulation and Engaging with Others	.649***	.636***	.638***
Emotional Regulation and Collaboration	.631***	.592***	.679***
Emotional Regulation and Open-Mindedness	.590***	.588***	.542***
Engaging with Others and Collaboration	.686***	.699***	.724***
Engaging with Others and Open-Mindedness	.735***	.725***	.841***
Collaboration and Open-Mindedness	.699***	.690***	.717***

Note. Pearson correlation coefficients were reported. *p < .05, **p < .005, ***p < .001.

Additionally, there was a consensus among the reporters that the correlation ($r_{student}$ = .590, p < .001; r_{parent} = .588, p < .001; $r_{teacher}$ = .542, p < .001) between emotional regulation and open-mindedness was relatively weaker compared to other SES domain pairs.

In comparing the correlations between reporters, the highest correlations (p < .001) among SES domain pairs were frequently observed in teachers' perceptions, occurring in 6 out of 10 pairs. Conversely, the lowest correlations (p < .001) were frequently noted in parents' perceptions, appearing in 7 out of 10 pairs.

4.2.2 Correlations between Students', Parents', and Teachers' Perceptions of SES

As illustrated in Table 7, weak and small positive correlations (r < .3, p < .05) were observed across all SES scales and domains between students and parents, students and teachers, and parents and teachers. An exception was found in the domain of engaging with others between students and parents, which showed a moderate positive correlation (r = .310, p < .001). Notably, the correlation for average engagement with others between students and parents (r = .310, p < .001) and students and teachers (r = .217, p < .001) was the strongest, while the correlation for average emotional regulation between students and parents (r = .219, p < .001) and students and teachers (r = .087, p < .001) was the weakest.

When comparing the correlations among the three groups (students and parents, students and teachers, and parents and teachers), the student-parent correlations (p <.001) consistently emerged as the strongest across all SES scales and domains.

Table 7

Correlations between the Students', Parents', and Teachers' Perceptions of SES

Domain	Scale	Students and Parents	Students and Teachers	Parents and Teachers
Task Performance	Self-control	.171***	.118***	.168***
	Responsibility	.221***	.154***	.209***
	Persistence	.191***	.173***	.185***
	Average	.220***	.179***	.217***
Emotional Regulation	Stress resistance	.186***	.033*	.036*
	Emotional control	.179***	.065***	.109***
	optimism	.208***	.119***	.094***
	Average	.219***	.087***	.105***
Engaging with Others	Energy	.229***	.143***	.114***
	Assertiveness	.273***	.182***	.168***
	Sociability	.254***	.128***	.124***
	Average	.310***	.217***	.183***
Collaboration	Empathy	.220***	.085***	.085***
	Trust	.167***	.066***	.034*
	Co-operation	.195***	.106***	.119***
	Average	.227***	.102***	.102***
Open-Mindedness	Tolerance	.220***	.128***	.134***
	Curiosity	.238***	.137***	.159***
	Creativity	.250***	.157***	.126***
	Average	.274***	.172***	.168***

Note. Pearson correlation coefficients were reported. *p < .05, **p < .005, ***p < .001.

4.2.3 Differences between Pairs of SES Domains in Students', Parents', and Teachers' Perceptions

As illustrated in Table 8, students ($\Delta_{TP-C} = -.221, \Delta_{ER-C} = -.396, \Delta_{EWO-C} = -.441\ \Delta_{C-OM} = .086$, p < .001), parents ($\Delta_{TP-C} = -.454, \Delta_{ER-C} = -.353, \Delta_{EWO-C} = -.255\ \Delta_{C-OM} = .125$, p < .001), and teachers ($\Delta_{TP-C} = -.203, \Delta_{ER-C} = -.189, \Delta_{EWO-C} = -.286\ \Delta_{C-OM} = .274$, p < .001) all rated students' collaboration more positively compared to other SES domains.

Moreover, differences between pairs of SES skills were observed in the perceptions of students, parents, and teachers. Specifically, students tended to rate their open-mindedness more positively ($\Delta_{TP-OM} = -.134, \Delta_{ER-OM} = -.309, \Delta_{EWO-OM} = -.355$, p < .001) while evaluating their engaging with others ($\Delta_{TP-EWO} = .220, \Delta_{ER-EWO} = .045, \Delta_{EWO-C} = -.441, \Delta_{EWO-OM} = -.355$, p < .001) more negatively. Parents, on the other hand, demonstrated a similar trend in perceiving their children's open-mindedness more positively ($\Delta_{TP-OM} = -.329, \Delta_{ER-OM} = -.228, \Delta_{EWO-OM} = -.130$, p < .001) while rating task performance more negatively ($\Delta_{TP-ER} = -.102, \Delta_{TP-EWO} = -.199, \Delta_{TP-C} = -.454, \Delta_{TP-OM} = .329$, p < .001) relative to other SES domains. In contrast, teachers exhibited smaller mean-level differences (p < .001) across nearly all SES domains when compared to the assessments made by students and parents, which suggests a more uniform perception of SES domains among teachers. (TP = Task Performance, ER = Emotional Regulation, EWO = Engaging With Others, C = Collaboration, OM = Open-Mindedness)

Table 8

Mean-Level Differences between Pairs of SES Domains in Students', Parents', and Teachers' Perceptions

Domain One	Domain Two	Mean-Level Differences		
		Students	Parents	Teachers
Task Performance	Emotional Regulation	.175***	-.102***	-.014
Task Performance	Engaging with Others	.220***	-.199***	.083***
Task Performance	Collaboration	-.221***	-.454***	-.203***
Task Performance	Open-Mindedness	-.134***	-.329***	.071***
Emotional Regulation	Engaging with Others	.045***	-.098***	.097***
Emotional Regulation	Collaboration	-.396***	-.353***	-.189***
Emotional Regulation	Open-Mindedness	-.309***	-.228***	.085***
Engaging with Others	Collaboration	-.441***	-.255***	-.286***
Engaging with Others	Open-Mindedness	-.355***	-.130***	-.012
Collaboration	Open-Mindedness	.086***	.125***	.274***

Note. Mean level differences were calculated by the mean of domain one minus the mean of domain two. *p < .05, **p < .005, ***p < .001.

4.2.4 Differences between Students', Parents', and Teachers' Perceptions of SES

As demonstrated in Table 9, except for parents' and teachers' perceptions of the skills of responsibility and emotional regulation, the differences between the students', parents' and teachers' perceptions of students' different SES were all statistically significant ($p < .005$). Overall, students had a significantly higher perception of their SES compared to parents ($p < .001$), except for assertiveness ($\Delta = -.114$, $p < .001$). Additionally, students perceived their SES more positively compared to teachers ($p < .005$). The mean-level differences in task performance ($\Delta = .480$, $p < .001$) were most pronounced between students and parents, while the mean-level difference in collaboration ($\Delta = .396$, $p < .001$) and open-mindedness ($\Delta = .585$, $p < .001$) were most notable between students and teachers.

When comparing parents and teachers, parents exhibited a more positive perception of their children's SES in the domains of engaging with others ($\Delta = .180$, $p < .001$), collaboration ($\Delta = .148$, $p < .001$), and open-mindedness ($\Delta = .299$, $p < .001$). Conversely, teachers held a more positive view of students' task performance ($\Delta = -.103$, $p < .001$) than parents.

Table 9

Differences between the Perceptions of SES among Students, Parents, and Teachers

Domain	Scale	Mean-Level Differences		
		ST-PA	ST-TC	PA-TC
Task Performance	Self-control	.469***	.226***	-.242***
	Responsibility	.387***	.372***	-.015
	Persistence	.585***	.534***	-.050**
	Average	.480***	.377***	-.103***
Emotional Regulation	Stress resistance	.067***	.214***	.147***
	Emotional control	.347***	.054**	-.293***
	optimism	.197***	.293***	.096***
	Average	.204***	.187***	-.016
Engaging with Others	Energy	.126***	.247***	.122***
	Assertiveness	-.114***	.176***	.290***
	Sociability	.167***	.295***	.128***
	Average	.060***	.240***	.180***
Collaboration	Empathy	.367***	.410***	.043**
	Trust	.187***	.375***	.189***
	Co-operation	.190***	.401***	.211***
	Average	.248***	.396***	.148***
Open-Mindedness	Tolerance	.296***	.805***	.509***
	Curiosity	.217***	.382***	.165***
	Creativity	.344***	.567***	.223***
	Average	.286***	.585***	.299***

Note. Mean level differences were reported. The value of ST-PA, ST-TC, and PA-TC was calculated by the mean of students' perceptions minus the mean of parents' perceptions, the mean of students' perceptions minus the mean of teachers' perceptions, and the mean of parents' perceptions minus the mean of teachers' perceptions, respectively. *p < .05, **p < .005, ***p < .001.

4.3 Results for Individual, Class, and School-Level Structural and Process Quality Predictors of Students' SES in Each Domain (RQ2)

To address the second research question, predictors of students' task performance, emotional regulation, engaging with others, collaboration, and open-mindedness were examined at individual, class, and school levels, respectively.

4.3.1 Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Task Performance

As presented in Table 10, individual-level process quality was more significant to students' task performance compared to class-level structural and process quality and school-level structural quality. Specifically, at the individual level, subjective wellbeing (β = .17, p < .001), global mindedness (β = .12, p < .001), parent-report SES (β = .12, p < .001), and perceived school belonging (β = .22, p < .001) exhibited relatively strong positive effects in predicting students' task performance, while school anxiety (β = -.09, p < .001) showed a relatively strong negative effect. Other factors such as growth mindset about SES (β = .04, p < .005), relationship with friends (β = .08, p < .001), relationship with parents (β = .07, p < .001), home literacy environment (β = .04, p < .05), non-school activity richness (β = .06, p < .001), and perceived school climate (β = .05, p < .001) also demonstrated significant, though weaker, positive effects. At the class and school levels, only the process quality of teacher-report SES (β = .06, p < .001) exhibited a slight positive effect on predicting students' task performance.

In comparing models, ICC values showed that 92% of the variance was at the student level, 2% at the class level, and 6% at the school level. Pseudo-R^2 values indicated that the fixed effects explained about 42% of the variance from Model 1 onwards. The values of AIC (from 10203.3 to 7413.5), BIC (from 10228.1 to 7620.2), and -2LL (from 10195.3 to 7345.5) progressively decreased from Model 0 to Model 3, indicating better fit with more complex models. Additionally, the improvements in model fit were significant from Model 0 to Model 1 (χ^2 = 2321.1), Model 1 to Model 2 1 (χ^2 = 306.7), and Model 2 to Model 3 1 (χ^2 = 222).

Since limited statistically significant effects of structural and process quality from class and school levels were found when added to individual-level process quality, a new test was conducted by first entering school- and class-level structural and process quality into the baseline model. This is because the sheer number of level 1 predictors and the correlations between these predictors and the outcomes may obscure the effects of level 2 and level 3 predictors. Consequently, a model with a reverse order might yield different results.

Table 10

Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Task Performance

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		.01	.02		.01	.02		.01	.02	
Individual-Level Process Quality												
Subjective Wellbeing				.16	.02	***	.16	.02	***	.17	.02	***
Global Mindedness				.12	.02	***	.12	.02	***	.12	.03	***
Growth Mindset about SES				.05	.01	***	.04	.01	**	.04	.01	**
Relationship with Friends				.08	.02	***	.09	.02	***	.08	.02	***
Relationship with Parents				.07	.01	***	.07	.01	***	.07	.01	***
Relationship with Teachers				.01	.01		.00	.02		-.01	.02	
Closeness with Surroundings				.03	.02		.02	.02		.03	.02	
Parent-Report SES				.13	.01	***	.11	.01	***	.12	.01	***
Home Literacy Environment				.04	.02	**	.04	.02	**	.04	.02	*
Non-school Activity Richness				.06	.01	***	.06	.02	***	.06	.02	***
Perceived School Climate				.06	.01	***	.06	.01	***	.05	.01	***
Perceived School Belonging				.21	.02	***	.21	.02	***	.22	.02	***
School Anxiety				-.10	.01	***	-.09	.01	***	-.09	.01	***
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							.01	.01		.01	.01	
Teachers' SES Training[a]							-.03	.02		-.03	.02	
Teacher-Report SES[b]							.06	.01	***	.06	.01	***
Teacher-Student Relationship[b]							-.01	.02		-.02	.02	
Class Activity Atmosphere[b]							-.00	.02		-.00	.02	
Active Learning Pedagogy[b]							-.02	.02		-.02	.02	
Class Promotion of SES[a]							.00	.02		.01	.02	
Class SES Evaluation[a]							.01	.01		.01	.01	
SES Feedback[a]							.02	.02		.02	.02	
School-Level Structural Quality												
Average Class Size										.01	.02	
School Activity Richness										.01	.02	
Diversity in Education										-.01	.02	
School SES Training										-.01	.02	
School Promotion of SES										.03	.02	
SES as School Aim										.01	.02	
School SES Curriculum										-.00	.02	
School SES Evaluation										-.01	.01	
Model Fit												
AIC	10203.3			7908.2			7619.5			7413.5		
BIC	10228.1			8012.7			7778.3			7620.2		
Pseudo-R^2 (fixed effects)	.00			.42			.42			.42		
Pseudo-R^2 (total)	.07			.43			.43			.43		
-2LL	10195.3			7874.2			7567.5			7345.5		
ICC												
Student	92%											
Class	2%											
School	6%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	2321.1											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	306.7											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	222											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Table 11

Predictors of Task Performance in Reverse Order

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		.01	.03		.01	.03		.01	.02	
School-Level Structural Quality												
Average Class Size				.00	.03		-.01	.03		.01	.02	
School Activity Richness				.00	.03		.02	.03		.01	.02	
Diversity in Education				.00	.03		.01	.03		-.01	.02	
School SES Training				.02	.03		.02	.03		-.01	.02	
School Promotion of SES				.07	.04		.06	.04		.03	.02	
SES as School Aim				-.02	.03		-.03	.03		.01	.02	
School SES Curriculum				.03	.04		.03	.04		-.00	.02	
School SES Evaluation				-.07	.03	*	-.06	.03		-.01	.01	
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.00	.02		.01	.01	
Teachers' SES Training[a]							-.03	.02		-.03	.02	
Teacher-Report SES[b]							.16	.01	***	.06	.01	***
Teacher-Student Relationship[b]							-.02	.02		-.02	.02	
Class Activity Atmosphere[b]							-.03	.02		-.00	.02	
Active Learning Pedagogy[b]							-.00	.02		-.02	.02	
Class Promotion of SES[a]							-.01	.02		.01	.02	
Class SES Evaluation[a]							.02	.02		.01	.01	
SES Feedback[a]							.02	.02		.02	.02	
Individual-Level Process Quality												
Subjective Wellbeing										.17	.02	***
Global Mindedness										.12	.03	***
Growth Mindset about SES										.04	.01	**
Relationship with Friends										.08	.02	***
Relationship with Parents										.07	.01	***
Relationship with Teachers										-.01	.02	
Closeness with Surroundings										.03	.02	
Parent-Report SES										.12	.01	***
Home Literacy Environment										.04	.02	*
Non-school Activity Richness										.06	.02	***
Perceived School Climate										.05	.01	***
Perceived School Belonging										.22	.02	***
School Anxiety										-.09	.01	***
Model Fit												
AIC	10203.3			9938.3			9416.7			7413.5		
BIC	10228.1			10012.3			9545.4			7620.2		
Pseudo-R^2 (fixed effects)	.00			.01			.04			.42		
Pseudo-R^2 (total)	.07			.07			.10			.43		
-2LL	10195.3			9914.3			9374.7			7345.5		
ICC												
Student	92%											
Class	2%											
School	6%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	281											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	539.6											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	2029.2											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

As presented in Table 11, individual-level process quality remained more significant compared to class and school-level structural and process quality. However, when class-level structural and process quality were included in Model 2, the significant process quality of school SES evaluation (β = -.07, p < .05) disappeared. Additionally, when individual-level process quality was included in Model 3, the effect size of the process quality of teacher-report SES was significantly reduced (β from .16 to .06, p < .001).

4.3.2 Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Emotional Regulation

As presented in Table 12, individual-level process quality was also more significant to students' emotional regulation compared to class-level structural and process quality and school-level structural quality. Specifically, at the individual level, subjective wellbeing (β = .28, p < .001), relationship with parents (β = .11, p < .001), and perceived school belonging (β = .23, p < .001) exhibited relatively strong positive effects in predicting students' emotional regulation, while school anxiety (β = -.25, p < .001) showed a relatively strong negative effect. Other factors such as relationship with friends (β = .07, p < .001) and non-school activity richness (β = .05, p < .005) also demonstrated significant, though weaker, positive effects. At the class and school levels, only the structural quality of school SES evaluation (β = -.03, p < .05) exhibited a slight negative effect on predicting students' emotional regulation. Notably, when school-level structural quality was included in Model 3, the significant process quality of growth mindset related to SES (β = .03, p < .05) disappeared, and the effect size of the process quality of parent-report SES was reduced by half (β from .14 to .07, p < .001).

In comparing models, ICC values showed that 95% of the variance was explained at the student level, < 1% at the class level, and 5% at the school level. Pseudo-R^2 values indicated that the fixed effects explained about 53% of the variance from Model 1 onwards. The values of AIC (from 10218.1 to 6811.3), BIC (from 10242.9 to 7018.0), and -2LL (from 10210.1 to 6743.3) progressively decreased from Model 0 to Model 3, indicating better fit with more complex models. Additionally, the improvements in model fit were significant from Model 0 to Model 1 (χ^2 = 3036), Model 1 to Model 2 1 (χ^2 = 239.3), and Model 2 to Model 3 1 (χ^2 = 191.5).

Similar to the model of Task Performance, a model with reverse order is presented in Table 13. Individual-level process quality remained more significant compared to class and school-level structural and process quality. However, when individual-level process quality was included in Model 3, the significant process quality of teacher-report SES (β = .08, p

< .001) disappeared and the effect size of the structural quality of school SES evaluation was reduced by half (β from -.07 to -.03, p < .05).

4.3.3 Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Engaging with Others

As presented in Table 14, individual-level process quality was also more significant to students' engaging with others compared to class-level structural and process quality and school-level structural quality. Specifically, at the individual level, subjective wellbeing (β = .21, p < .001), global mindedness (β = .10, p < .001), parent-report SES (β = .14, p < .001), and perceived school belonging (β = .34, p < .001) exhibited relatively strong positive effects in predicting students' emotional regulation. Other factors such as growth mindset about SES (β = .03, p < .05), relationship with friends (β = .05, p < .005), closeness with surroundings (β = .06, p < .001), home literacy environment (β = .06, p < .001), non-school activity richness (β = .07, p < .001), and perceived school climate (β = .07, p < .001) also demonstrated significant, though weaker, positive effects, while relationship with parents (β = -.03, p < .05) and school anxiety (β = -.05, p < .001) showed significant negative effect. At the class level, the structural quality of teachers' SES training (β = -.04, p < .005) showed a slight negative effect, while the process quality of teacher-report SES (β = .03, p < .005) showed a slight positive effect on predicting students' emotional regulation. At the school level, the structural quality of diversity in education (β = .03, p < .05) also showed a slight positive effect on predicting students' emotional regulation. Notably, when school-level structural quality was included in Model 3, the significant structural quality of class SES evaluation (β = .03, p < .05) disappeared, and the effect size of the process quality of parent-report SES was reduced by half (β from .32 to .14, p < .001).

In comparing models, ICC values showed that 91% of the variance was explained at the student level, 3% at the class level, and 6% at the school level. Pseudo-R^2 values indicated that the fixed effects explained about 54% of the variance from Model 1 onwards. The values of AIC (from 10184.2 to 6609.2), BIC (from 10209.0 to 6816.0), and -2LL (from 10176.2 to 6541.2) progressively decreased from Model 0 to Model 3, indicating better fit with more complex models. Additionally, the improvements in model fit were significant from Model 0 to Model 1 (χ^2 = 3312.7), Model 1 to Model 2 1 (χ^2 = 296.1), and Model 2 to Model 3 1 (χ^2 = 226.2).

Table 12

Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Emotional Regulation

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	β	S.E.	p	β	S.E.	p	β	S.E.	p
Fixed Part												
Intercept	.00	.03		-.5	.09	***	.01	.01		.01	.01	
Individual-Level Process Quality												
Subjective Wellbeing				.28	.02	***	.28	.02	***	.28	.02	***
Global Mindedness				.02	.01		.02	.01		.02	.01	
Growth Mindset about SES				.03	.01	*	.03	.01	*	.02	.01	
Relationship with Friends				.08	.01	***	.08	.01	***	.07	.02	***
Relationship with Parents				.11	.01	***	.11	.01	***	.11	.01	***
Relationship with Teachers				-.01	.01		-.01	.01		-.02	.01	
Closeness with Surroundings				.03	.01		.03	.01		.03	.01	
Parent-Report SES				.14	.02	***	.07	.01	***	.07	.01	***
Home Literacy Environment				-.00	.01		-.00	.01		-.00	.01	
Non-school Activity Richness				.05	.01	***	.05	.01	***	.05	.01	**
Perceived School Climate				.00	.01		.00	.01		.01	.01	
Perceived School Belonging				.21	.02	***	.22	.02	***	.23	.02	***
School Anxiety				-.25	.01	***	-.25	.01	***	-.25	.01	***
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.01	.01		-.01	.01	
Teachers' SES Training[a]							-.00	.01		-.01	.01	
Teacher-Report SES[b]							-.01	.01		-.01	.01	
Teacher-Student Relationship[b]							.02	.02		.01	.02	
Class Activity Atmosphere[b]							-.02	.02		-.01	.02	
Active Learning Pedagogy[b]							-.02	.01		-.02	.01	
Class Promotion of SES[a]							-.00	.01		-.00	.01	
Class SES Evaluation[a]							.00	.01		.01	.01	
SES Feedback[a]							.01	.01		.01	.01	
School-Level Structural Quality												
Average Class Size										.01	.01	
School Activity Richness										-.00	.01	
Diversity in Education										.02	.01	
School SES Training										-.01	.01	
School Promotion of SES										.03	.02	
SES as School Aim										-.00	.01	
School SES Curriculum										-.01	.02	
School SES Evaluation										-.03	.01	*
Model Fit												
AIC	10218.1			7208.1			6986.8			6811.3		
BIC	10242.9			7312.6			7145.7			7018.0		
Pseudo-R^2 (fixed effects)	.00			.53			.53			.53		
Pseudo-R^2 (total)	.06			.53			.53			.53		
-2LL	10210.1			7174.1			6934.8			6743.3		
ICC												
Student	95%											
Class	< 1%											
School	5%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	3036											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	239.3											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	191.5											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Table 13

Predictors of Emotional Regulation in Reverse Order

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		.00	.03		.00	.03		.01	.01	
School-Level Structural Quality												
Average Class Size				-.01	.03		-.02	.03		.01	.01	
School Activity Richness				-.01	.03		-.00	.03		-.00	.01	
Diversity in Education				.03	.03		.05	.03		.02	.01	
School SES Training				.02	.03		.01	.03		-.01	.01	
School Promotion of SES				.08	.04		.08	.04		.03	.02	
SES as School Aim				-.03	.03		-.04	.03		-.00	.01	
School SES Curriculum				.00	.04		.01	.04		-.01	.02	
School SES Evaluation				-.07	.03	*	-.08	.03	*	-.03	.01	*
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.02	.02		-.01	.01	
Teachers' SES Training[a]							-.00	.02		-.01	.01	
Teacher-Report SES[b]							.08	.02	***	-.01	.01	
Teacher-Student Relationship[b]							-.01	.03		.01	.02	
Class Activity Atmosphere[b]							-.03	.03		-.01	.02	
Active Learning Pedagogy[b]							-.01	.02		-.02	.01	
Class Promotion of SES[a]							.01	.02		-.00	.01	
Class SES Evaluation[a]							.01	.02		.01	.01	
SES Feedback[a]							.03	.02		.01	.01	
Individual-Level Process Quality												
Subjective Wellbeing										.28	.02	***
Global Mindedness										.02	.01	
Growth Mindset about SES										.02	.01	
Relationship with Friends										.07	.02	***
Relationship with Parents										.11	.01	***
Relationship with Teachers										-.02	.01	
Closeness with Surroundings										.03	.01	
Parent-Report SES										.07	.01	***
Home Literacy Environment										-.00	.01	
Non-school Activity Richness										.05	.01	**
Perceived School Climate										.01	.01	
Perceived School Belonging										.23	.02	***
School Anxiety										-.25	.01	***
Model Fit												
AIC	10218.1			9947.7			9542.4			6811.3		
BIC	10242.9			10021.8			9671.1			7018.0		
Pseudo-R^2 (fixed effects)	.00			.01			.02			.53		
Pseudo-R^2 (total)	.06			.06			.06			.53		
-2LL	10210.1			9923.7			9500.4			6743.3		
ICC												
Student	95%											
Class	0%											
School	5%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	286.4											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	423.3											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	2757.1											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Table 14

Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Engaging with Others

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		-1.14	.1	***	.01	.01		.01	.01	
Individual-Level Process Quality												
Subjective Wellbeing				.21	.01	***	.21	.02	***	.21	.02	***
Global Mindedness				.11	.01	***	.10	.01	***	.10	.01	***
Growth Mindset about SES				.03	.01	**	.03	.01	*	.03	.01	*
Relationship with Friends				.05	.01	***	.05	.01	***	.05	.01	**
Relationship with Parents				-.03	.01	*	-.03	.01	*	-.03	.01	*
Relationship with Teachers				.00	.01		-.00	.01		-.01	.01	
Closeness with Surroundings				.05	.01	***	.06	.01	***	.06	.01	***
Parent-Report SES				.32	.03	***	.13	.01	***	.14	.01	***
Home Literacy Environment				.06	.01	***	.06	.01	***	.06	.01	***
Non-school Activity Richness				.06	.01	***	.07	.01	***	.07	.01	***
Perceived School Climate				.07	.01	***	.07	.01	***	.07	.01	***
Perceived School Belonging				.33	.02	***	.33	.02	***	.34	.02	***
School Anxiety				-.05	.01	***	-.05	.01	***	-.05	.01	***
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.00	.01		-.00	.01	
Teachers' SES Training[a]							-.05	.01	**	-.04	.01	**
Teacher-Report SES[b]							.04	.01	***	.03	.01	**
Teacher-Student Relationship[b]							-.01	.02		-.02	.02	
Class Activity Atmosphere[b]							-.01	.02		-.00	.02	
Active Learning Pedagogy[b]							-.00	.02		-.00	.02	
Class Promotion of SES[a]							.01	.01		.01	.01	
Class SES Evaluation[a]							.03	.01	*	.03	.01	
SES Feedback[a]							.01	.01		.01	.01	
School-Level Structural Quality												
Average Class Size										-.01	.01	
School Activity Richness										.00	.01	
Diversity in Education										.03	.01	*
School SES Training										-.02	.01	
School Promotion of SES										.01	.02	
SES as School Aim										-.00	.01	
School SES Curriculum										.00	.02	
School SES Evaluation										.00	.01	
Model Fit												
AIC	10184.2			7097.6			6819.4			6609.2		
BIC	10209.0			7202.0			6978.3			6816.0		
Pseudo-R^2 (fixed effects)	.00			.54			.54			.55		
Pseudo-R^2 (total)	.09			.58			.58			.58		
-2LL	10176.2			7063.5			6767.4			6541.2		
ICC												
Student	91%											
Class	3%											
School	6%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	3312.7											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	296.1											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	226.2											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Similar to the model of Task Performance, a model with reverse order is presented in Table 15. Individual-level process quality remained more significant compared to class and school-level structural and process quality. However, when individual-level process quality was included in Model, the effect size of the process quality of teacher-report SES was significantly reduced (β from .20 to .03, $p < .005$).

4.3.4 Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Collaboration

As presented in Table 16, individual-level process quality was also more significant to students' collaboration compared to class-level structural and process quality and school-level structural quality. Specifically, at the individual level, subjective wellbeing ($\beta = .21$, $p < .001$), relationship with friends ($\beta = .24$, $p < .001$), parent-report SES ($\beta = .09$, $p < .001$), and perceived school belonging ($\beta = .26$, $p < .001$) exhibited relatively strong positive effects in predicting students' emotional regulation. Other factors such as global mindedness ($\beta = .03$, $p < .05$), relationship with parents ($\beta = .04$, $p < .005$), closeness with surroundings ($\beta = .08$, $p < .001$), non-school activity richness ($\beta = .06$, $p < .001$), perceived school climate ($\beta = .03$, $p < .05$), and school anxiety ($\beta = .03$, $p < .05$) also demonstrated significant, though weaker, positive effects. At class and school levels, the structural quality of school activity and richness ($\beta = -.03$, $p < .05$) showed a slight negative effect, while the structural quality of school promotion of SES ($\beta = .04$, $p < .05$) showed a slight positive effect on predicting students' collaboration. Notably, when school-level structural quality was included in Model 3, the significant process quality of class activity atmosphere ($\beta = -.04$, $p < .05$) disappeared, and the effect size of the process quality of parent-report SES was reduced by half (β from .20 to .09, $p < .001$).

In comparing models, ICC values showed that 97% of the variance was explained at the student level, < 1% at the class level, and 3% at the school level. Pseudo-R^2 values indicated that the fixed effects explained about 52% of the variance from Model 1 onwards. The values of AIC (from 10199.4 to 6775.0), BIC (from 10224.2 to 6707.0), and -2LL (from 10191.4 to 6707.0) progressively decreased from Model 0 to Model 3, indicating better fit with more complex models. Additionally, the improvements in model fit were significant from Model 0 to Model 1 ($\chi^2 = 3016.9$), Model 1 to Model 2 1 ($\chi^2 = 275.3$), and Model 2 to Model 3 1 ($\chi^2 = 192.2$).

Table 15

Predictors of Engaging with Others in Reverse Order

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		.01	.03		.01	.03		.01	.01	
School-Level Structural Quality												
Average Class Size				-.03	.03		-.04	.03		-.01	.01	
School Activity Richness				-00	.03		.01	.03		.00	.01	
Diversity in Education				.04	.03		.05	.03		.03	.01	*
School SES Training				.01	.03		.00	.03		-.02	.01	
School Promotion of SES				.06	.04		.06	.04		.01	.02	
SES as School Aim				-.05	.03		-.05	.03		-.00	.01	
School SES Curriculum				.03	.04		.03	.04		.00	.02	
School SES Evaluation				-.04	.03		-.05	.03		.00	.01	
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.02	.02		-.00	.01	
Teachers' SES Training[a]							-.04	.02	*	-.04	.01	**
Teacher-Report SES[b]							.20	.02	***	.03	.01	**
Teacher-Student Relationship[b]							-.03	.02		-.02	.02	
Class Activity Atmosphere[b]							-.03	.03		-.00	.02	
Active Learning Pedagogy[b]							.01	.02		-.00	.02	
Class Promotion of SES[a]							-.01	.02		.01	.01	
Class SES Evaluation[a]							.03	.02		.03	.01	
SES Feedback[a]							.01	.02		.01	.01	
Individual-Level Process Quality												
Subjective Wellbeing										.21	.02	***
Global Mindedness										.10	.01	***
Growth Mindset about SES										.03	.01	*
Relationship with Friends										.05	.01	**
Relationship with Parents										-.03	.01	*
Relationship with Teachers										-.01	.01	
Closeness with Surroundings										.06	.01	***
Parent-Report SES										.14	.01	***
Home Literacy Environment										.06	.01	***
Non-school Activity Richness										.07	.01	***
Perceived School Climate										.07	.01	***
Perceived School Belonging										.34	.02	***
School Anxiety										-.05	.01	***
Model Fit												
AIC	10184.2			9909.6			9323.7			6609.2		
BIC	10209.0			9938.6			9452.4			6816.0		
Pseudo-R^2 (fixed effects)	.00			.01			.06			.55		
Pseudo-R^2 (total)	.09			.09			.13			.58		
-2LL	10176.2			9885.6			9281.7			6541.2		
ICC												
Student	91%											
Class	3%											
School	6%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	290.6											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	603.9											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	2740.5											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Table 16

Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Collaboration

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		-.76	.11	***	.01	.01		.01	.01	
Individual-Level Process Quality												
Subjective Wellbeing				.21	.02	***	.21	.02	***	.21	.02	***
Global Mindedness				.04	.01	**	.03	.01	*	.03	.01	*
Growth Mindset about SES				.00	.01		.00	.01		.00	.01	
Relationship with Friends				.24	.01	***	.24	.01	***	.24	.02	***
Relationship with Parents				.04	.01	**	.04	.01	**	.04	.01	**
Relationship with Teachers				.02	.01		.02	.01		.02	.01	
Closeness with Surroundings				.08	.01	***	.08	.01	***	.08	.01	***
Parent-Report SES				.20	.03	***	.09	.01	***	.09	.01	***
Home Literacy Environment				.02	.01		.02	.01		.02	.01	
Non-school Activity Richness				.06	.01	***	.06	.01	***	.06	.01	***
Perceived School Climate				.04	.01	**	.04	.01	**	.03	.01	*
Perceived School Belonging				.25	.02	***	.26	.02	***	.26	.02	***
School Anxiety				.03	.01	**	.03	.01	*	.03	.01	*
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.01	.01		-.00	.01	
Teachers' SES Training[a]							-.02	.01		-.01	.01	
Teacher-Report SES[b]							-.00	.01		-.00	.01	
Teacher-Student Relationship[b]							.03	.02		.02	.02	
Class Activity Atmosphere[b]							-.04	.02	*	-.04	.02	
Active Learning Pedagogy[b]							-.02	.02		-.02	.02	
Class Promotion of SES[a]							.01	.01		.01	.01	
Class SES Evaluation[a]							-.01	.01		-.01	.01	
SES Feedback[a]							.02	.01		.02	.01	
School-Level Structural Quality												
Average Class Size										.01	.01	
School Activity Richness										-.03	.01	*
Diversity in Education										-.02	.01	
School SES Training										-.01	.01	
School Promotion of SES										.04	.02	*
SES as School Aim										.00	.01	
School SES Curriculum										-.00	.02	
School SES Evaluation										-.01	.01	
Model Fit												
AIC	10199.4			7208.5			6951.2			6775.0		
BIC	10224.2			7313.0			7110.00			6981.7		
Pseudo-R^2 (fixed effects)	.00			.52			.52			.52		
Pseudo-R^2 (total)	.08			.54			.54			.54		
-2LL	10191.4			7174.5			6899.2			6707.0		
ICC												
Student	97%											
Class	< 1%											
School	3%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	3016.9											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	275.3											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	192.2											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Table 17

Predictors of Collaboration in Reverse Order

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		-.00	.03		-.00	.03		.01	.01	
School-Level Structural Quality												
Average Class Size				-00	.03		-.01	.03		.01	.01	
School Activity Richness				-.04	.03		-.03	.03		-.03	.01	*
Diversity in Education				.00	.03		.01	.03		-.02	.01	
School SES Training				.02	.03		.02	.03		-.01	.01	
School Promotion of SES				.09	.04		.09	.04	*	.04	.02	*
SES as School Aim				-.04	.03		-.05	.03		.00	.01	
School SES Curriculum				.02	.04		.03	.04		-.00	.02	
School SES Evaluation				-.06	.03		-.06	.03		-.01	.01	
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.02	.02		-.00	.01	
Teachers' SES Training[a]							-.01	.02		-.01	.01	
Teacher-Report SES[b]							.10	.02	***	-.00	.01	
Teacher-Student Relationship[b]							.01	.03		.02	.02	
Class Activity Atmosphere[b]							-.07	.03	**	-.04	.02	
Active Learning Pedagogy[b]							.00	.02		-.02	.02	
Class Promotion of SES[a]							.00	.02		.01	.01	
Class SES Evaluation[a]							-.00	.02		-.01	.01	
SES Feedback[a]							.02	.02		.02	.01	
Individual-Level Process Quality												
Subjective Wellbeing										.21	.02	***
Global Mindedness										.03	.01	*
Growth Mindset about SES										.00	.01	
Relationship with Friends										.24	.02	***
Relationship with Parents										.04	.01	**
Relationship with Teachers										.02	.01	
Closeness with Surroundings										.08	.01	***
Parent-Report SES										.09	.01	***
Home Literacy Environment										.02	.01	
Non-school Activity Richness										.06	.01	***
Perceived School Climate										.03	.01	*
Perceived School Belonging										.26	.02	***
School Anxiety										.03	.01	*
Model Fit												
AIC	10199.4			9938.6			9481.7			6775.0		
BIC	10224.2			10012.6			9610.4			6981.7		
Pseudo-R^2 (fixed effects)	.00			.01			.02			.52		
Pseudo-R^2 (total)	.08			.08			.09			.54		
-2LL	10191.4			9914.6			9439.7			6707.0		
ICC												
Student	97%											
Class	< 1%											
School	3%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	276.8											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	474.9											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	2732.7											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Table 18

Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Open-Mindedness

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		-1.06	.10	***	.01	.01		.01	.01	
Individual-Level Process Quality												
Subjective Wellbeing				.19	.02	***	.19	.02	***	.19	.02	***
Global Mindedness				.19	.01	***	.19	.01	***	.19	.02	***
Growth Mindset about SES				.05	.01	***	.04	.01	**	.04	.01	**
Relationship with Friends				.05	.02	**	.04	.02	**	.04	.02	*
Relationship with Parents				-.01	.01		-.01	.01		-.01	.01	
Relationship with Teachers				.05	.01	***	.05	.01	***	.04	.01	**
Closeness with Surroundings				.05	.01	**	.05	.01	**	.05	.01	***
Parent-Report SES				.28	.03	***	.13	.01	***	.13	.01	***
Home Literacy Environment				.08	.01	***	.08	.01	***	.09	.01	***
Non-school Activity Richness				.06	.01	***	.06	.01	***	.06	.01	***
Perceived School Climate				.07	.01	***	.07	.01	***	.07	.01	***
Perceived School Belonging				.21	.02	***	.22	.02	***	.22	.02	***
School Anxiety				-.02	.01		-.02	.01		-.02	.01	
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							.00	.01		.01	.01	
Teachers' SES Training[a]							-.02	.01		-.02	.01	
Teacher-Report SES[b]							.02	.01		.02	.01	
Teacher-Student Relationship[b]							.01	.02		.00	.02	
Class Activity Atmosphere[b]							-.02	.02		-.02	.02	
Active Learning Pedagogy[b]							-.02	.02		-.02	.02	
Class Promotion of SES[a]							.01	.01		.01	.01	
Class SES Evaluation[a]							.01	.01		.01	.01	
SES Feedback[a]							.01	.02		.01	.02	
School-Level Structural Quality												
Average Class Size										.01	.02	
School Activity Richness										-.02	.02	
Diversity in Education										-.00	.02	
School SES Training										-.01	.02	
School Promotion of SES										.01	.02	
SES as School Aim										.03	.02	
School SES Curriculum										-.01	.02	
School SES Evaluation										.02	.02	
Model Fit												
AIC	10191.2			7422.5			7181.1			6985.6		
BIC	10216.0			7527.0			7340.0			7192.3		
Pseudo-R^2 (fixed effects)	.00			.49			.49			.50		
Pseudo-R^2 (total)	.08			.51			.51			.51		
-2LL	10183.2			7388.5			7129.1			6917.6		
ICC												
Student	92%											
Class	2%											
School	6%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	2794.7											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	259.4											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	211.5											

Note. Multilevel modelling was used. *p < .05, **p < .005, ***p < .001.

Table 19

Predictors of Open-Mindedness in Reverse Order

	Model 0			Model 1			Model 2			Model 3		
	β	S.E.	p	*β*	S.E.	p	*β*	S.E.	p	*β*	S.E.	p
Fixed Part												
Intercept	.00	.03		.01	.03		.01	.03		.01	.01	
School-Level Structural Quality												
Average Class Size				-.01	.03		-.02	.03		.01	.02	
School Activity Richness				-.02	.03		-.01	.03		-.02	.02	
Diversity in Education				.01	.03		.02	.03		-.00	.02	
School SES Training				.03	.03		.03	.03		-.01	.02	
School Promotion of SES				.05	.04		.05	.04		.01	.02	
SES as School Aim				-.03	.03		-.03	.03		.03	.02	
School SES Curriculum				.04	.04		.03	.03		-.01	.02	
School SES Evaluation				-.04	.03		-.03	.03		.02	.02	
Class Level (a: Structural Quality, b: Process Quality)												
Teachers' Education Level[a]							-.01	.02		.01	.01	
Teachers' SES Training[a]							-.03	.02		-.02	.01	
Teacher-Report SES[b]							.16	.02	***	.02	.01	
Teacher-Student Relationship[b]							-.00	.03		.00	.02	
Class Activity Atmosphere[b]							-.06	.03	*	-.02	.02	
Active Learning Pedagogy[b]							-.00	.02		-.02	.02	
Class Promotion of SES[a]							.00	.02		.01	.01	
Class SES Evaluation[a]							.00	.02		.01	.01	
SES Feedback[a]							.01	.02		.01	.02	
Individual-Level Process Quality												
Subjective Wellbeing										.19	.02	***
Global Mindedness										.19	.02	***
Growth Mindset about SES										.04	.01	**
Relationship with Friends										.04	.02	*
Relationship with Parents										-.01	.01	
Relationship with Teachers										.04	.01	**
Closeness with Surroundings										.05	.01	***
Parent-Report SES										.13	.01	***
Home Literacy Environment										.09	.01	***
Non-school Activity Richness										.06	.01	***
Perceived School Climate										.07	.01	***
Perceived School Belonging										.22	.02	***
School Anxiety										-.02	.01	
Model Fit												
AIC	10191.2			9923.6			9440.3			6985.6		
BIC	10216.0			9997.6			9569.0			7192.3		
Pseudo-R^2 (fixed effects)	.00			.01			.03			.50		
Pseudo-R^2 (total)	.08			.08			.10			.51		
-2LL	10183.2			9899.6			9398.3			6917.6		
ICC												
Student	92%											
Class	2%											
School	6%											
$\chi^2_{change\ from\ Model\ 0\ to\ Model\ 1}$	283.6											
$\chi^2_{change\ from\ Model\ 1\ to\ Model\ 2}$	501.3											
$\chi^2_{change\ from\ Model\ 2\ to\ Model\ 3}$	2480.7											

Note. Multilevel modelling was used. *p < .05, **p <. 005, ***p < .001.

Similar to the model of Task Performance, a model with reverse order is presented in Table 17. Individual-level process quality remained more significant compared to class and school-level structural and process quality. However, when individual-level process quality was included in Model 3, the significant process quality of teacher-report SES (β = .10, p < .001) and class activity atmosphere (β = -.07, p < .005) disappeared and the effect size of the structural quality of school promotion of SES was reduced by half (β from .09 to .04, p < .05).

4.3.5 Individual, Class, and School-Level Structural and Process Quality Predictors of Students' Open-Mindedness

As presented in Table 18, individual-level process quality was also more significant to students' open-mindedness compared to class-level structural and process quality and school-level structural quality. Specifically, at the individual level, subjective wellbeing (β = .19, p < .001), global mindedness (β = .19, p < .001), parent-report SES (β = .13, p < .001), and perceived school belonging (β = .22, p < .001) exhibited relatively strong positive effects in predicting students' emotional regulation. Other factors such as growth mindset about SES (β = .05, p < .005), relationship with friends (β = .05, p < .05), relationship with teachers (β = .05, p < .005), closeness with surroundings (β = .05, p < .001), home literacy environment (β = .08, p < .001), non-school activity richness (β = .06, p < .001), and perceived school climate (β = .07, p < .001) also demonstrated significant, though weaker, positive effects. At class and school levels, no statistically significant (p < .05) factors were found on predicting students' open-mindedness. Notably, when school-level structural quality was included in Model 3, the effect size of the process quality of parent-report SES was reduced by half (β from .28 to .13, p < .001).

In comparing models, ICC values showed that 92% of the variance was explained at the student level, 2% at the class level, and 6% at the school level. Pseudo-R^2 values indicated that the fixed effects explained about 49% of the variance from Model 1 onwards. The values of AIC (from 10191.2 to 6985.6), BIC (from 10216.0 to 7192.3), and -2LL (from 10183.2 to 6917.6) progressively decreased from Model 0 to Model 3, indicating better fit with more complex models. Additionally, the improvements in model fit were significant from Model 0 to Model 1 (χ^2 = 2794.7), Model 1 to Model 2 1 (χ^2 = 259.4), and Model 2 to Model 3 1 (χ^2 = 211.5).

Similar to the model of Task Performance, a model with reverse order is presented in Table 19. Individual-level process quality remained more significant compared to class and school-level structural and process quality. However, when individual-level process quality

was included in Model 3, the significant process quality of teacher-report SES (β = .16, p < .001) and class activity atmosphere (β = -.06, p < .05) disappeared.

5. Discussion

This chapter discusses and interprets the key findings of this research, the limitations, the implications, and the conclusion of this study.

5.1 Findings and Interpretations

This research investigated the relations and variances in different domains and sub-domains of Chinese students' social and emotional skills (SES) as reported by students, parents, and teachers, as well as the multilevel influential factors of SES at the individual, class, and school levels, within the context of structural and process quality. Findings and interpretations are addressed according to the two research questions.

5.1.1 What are the Correlations and Differences in the Perceptions of Students' SES among Students, Parents, and Teachers (RQ1)

For the first research question, the study revealed distinct perceptions of students' SES among students, parents, and teachers, across various domains and sub-domains.

5.1.1.1 Within-Group Correlations among SES Domains

Firstly, the study found strong positive within-group correlations among all SES domains for all reporters, with the strongest correlations all being between engaging with others and open-mindedness ($r_{Students}$ = .735, $r_{Parents}$ = .725, $r_{Teachers}$ = .841, $p < .001$). When comparing within-group correlations among reporters, teachers tended to observe the highest correlations among SES domains, while parents reported the weakest, indicating that teachers perceived different domains of SES as more interrelated.

The findings correspond with previous research, which indicates strong correlations between scales measuring different types of SES reported by the same individual (Kankaraš et al., 2019). Admittedly, this may be attributed to the limitations inherent in the self-report method. One such limitation is the 'rater effect', where an individual's self-assessments across various skills show strong correlations, as noted by Stanger and Lewis (1993). This effect underscores the importance of using multi-report methods to address measurement issues associated with single-report data, therefore enhancing the validity of individual assessments. Additionally, potential biases in self-reporting may contribute to the observed within-group correlations. These biases can artificially inflate correlations, as individuals may consistently overestimate or underestimate their abilities across different domains. This tendency is partially explained by the Dunning-Kruger effect (McIntosh et al., 2019), where individuals with lower skill levels are more likely to overestimate their abilities, while those with higher skill levels tend to underestimate their abilities.

However, the high within-group correlations may also indicate similarities and overlaps in the lower-order structure of SES constructs, reflecting their interrelated nature. Take the strongest correlations between engaging with others and open-mindedness as an example, it suggests a potential linkage between these traits. Specifically, individuals who are open to exploring various ideas and experiences (open-mindedness, Kankaraš & Suarez-Alvarez, 2019) may be better at thriving and excelling in social interactions (engaging with others, Kankaraš & Suarez-Alvarez, 2019). Research supports this view, suggesting that open-mindedness is social in nature (Kwong, 2021), which could explain its association with engaging with others.

In terms of teachers' more interrelated perceptions of different SES domains, the first possible reason can be the distinct contexts in which they assess children. Specifically, parents tend to evaluate their children's abilities across various home settings, while teachers typically assess students in structured and consistent classroom environments (John & De Fruyt, 2015). This more stable context may contribute to the greater consistency observed in teachers' assessments of students' abilities. Furthermore, the significant emphasis on SES within teacher evaluation frameworks may also explain teachers' higher within-group correlations among SES domains. Teachers often have access to structured assessment frameworks that prioritize SES (Yoder, 2014), enabling them to form more integrated assessments of students' SES. In contrast, parents' evaluations are less likely to be guided by such frameworks and may therefore be more variable. However, this consistency may also reflect teachers' potential bias, as research suggests that teachers' assessments of students' behaviours can be influenced by students' academic performance (Krolak-Schwerdt et al., 2013), potentially leading to an underestimation of SES factors but overemphasis on academic factors.

5.1.1.2 Cross-Reporter Correlations among SES Domains

Secondly, the study found positive weak to moderate cross-reporter correlations on all domains and subdomains of SES perceptions. Among them, correlations on engaging with others (r_1) were the strongest and emotional regulation (r_2) was the weakest among student-parent correlations (r_1 = .310, r_2 = .219, $p < .001$) and student-teacher correlations (r_1 = .217, r_2 = .087, $p < .001$). Moreover, the strongest average correlations among groups across all SES domains were the student-parent correlations ($r_{\text{Task Performance}}$ = .220, $r_{\text{Emotional Regulation}}$ = .219, $r_{\text{Engaging with Others}}$ = .310, $r_{\text{Collaboration}}$ = .227, $r_{\text{Open-Mindedness}}$ = .274, $p < .001$).

The findings revealed a limited overlap among students, parents, and teachers in their perceptions of students' SES, aligning with previous research that suggests minimal congruence across different raters' assessments of personality traits (Marsh, 2008). While this

was not the primary focus of the study, the correlations observed among the assessments by students, parents, and teachers regarding the same SES skills provide insights into the convergent validity, the degree to which different measures of the same concept align (Carlson & Herdman, 2012), of various SES scales. For instance, the consensus on engaging with others, which showed stronger correlations compared to emotional regulation, suggests a higher convergent validity for the former than the later.

The importance of this finding lies in understanding the degree of alignment between students, parents, and teachers concerning students' SES, highlighting domains of agreement and divergence. The greater overlap in perceptions of engaging with others than emotional regulation between students and parents, as well as between students and teachers, indicates more consistent views on social engagement skills than on emotional regulation skills. This discrepancy may be attributed to variations in student behaviours across different contexts (Kankaraš, 2023), as research indicates that young children tend to exhibit more negative emotions in front of parents than peers (Zeman & Garber, 1996). This suggests that students' social engagement behaviours are more consistent across different settings compared to their emotional regulation skills. Thus, the findings underscore the complexity and multidimensional nature of SES as a personality trait, manifesting differently depending on the context (Abrahams, 2019).

It is noteworthy that although cross-reporter correlations in SES perceptions are generally small, the actual associations might be stronger. Research indicates that using different informants to assess the same construct often underestimates true correlations due to measurement errors unique to each rater (Conway, 2002). Additionally, the student-parent correlation being the strongest across all SES domains aligns with previous findings (Kankaraš, et al., 2019). This could be due to teachers having limited insight into certain aspects of students' abilities, resulting in lower student-teacher and teacher-parent correlations compared to student-parent correlations. Alternatively, the objectivity of teachers' assessments might differ from that of parents and students. Given their extensive experience with a wide range of students, teachers may assess students' SES more objectively than parents and students themselves (Kankaraš & Suarez-Alvarez, 2019), possibly explaining the weaker correlations between teachers and other groups.

5.1.1.3 Within-Group Differences among SES Domains

Thirdly, the study found significant differences between pairs of SES domains for the perceptions of students, parents, and teachers, but all groups agreed that collaboration is the students' strongest skill. For other skills, students perceived themselves as more open-minded

but less good at engaging with others, while parents viewed their children as more open-minded but less capable of task performance. Teachers, on the other hand, provided a more uniform perception across all SES domains.

The findings indicate that students, parents, and teachers all recognize that the Big Five Model of SES encompasses five distinct domains, which underscores the model's efficacy in accurately representing the essential components of SES. This consensus among different groups of reporters indicates both the broad acceptance and practical applicability of the model within the Chinese context. Consequently, this research fills a gap in the existing knowledge regarding the SES development of Chinese students, as highlighted by the OECD (2022). Furthermore, the study emphasises the importance of focusing on specific skills and domains within SES, rather than solely concentrating on the overarching concept, therefore advocating for a nuanced understanding of SES and its various combinations (also see in Kankaraš & Suarez-Alvarez, 2019).

It is noteworthy that students, parents, and teachers all identified collaboration as the strongest SES among students. According to Kankaraš (2023), students' behaviours can vary across different settings, making this consensus particularly significant. It suggests that students may exhibit their collaborative abilities consistently across various contexts. Additionally, the combination of self-reports and reports from others provides a more comprehensive assessment of these skills (Connelly & Ones, 2010). Thus, the agreement on students' strong collaborative abilities provides robust evidence of their excellence in this area compared to other SES. This could be attributed to the increased emphasis on cultivating collaborative skills nowadays (Child & Shaw, 2016), which has provided children with more opportunities to develop these abilities, therefore making collaboration a standout SES.

Interestingly, students perceived a strong correlation between their skills in engaging with others and open-mindedness. However, they rated themselves as more open-minded but less good at engaging with others. This discrepancy could be due to overconfidence in their open-mindedness or a lack of confidence in their social engagement skills. Nonetheless, the research also shows that parents rate students' open-mindedness skills highest among SES and note that students' social engagement behaviours are the most consistent across different settings. This suggests an alternative explanation: students may recognize the importance and interrelation of both skills but find it challenging to apply open-mindedness in social interactions. This indicates a potential need for support and guidance to help students effectively use their open-mindedness in developing social engagement skills.

5.1.1.4 Cross-Reporter Differences among SES Domains

Fourthly, the study found notable differences between students, parents, and teachers in their perceptions of all SES domains. Generally, students viewed their SES more positively, except in assertiveness, where parents had a more favourable view. Parents generally had a more positive view of their children's skills in domains of engaging with others, collaboration, and open-mindedness, whereas teachers had a more positive perception of students' task performance.

The findings indicate significant differences in how students, parents, and teachers perceive the students' SES, with each group exhibiting distinct perceptions. There can be two primary explanations for these differences. The first explanation for the perceptual differences could be measurement errors. Specifically, individuals may misunderstand the questions or have difficulty recalling necessary information when using self-report methods (Kankaraš & Suarez-Alvarez, 2019), leading to inconsistent perceptions. Alternatively, the differing standards used by students, parents, and teachers to evaluate students' SES could explain these perceptual discrepancies. However, prior research has also found distinct differences in behaviours reported by students, parents, and teachers (Marsh & Byrne, 1993), suggesting that these perception differences might be more accurately attributed to variations in how certain skills are manifested and noticed in different contexts and by different groups (Marsh & Byrne, 1993).

Additionally, students tended to have more optimistic views of their SES compared to parents and teachers, aligning with previous studies that highlight students' generally positive self-perceptions (Newgent et al., 2009). This phenomenon may be explained by students' tendency to overestimate their abilities or by greater measurement errors within the younger group (Soto et al., 2011). Further support for this explanation comes from research indicating that the discrepancies between self-reports and other reports vary with age, being less pronounced in younger children and becoming more significant during adolescence (Göllner et al., 2016).

An exception to these trends was observed in the skill of assertiveness, where parents rated students more positively than teachers. One possible explanation is that parents overestimate their children's assertiveness, possibly underestimating their children's levels of worry and anxiety and overestimating their optimism (Lagattuta et al., 2012). Alternatively, as SES can manifest differently depending on the context (Abrahams, 2019), it is plausible that children display more assertiveness when interacting with parents than in other settings. This may also account for the perceptual differences between parents and teachers, where parents

are generally more optimistic about students' interpersonal skills, while teachers are more optimistic about students' task-related skills. This difference may arise because students have more opportunities to exhibit interpersonal skills with parents and task-related skills with teachers. However, the exception of the assertiveness skill can also be explained by the cultural specificity in China, where assertive skills are less valued compared with Western cultures (Chen et al., 2006). Therefore, a lower perception of assertiveness skill in students still reflects a more positive understandings of their abilities.

5.1.2 To What Extent Do Individuals, Class, and School-Level Process and Structural Quality Predict Students' Social and Emotional Skills in the Five Domains (RQ2)

For the second research question, the study identified the multilevel structural and process quality predictors influencing SES at the individual, class, and school levels across five domains, within the context of structural and process quality.

5.1.2.1 Predominantly Important Individual-Level Process Quality Predictors

The study found that individual-level process quality has a more significant influence on students' SES across all five domains than class-level structural and process quality and school-level structural quality. This pattern persisted regardless of whether individual-level or school-level quality predictors are introduced into the model first. Nevertheless, incorporating structural and process quality from individual, class, and school levels collectively enhanced the model's explanatory power in accounting for SES variations.

The findings underscore the crucial role of individual-level process quality in explaining different domains of SES, aligning with the data from an analysis of ten cities, which indicated no significant differences at the class or school level in students' SES development (OECD, 2023). This consistency suggests that the dominance of individual process quality in shaping students' SES in Suzhou has cross-cultural relevance. The results highlight that individual process quality may outweigh the influence of broader educational settings in shaping students' SES. This could be attributed to students using their immediate learning environment as a reference for self-assessment (OECD, 2021a), causing variances within classrooms and schools rather than between them. This finding points to the potential need for standardized assessment frameworks to assist students in self-assessing and enhancing their self-awareness of their SES, therefore supporting their development. Furthermore, although effect size of some structural and process quality predictors changed when predictors from other levels were introduced, the sequence in which individual, class, and school-level structural and process quality are entered into the model does not affect the predominant role of individual process quality predictors, reinforces the conclusion that individual-level process

quality are more influential than class- and school-level structural and process quality in shaping students' SES. However, it is also important to acknowledge that class- and school-level structural and process quality still play a role in influencing SES.

5.1.2.2 Differences between Individual-Level Process Quality Predictors in SES

Although most individual-level process quality in this study were found to be significant, indicating their role in shaping SES development, the research also identified certain process quality predictors as particularly influential across multiple SES domains. Specifically, subjective wellbeing and perceived school belonging emerged as strong influences across all five domains of SES. Additionally, parent-reported SES significantly impacted all domains except emotional regulation. Global mindedness was notably influential in the domains of task performance, engaging with others, and open-mindedness. A strong effect of school anxiety was found to exist in the domain of task performance and emotional regulation. Interestingly, student-perceived relationships with teachers were not significantly influential in SES domains except for open-mindedness.

These findings align with previous research that underscores the importance of subjective wellbeing (Strickhouser & Zell, 2017) and students' perceived school belonging (Korpershoek et al., 2019) in shaping students' SES. This study extends existing research by demonstrating the consistent effectiveness of these factors across all five SES domains, suggesting that educational interventions focusing on enhancing subjective wellbeing and school belonging could be particularly beneficial. It is important to note that while perceived school belonging is considered an individual factor, it can be influenced by broader contextual factors, such as the school environment.

Furthermore, the influence of parent-reported SES on students' SES, which aligns with other findings in this research, showed that student-parent correlation was the strongest across all SES domains and emotional regulation was the weakest among student-parent correlations. This suggests a need for targeted educational tools to help parents better support their children's emotional regulation. Regarding school anxiety, this study's findings support earlier work by Magelinskaitė et al. (2014), indicating that school anxiety has a more substantial impact on intrapersonal skills compared to interpersonal skills. This could be explained by the fact that anxiety is more closely related to intrapersonal skills, as research has shown that anxiety levels are more influenced by intrapersonal management strategies than by interpersonal management strategies (Lotfi et al., 2021).

The unexpected result concerning student-perceived relationships with teachers, which appeared to influence only the domain of open-mindedness, contrasts with previous studies

that reported positive correlations between teacher-student relationships and students' SES (Poulou, 2015). This discrepancy may result from differences in how teachers and students perceive their relationships (Poulou, 2017). Given the critical role of teachers in student development (Chetty, 2014), it is essential to consider both students' and teachers' perspectives in assessing the impact of these relationships on SES. While students may not always recognize the influencing role of these relationships on SES, teachers' perspectives might offer a more accurate reflection of the influence on students' development, as research indicates that others' ratings can have more predictive value than self-rating (Lindqvist & Vestman, 2011).

5.1.2.3 Significant Class- and School-Level Structural and Process Quality Predictors

At the class-level structural and process quality, the research identified the process quality of teacher-reported SES in predicting students' SES in the domain of task performance and engagement with others. Additionally, the structural quality of teachers' SES training was found to predict students' SES in the domain of engaging with others. At the school-level structural quality, the research found that school SES education predicted students' emotional regulation, diversity in education predicted students' engaging with others, and both school activity richness and school promotion of SES predicted students' collaboration skills.

The effect of teacher-reported SES on students' SES development aligns with previous research on the role of teachers' assessments in predicting various student behaviours (Segal, 2012). The predictive value of teacher-reported SES specifically in the domains of task performance and engaging with others, but not in the other three domains, may be attributed to teachers' opportunities to observe and understand specific student skills (Kankaraš, 2023). The finding extends previous research by specifying the domains of SES influenced by teachers' assessment. Regarding the impact of teachers' SES training on students' SES, which corresponds with earlier studies (Alvarez, 2007), this study highlights the specific domain of engaging with others where teacher's SES training has the most influence. This suggests the effectiveness of teacher training to support students' SES development comprehensively.

Furthermore, the study's findings on school-level structural quality confirm the significance of school SES evaluation (OECD, 2023), diversity in education (Murray-Larrier & NCSC, 2021), school activity richness (Blatt-Gross, 2010; Morales et al., 2016), and school promotion of SES (Moreira et al., 2014) in predicting students' SES. Importantly, the research demonstrates that different school-level structural quality has specific influences on various SES domains, underscoring the importance of targeted interventions to develop specific aspects of students' SES.

5.1.2.4 Possible Interactions between Structural and Process Quality at Different Levels

The study also revealed that the effect size of some structural and process quality predictors changed significantly when predictors from other levels were included in the model, suggesting interactions between structural and process quality from different levels.

Specifically, when individual-level process quality was added first, followed by class- and school-level structural and process quality, it was found that individual-level process quality such as growth mindset related to SES and parent-reported SES were influenced by higher-level structural and process quality in predicting students' SES. Class-level structural and process quality such as class SES evaluation and class activity atmosphere were also found to be influenced by higher school-level structural quality. Conversely, when predictors were added in the order of school level, class level, and individual level, the relationships between predictors of school SES evaluation, school promotion of SES, teacher-reported SES, and class activity atmosphere with students' SES were influenced by lower-level predictors. These findings suggest potential mediation or moderation effects between structural and process quality at different levels and the outcome variables, calling for further research to confirm these interactions. Regardless of future research outcomes, these findings emphasise the importance of considering multilevel structural and process quality predictors of SES and the complex relationships between these predictors in shaping students' SES development.

5.2 Limitations of this Study

The research is subject to limitations. The first limitation is the limitation of the data. Specifically, the SSES 2019 dataset, which lacks longitudinal data, prevents an understanding of changes and developments in students' SES over time. Moreover, the dataset exclusively includes participants from Suzhou city and focuses solely on the 10-year-old cohort. The geographic and demographic restriction limits the generalizability of the findings, as it does not account for SES development across different age groups or regions within China.

Secondly, there are limitations related to the data collection methods employed. Although multiple reports from student themselves, their parents, and their teachers were used to assess students' SES, these reports are self-report and, therefore, subject to limitations such as respondents' limited knowledge and memory biases (Connelly & Ones, 2010). Therefore, while utilizing multiple reports can offer complementary insights, the limitations associated with self-reported data persist.

Finally, the limitations of the data analysis methods also exist. While multilevel modelling was employed to analyse the hierarchically structured data, this approach presents

challenges when attempting to explore moderation and mediation effects between variables at different levels. Such complexities can obscure a comprehensive understanding of the interactions and mechanisms through which various factors influence students' SES.

5.3 Implications of this Study

This study has several implications for both theoretical contributions and practical applications.

5.3.1 Theoretical Contributions

Firstly, this study provided a culturally specific perspective on children's SES development by focusing on Chinese children, who outperform their peers in other countries on academic PISA tests and live in a context distinct from Western cultures. By examining the SES development of Chinese children (For example, this study found that Chinese students viewed their SES more positively except in assertiveness, a skill that is less valued in Chinese context compared with Western cultures), this study contributed to the cross-cultural and cross-skill understanding of children's development worldwide.

Additionally, this study offered a more comprehensive understanding of SES by exploring specific domains and subdomains rather than just the broad category of SES and by examining how different reporters perceive students' SES. This contributes to more targeted research aimed at supporting the development of specific SES domains and more tailored support to students, parents, and teachers.

Moreover, this study enhanced the understanding of the complex factors that interact and contribute to SES development. By categorizing these factors within both structural and process quality framework and across multiple levels (individual, class, and school), the study helped to organise and understand the intricate dynamics involved from both a synthesized and detailed perspective.

5.3.2 Practical Applications

In addition to its theoretical contributions, this study offers several practical applications for Chinese students, parents, teachers, school administrators, and policymakers in promoting the structural and process quality of students' SES.

For students in China, who generally possess an optimistic view of their SES, are encouraged to integrate their self-perceptions with those of their parents and teachers when evaluating their SES development. This approach is particularly relevant for areas such as emotional regulation, where there is often a discrepancy between the students' self-assessments and the perceptions of others. Additionally, given the strong correlation between social engagement and open-mindedness in students' perceptions of SES, but their relative lack of

confidence in social engagement, students should take advantage of their open-mindedness to enhance their social engagement skills. Furthermore, to effectively improve the process quality of SES development, students are advised to foster their subjective well-being and sense of school belonging, as these factors are consistently predictive across different SES domains.

For parents in China, whose perceptions of their children's SES are more closely aligned with those of the children than with teachers, are encouraged to consider both their children's school behaviours and teachers' assessments for a comprehensive understanding of SES development, particularly regarding task-related skills. To enhance the process quality of SES development, parents should focus on better understanding and supporting their children's emotional regulation skills, as parent-reported SES influences all SES domains except for emotional regulation.

For teachers in China, given that they perceive the various SES domains as more interconnected compared to students, there is a need for increased communication among teachers, parents, and students. Teachers are also encouraged to share their assessment standards and provide feedback on students' SES development. To further enhance the structural and process quality of SES development, teachers are encouraged to pursue additional SES training, with a particular emphasis on skills related to social engagement, as such training has been shown to positively influence students' SES in this area.

For school administrators, to improve the structural quality of students' SES development, they are advised to implement targeted strategies that address specific SES domains. These strategies include promoting SES education to enhance emotional regulation, fostering diversity to improve social engagement, and enriching school activities and SES promotion efforts to develop collaboration skills.

For policymakers in China, they are encouraged to focus on promoting specific SES skills and domains rather than the overarching SES concept, given the significant variations among different SES domains. Additionally, the enactment of standardized assessment frameworks is recommended to aid students, parents, and teachers in achieving a more comprehensive and objective evaluation of students' SES development.

5.4 Conclusion

The study conducted a secondary data analysis to investigate the relationships and variances in different domains and sub-domains of SES among Chinese students, as reported by students, parents, and teachers, as well as the multilevel factors influencing SES at the individual, class, and school levels, within the context of structural and process quality. The findings reveal distinct perceptions of students' SES across various domains and sub-domains

among students, parents, and teachers. Moreover, individual-level process quality is found to significantly influence students' SES across all five domains more than class-level structural and process quality and school-level structural quality. However, incorporating structural and process quality factors from individual, class, and school levels also helps explain variations in SES. For example, school-level structural quality factors such as school SES education predicted students' engagement with others, and both school activity richness and school promotion of SES predicted students' collaboration skills. The potential mediation and moderation effects between structural and process quality at different levels and SES call for further research to confirm these interactions. Overall, this study provides an empirical foundation for informing policies and interventions, contributing to the development of more effective educational programs that support the holistic wellbeing of children.

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Appendix A: Assumption Checks

Variable types and non-zero variance, normality, no perfect multicollinearity, homoscedasticity, and independent errors (Field et al, 2012, p. 219; p. 412; p. 271) were checked before conducting Pearson correlation coefficients, general linear model, and multilevel modelling.

Variable Types and Non-Zero Variance

All the explanatory variables were quantitative with variation in value and all the outcome variables were quantitative, continuous and unbounded, which met the assumptions of variable types and non-zero variance (Field et al, 2012, p. 271).

Normality

Normality tests were conducted with Skewness and Kurtosis for each scale and domains of SES shown in the table below. With Skewness within ± 1 and Kurtosis within ± 3 (Field, 2018, p. 347), the assumption of normality was met, except for the student-reported Trust.

		Students' Perceptions		Parents' Perceptions		Teachers' Perceptions	
		Skewness	Kurtosis	Skewness	Kurtosis	Skewness	Kurtosis
Task Performance	Self-control	-.19	-.07	.05	.42	-.36	.54
	Responsibility	-.50	.03	-.06	-.01	-.37	.28
	Persistence	-.57	-.04	-.08	.10	-.54	.13
	Average	-.43	-.06	-.05	.32	-.43	.21
Emotional Regulation	Stress resistance	-.36	-.49	-.20	.13	.03	.27
	Emotional control	-.55	.08	-.09	.22	-.33	.17
	optimism	-.92	1.06	-.22	.55	-.36	.66
	Average	-.46	-.11	.00	.22	.18	.20
Engaging with Others	Energy	-.38	-.11	.03	.07	.00	-.24
	Assertiveness	-.05	-.28	-.05	.32	.03	-.06
	Sociability	-.83	.93	-.12	.04	-.39	.78
	Average	-.28	.02	.08	.19	-.03	.23
Collaboration	Empathy	-.50	.22	-.06	.27	-.35	.80
	Trust	-1.16	1.38	-.21	.84	-.06	.66
	Co-operation	-.85	.65	-.31	.40	-.46	.61
	Average	-.77	.76	-.12	.46	-.30	.88
Open-Mindedness	Tolerance	-.59	.29	.09	-.04	-.15	.32
	Curiosity	-.66	.48	-.08	.00	-.52	.41
	Creativity	-.48	-.04	.04	-.06	-.26	.15
	Average	-.48	.19	.07	.04	-.35	.52

No Perfect Multicollinearity

All the predictors for different domains of SES were reported in the correlation matrix since the multicollinearity of data can be ruled out by examining the correlation coefficients (Field et al, 2012, p. 774). With all the coefficients < .9 (Field et al, 2012, p. 774), this assumption was met. The details of correlation matrix could be found in Appendix B.

Homoscedasticity

As shown in the figures below, the residuals at each level of the predictors for different SES domains were randomly scattered around the horizontal line, indicating the same variance to meet the assumption of homoscedasticity (Field et al, 2012, p. 272).

Independent Errors

This assumption was examined through the Durbin-Watson test for each SES outcome domains for serial correlations between errors (Field et al, 2012, p. 272). With values closely around 2, this assumption was met (task performance = 1.93, emotional regulation = 2.03, engaging with others = 1.88, collaboration = 1.88, open-mindedness = 1.87).

Appendix B: Correlation Matrix

Table B1

Correlation Matrix for Predictors of Task Performance

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	1																														
2	.01	1																													
3	.01	-.14	1																												
4	-.00	-.02	-.02	1																											
5	-.00	-.06	-.08	.03	1																										
6	.00	-.15	.06	.00	.08	1																									
7	-.01	-.06	-.06	.02	-.04	-.03	1																								
8	-.00	-.15	-.06	-.01	-.15	-.12	-.10	1																							
9	-.00	.04	-.01	-.03	.01	-.07	-.04	-.01	1																						
10	.00	-.09	-.18	-.01	-.03	-.05	-.07	-.05	.01	1																					
11	-.01	-.08	-.15	.07	.01	.04	-.05	-.06	-.01	-.23	1																				
12	-.00	-.08	-.16	.06	-.15	.06	-.04	-.04	-.01	-.05	-.04	1																			
13	-.00	-.21	-.00	-.16	-.32	-.19	-.16	-.09	-.07	-.01	-.05	-.06	1																		
14	-.00	.09	.03	.15	.01	.13	-.01	-.01	.02	.03	.05	-.07	.14	1																	
15	-.02	.02	-.00	-.00	-.03	-.02	-.01	.00	.02	.01	-.01	.01	.03	.01	1																
16	-.01	.00	.01	.01	-.00	-.02	.02	-.02	-.00	-.01	-.01	-.03	.02	-.00	.09	1															
17	-.01	.03	-.01	-.05	-.02	-.03	-.07	.03	-.20	-.02	.00	.01	-.06	.00	.02	-.03	1														
18	-.00	.00	-.00	-.01	-.03	.01	.02	.00	.01	-.02	-.03	.02	.02	-.00	-.01	-.04	-.09	1													
19	.01	.01	.01	.01	.03	-.00	-.00	-.00	.01	.01	.05	-.01	-.01	.01	-.03	-.03	-.01	-.63	1												
20	-.01	-.03	-.00	.00	.00	.01	.00	-.00	.00	.00	.01	-.00	-.02	-.02	-.03	-.2	-.03	-.03	-.07	1											
21	.01	.02	-.02	.00	-.00	.02	-.01	.02	.03	.03	-.01	.02	-.02	.01	.01	-.24	-.03	-.05	-.15	-.02	1										
22	-.01	-.02	.01	-.01	-.02	.02	-.01	.01	-.01	-.00	.01	-.01	.02	.02	.04	-.06	-.00	.03	-.11	-.03	-.26	1									
23	.01	-.00	.01	.02	-.02	.00	-.01	.01	.01	-.00	-.02	-.01	.01	.03	.02	-.11	-.03	-.10	-.03	-.43	.05	-.03	1								
24	-.00	.03	-.01	-.01	.00	-.03	.01	-.01	.05	.02	.02	-.01	-.01	-.01	-.01	-.01	-.03	-.02	.08	.02	.03	-.03	-.03	1							
25	.02	.01	.01	-.00	.01	-.00	-.01	.02	.05	-.04	.02	-.02	-.02	-.01	-.06	-.01	.03	-.03	-.02	-.01	.00	-.02	.03	-.05	1						
26	-.00	-.04	.02	.03	-.03	.03	-.03	.02	-.03	-.01	-.02	.01	.01	.02	.02	-.05	-.02	-.04	.03	-.06	.03	-.01	.04	-.18	-.09	1					
27	-.01	.03	-.05	-.02	.03	-.02	-.01	-.01	.01	-.03	-.01	.02	-.01	.01	-.03	.02	.02	.03	-.00	-.03	.00	-.04	-.02	-.08	-.23	.01	1				
28	.01	-.00	-.02	.01	-.01	-.01	-.02	-.00	.01	.03	.01	-.01	-.00	.01	.02	-.01	-.01	-.03	-.02	-.01	.01	.04	.02	.21	-.09	.03	-.15	1			
29	-.02	.01	.03	-.00	-.01	-.01	.02	.02	.03	.05	-.01	.01	-.01	.02	.04	-.04	-.02	-.01	.01	.03	.06	.01	-.01	-.04	-.01	-.03	.02	-.22	1		
30	.01	.02	-.01	.00	-.01	.01	.01	-.01	-.03	-.06	-.00	-.01	.00	.01	.00	-.00	.02	-.03	.03	-.01	.02	-.05	.01	-.03	.02	-.14	.01	-.54	-.11	1	
31	-.02	-.01	.03	.01	.03	.01	.03	.01	.00	.03	-.02	-.00	-.02	-.02	-.02	-.00	-.03	.06	-.01	-.00	-.05	-.02	-.04	-.17	-.11	.03	-.08	-.21	.10	-.11	1

Note. 1 = Intercept, 2 = Subjective Wellbeing, 3 = Global Mindedness, 4 = Growth Mindset about SES, 5 = Relationship with Parents, 6 = Relationship with Friends, 7 = Relationship with Teachers, 8 = Closeness with Surroundings, 9 = Parent-Report SES, 10 = Home Literacy Environment, 11 = Non-School Activity Richness, 12 = Perceived School Climate, 13 = Perceived School Belonging, 14 = School Anxiety, 15 = Teachers' Education Level, 16 = Teachers' SES Training, 17 = Teacher-Report SES, 18 = Teacher-Student Relationship, 19 = Class Activity Atmosphere, 20 = Active Learning Pedagogy, 21 = Class Promotion of SES, 22 = Class SES Evaluation, 23 = SES Feedback, 24 = Average Class Size, 25 = School Activity Richness, 26 = Diversity in Education, 27 = School SES Training, 28 = School Promotion of SES, 29 = SES as School Aim, 230 = School SES Curriculum, 31 = School SES Evaluation.

Table B2

Correlation Matrix for Predictors of Emotional Regulation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	1																														
2	.01	1																													
3	.01	-.14	1																												
4	-.00	-.02	-.01	1																											
5	-.00	-.06	-.08	.03	1																										
6	.00	-.14	.06	-.00	.08	1																									
7	-.01	-.05	-.06	.01	-.05	-.03	1																								
8	-.00	-.15	-.05	-.01	-.15	-.13	-.10	1																							
9	-.00	-.02	-.02	-.02	-.00	-.03	-.02	-.02	1																						
10	.00	-.09	-.19	-.01	-.03	-.05	-.08	-.05	-.01	1																					
11	-.01	-.08	-.15	.07	.00	.04	-.05	-.06	.01	-.24	1																				
12	-.00	-.09	-.16	.06	-.15	.06	-.04	-.04	.00	-.06	-.04	1																			
13	-.00	-.20	-.00	-.16	-.32	-.19	-.17	-.09	-.09	-.01	-.05	-.06	1																		
14	-.00	.09	.03	.15	.01	.13	-.01	-.01	.05	.03	.05	-.07	.14	1																	
15	-.02	.02	-.00	-.00	-.03	-.01	-.00	.00	-.00	.01	-.01	.01	.03	.01	1																
16	-.01	.00	.01	.01	.00	-.03	.02	-.02	-.00	-.01	-.01	-.03	.01	-.00	.10	1															
17	-.00	.00	-.02	-.01	-.01	-.01	-.06	.01	-.07	-.05	.01	.00	-.05	.01	.01	-.01	1														
18	-.00	.00	-.00	-.02	-.04	.01	.03	.00	.02	-.02	-.03	.02	.02	-.00	-.01	-.04	-.17	1													
19	.01	.01	.00	.00	.03	-.00	-.01	-.00	-.01	.00	.05	-.01	-.01	.01	-.03	-.03	.07	-.64	1												
20	-.00	-.03	-.00	.00	.00	.01	.00	-.00	-.01	.00	.01	-.00	-.03	-.02	-.03	-.20	-.04	-.03	-.07	1											
21	.01	.02	-.02	.00	-.01	.02	-.01	.02	.01	.02	-.01	.02	-.02	.01	.00	-.24	0.04	-.06	-.15	-.03	1										
22	-.01	-.02	.01	-.01	-.03	.02	-.00	.00	.00	-.00	.02	-.01	.02	.02	.04	-.06	-.02	.03	-.11	-.04	-.26	1									
23	.01	.00	.01	.02	-.02	.00	-.01	.01	.00	-.00	-.02	-.01	.01	.03	.02	-.11	-.03	-.09	-.03	-.43	.05	-.02	1								
24	-.00	.04	-.01	-.01	.00	-.03	.01	-.01	.02	.02	.02	-.01	-.01	-.01	-.01	-.01	-.01	-.03	.09	.01	.03	-.03	-.03	1							
25	.02	.02	.02	-.00	.02	-.01	-.01	.02	-.03	-.04	.03	-.02	-.02	-.01	-.06	-.02	0.04	-.04	-.02	-.01	.01	-.03	.04	-.05	1						
26	-.00	-.04	.02	.03	-.04	.03	-.04	.02	-.00	-.01	-.02	.01	.01	.02	.02	-.06	-.01	-.04	.03	-.07	.04	-.01	.04	-.18	-.09	1					
27	-.02	.03	-.06	-.02	.03	-.02	-.00	-.01	.02	-.03	-.02	.02	-.01	.01	-.03	.03	-.01	.04	0.00	-.03	.00	-.04	-.02	-.07	-.23	.01	1				
28	.01	-.00	-.02	.01	-.01	-.01	-.03	-.00	-.04	.03	.02	-.01	-.00	.01	.02	-.01	.01	-.04	-.02	-.01	.01	.05	.03	.21	-.09	.02	-.15	1			
29	-.01	.01	.03	.00	-.01	-.01	.02	.02	.03	.06	-.01	.01	-.01	.02	.04	-.04	-.04	-.01	.01	.03	.06	.01	-.01	-.04	-.02	-.03	.02	-.22	1		
30	.01	.02	-.01	.00	-.02	.01	.02	-.01	.00	-.07	-.00	-.01	.00	.01	.01	.00	.02	-.04	.04	-.01	.02	-.06	.01	-.03	.02	-.13	.01	-.54	-.11	1	
31	-.03	-.01	.03	.01	.03	.01	.03	.01	.02	.03	-.02	-.00	-.02	-.02	-.02	.00	-.08	.08	-.02	.00	-.06	-.02	-.04	-.17	-.11	.03	-.08	-.22	.11	-.11	1

Note. 1 = Intercept, 2 = Subjective Wellbeing, 3 = Global Mindedness, 4 = Growth Mindset about SES, 5 = Relationship with Parents, 6 = Relationship with Friends, 7 = Relationship with Teachers, 8 = Closeness with Surroundings, 9 = Parent-Report SES, 10 = Home Literacy Environment, 11 = Non-School Activity Richness, 12 = Perceived School Climate, 13 = Perceived School Belonging, 14 = School Anxiety, 15 = Teachers' Education Level, 16 = Teachers' SES Training, 17 = Teacher-Report SES, 18 = Teacher-Student Relationship, 19 = Class Activity Atmosphere, 20 = Active Learning Pedagogy, 21 = Class Promotion of SES, 22 = Class SES Evaluation, 23 = SES Feedback, 24 = Average Class Size, 25 = School Activity Richness, 26 = Diversity in Education, 27 = School SES Training, 28 = School Promotion of SES, 29 = SES as School Aim, 230 = School SES Curriculum, 31 = School SES Evaluation.

Table B3

Correlation Matrix for Predictors of Engaging with Others

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	1																														
2	.01	1																													
3	.01	-.14	1																												
4	-.01	.02	-.02	1																											
5	.00	-.06	-.08	.02	1																										
6	.00	-.14	.06	.00	.08	1																									
7	-.01	-.05	-.06	.01	-.04	-.03	1																								
8	.00	-.15	-.06	-.01	-.15	-.12	-.10	1																							
9	.00	-.02	-.03	-.04	.02	.01	-.02	-.02	1																						
10	.00	-.09	-.18	-.01	-.03	-.06	-.07	-.05	-.02	1																					
11	-.01	-.08	-.15	.08	.00	.04	-.05	-.06	-.06	-.23	1																				
12	-.01	-.08	-.16	.06	-.16	.06	-.04	-.04	-.04	-.05	-.04	1																			
13	.00	-.20	.00	-.15	-.32	-.19	-.17	-.09	-.08	-.01	-.04	-.05	1																		
14	.00	.09	.03	.15	.01	.14	-.01	-.01	.02	.03	.05	-.07	.14	1																	
15	-.03	.01	.00	.00	-.03	-.01	-.01	.00	.00	.01	-.01	.01	.03	.01	1																
16	-.01	.00	.01	.01	.00	-.02	.02	-.02	-.01	-.01	-.01	-.03	.02	.00	.10	1															
17	-.01	.01	-.03	-.06	.00	-.01	-.04	.01	-.14	-.05	-.02	.00	-.08	.01	.02	-.02	1														
18	.00	.00	.00	-.01	-.03	.01	.02	.00	.03	-.02	-.03	.02	.02	.00	-.01	-.04	-.10	1													
19	.01	.01	.01	.00	.03	.00	-.01	.00	-.01	.01	.04	-.01	-.01	.01	-.03	-.03	.02	-.64	1												
20	.00	-.03	.00	.00	.00	.01	.00	.00	.01	.00	.01	.00	-.02	-.02	-.03	-.21	-.05	-.03	-.07	1											
21	.00	.02	-.02	.00	-.01	.02	-.01	.02	.02	.02	-.01	.02	-.02	.01	.00	-.25	-.03	-.04	-.15	-.02	1										
22	-.01	-.02	.01	.00	-.03	.01	.00	.01	-.03	.00	.02	-.01	.02	.02	.04	-.06	-.01	.02	-.11	-.04	-.26	1									
23	.01	.00	.01	.02	-.02	.00	-.01	.01	.02	.00	-.02	.00	.01	.03	.02	-.11	-.03	-.10	-.03	-.42	.05	-.03	1								
24	-.01	.03	-.01	-.01	.00	-.02	.01	-.01	-.01	.01	.02	-.01	-.01	.00	-.02	.00	.01	-.03	.09	.01	.03	-.02	-.03	1							
25	.01	.01	.02	.00	.01	-.01	-.01	.02	-.03	-.04	.02	-.02	-.02	-.01	-.06	-.02	.03	-.03	-.02	-.01	.01	-.03	.04	-.06	1						
26	.01	-.04	.02	.03	-.03	.03	-.04	.02	.02	-.01	-.02	.01	.01	.02	.02	-.06	-.03	-.04	.04	-.07	.03	-.01	.05	-.19	-.09	1					
27	-.02	.03	-.05	-.02	.03	-.02	-.01	-.01	.01	-.03	-.02	.02	-.01	.01	-.04	.03	-.02	.04	.00	-.03	.01	-.04	-.02	-.06	-.23	.01	1				
28	.00	.00	-.02	.01	-.01	-.01	-.02	.00	-.02	.03	.02	.00	.00	.01	.02	-.01	.02	-.03	-.03	-.01	.01	.04	.03	.21	-.09	.03	-.15	1			
29	-.03	.01	.02	.00	-.01	-.01	.02	.02	.00	.05	.00	.01	-.01	.02	.04	-.04	.00	-.01	.01	.03	.06	.01	-.01	-.05	-.02	-.01	.00	-.20	1		
30	.01	.02	-.01	.00	-.02	.01	.02	-.01	-.01	-.06	.00	-.01	.00	.01	.01	.00	.00	-.03	.03	-.01	.03	-.06	.01	-.04	.02	-.13	.01	-.53	-.10	1	
31	-.04	-.01	0.03	0.01	.03	.01	.03	.01	.00	.03	-.02	.00	-.02	-.02	-.02	.00	-.05	.07	-.02	.00	-.05	-.02	-.04	-.15	-.12	.03	-.07	-.21	.11	-.11	1

Note. 1 = Intercept, 2 = Subjective Wellbeing, 3 = Global Mindedness, 4 = Growth Mindset about SES, 5 = Relationship with Parents, 6 = Relationship with Friends, 7 = Relationship with Teachers, 8 = Closeness with Surroundings, 9 = Parent-Report SES, 10 = Home Literacy Environment, 11 = Non-School Activity Richness, 12 = Perceived School Climate, 13 = Perceived School Belonging, 14 = School Anxiety, 15 = Teachers' Education Level, 16 = Teachers' SES Training, 17 = Teacher-Report SES, 18 = Teacher-Student Relationship, 19 = Class Activity Atmosphere, 20 = Active Learning Pedagogy, 21 = Class Promotion of SES, 22 = Class SES Evaluation, 23 = SES Feedback, 24 = Average Class Size, 25 = School Activity Richness, 26 = Diversity in Education, 27 = School SES Training, 28 = School Promotion of SES, 29 = SES as School Aim, 230 = School SES Curriculum, 31 = School SES Evaluation.

Table B4

Correlation Matrix for Predictors of Collaboration

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	1																														
2	.01	1																													
3	.01	-.14	1																												
4	-.01	-.02	-.02	1																											
5	.00	-.06	-.08	.03	1																										
6	.00	-.15	.06	.00	.08	1																									
7	-.01	-.06	-.06	.01	-.04	-.03	1																								
8	.00	-.15	-.06	-.01	-.15	-.12	-.10	1																							
9	.00	.01	.00	-.01	-.04	-.05	-.03	-.03	1																						
10	.00	-.09	-.19	-.02	-.03	-.05	-.08	-.05	-.01	1																					
11	-.01	-.08	-.15	.07	.01	.05	-.05	-.06	-.05	-.23	1																				
12	-.01	-.08	-.16	.06	-.16	.06	-.05	-.04	-.01	-.06	-.04	1																			
13	.00	-.20	.00	-.16	-.32	-.19	-.17	-.09	-.07	-.01	-.05	-.06	1																		
14	.00	.09	.03	.15	.01	.14	-.01	-.01	-.01	.03	.05	-.07	.15	1																	
15	-.03	.01	.00	.00	-.03	-.01	-.01	.00	.02	.01	-.01	.01	.03	.01	1																
16	-.01	.00	.01	.01	.00	-.02	.02	-.02	-.02	-.01	-.01	-.03	.02	.00	.10	1															
17	-.01	.02	-.01	-.02	-.01	-.03	-.07	.00	-.08	-.01	.00	.01	-.06	.00	.00	-.04	1														
18	.00	.00	.00	-.01	-.03	.02	.03	.00	.03	-.02	-.03	.02	.02	.00	-.01	-.04	-.14	1													
19	.01	.01	.01	.00	.03	.00	-.01	.00	.00	.01	.05	-.01	-.01	.01	-.03	-.03	.03	-.63	1												
20	.00	-.03	.00	.00	.00	.01	.00	.00	.01	.00	.01	.00	-.03	-.02	-.03	-.20	-.05	-.03	-.07	1											
21	.01	.02	-.02	.00	-.01	.02	-.01	.02	.04	.02	-.01	.02	-.02	.01	.01	-.25	.00	-.05	-.15	-.02	1										
22	-.01	-.02	.01	-.01	-.02	.02	.00	.01	-.04	.00	.02	-.01	.02	.02	.04	-.06	-.01	.03	-.11	-.04	-.26	1									
23	.01	.00	.01	.02	-.02	.01	.00	.01	.00	.00	-.02	-.01	.02	.03	.02	-.11	-.06	-.09	-.03	-.42	.05	-.03	1								
24	-.01	.04	-.01	-.01	.00	-.03	.01	-.01	.00	.01	.02	-.01	-.01	-.01	-.02	-.01	.00	-.03	.09	.01	.03	-.03	-.03	1							
25	.02	.01	.02	.00	.02	.00	.00	.02	-.05	-.04	.03	-.02	-.01	-.01	-.06	-.02	.02	-.03	-.02	-.01	.01	-.03	.04	-.05	1						
26	.01	-.04	.02	.03	-.04	.03	-.04	.02	.02	-.01	-.02	.01	.01	.02	.02	-.06	-.02	-.04	.04	-.07	.04	-.01	.04	-.19	-.09	1					
27	-.02	.03	-.06	-.02	.03	-.02	-.01	-.01	.02	-.03	-.02	.02	-.01	.01	-.03	.03	.02	.03	.00	-.03	.01	-.04	-.02	-.07	-.23	.01	1				
28	.01	.00	-.02	.01	-.01	-.01	-.03	.00	-.02	.03	.02	-.01	.00	.01	.02	-.01	.02	-.03	-.03	-.01	.01	.04	.03	.21	-.09	.03	-.15	1			
29	-.02	.01	.03	.00	-.01	-.01	.02	.02	.02	.05	-.01	.01	-.01	.02	.04	-.04	-.02	-.01	.01	.03	.06	.01	-.01	-.04	-.02	-.02	.01	-.21	1		
30	.01	.02	-.01	.00	-.01	.01	.02	-.01	-.03	-.06	.00	-.01	.01	.01	.01	.00	.00	-.03	.03	-.01	.02	-.06	.01	-.03	.02	-.13	.01	-.53	-.11	1	
31	-.03	-.01	.03	.01	.03	.01	.03	.01	.00	.03	-.02	.00	-.02	-.02	-.02	.00	-.06	.07	-.02	.00	-.06	-.02	-.04	-.16	-.11	.03	-.08	-.21	.11	-.11	1

Note. 1 = Intercept, 2 = Subjective Wellbeing, 3 = Global Mindedness, 4 = Growth Mindset about SES, 5 = Relationship with Parents, 6 = Relationship with Friends, 7 = Relationship with Teachers, 8 = Closeness with Surroundings, 9 = Parent-Report SES, 10 = Home Literacy Environment, 11 = Non-School Activity Richness, 12 = Perceived School Climate, 13 = Perceived School Belonging, 14 = School Anxiety, 15 = Teachers' Education Level, 16 = Teachers' SES Training, 17 = Teacher-Report SES, 18 = Teacher-Student Relationship, 19 = Class Activity Atmosphere, 20 = Active Learning Pedagogy, 21 = Class Promotion of SES, 22 = Class SES Evaluation, 23 = SES Feedback, 24 = Average Class Size, 25 = School Activity Richness, 26 = Diversity in Education, 27 = School SES Training, 28 = School Promotion of SES, 29 = SES as School Aim, 230 = School SES Curriculum, 31 = School SES Evaluation.

Table B5

Correlation Matrix for Predictors of Open-Mindedness

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	1																														
2	.01	1																													
3	.01	-.15	1																												
4	.00	-.02	-.01	1																											
5	.00	-.06	-.08	.03	1																										
6	.00	-.15	.06	.00	.08	1																									
7	-.01	-.06	-.05	.02	-.04	-.03	1																								
8	.00	-.15	-.06	-.01	-.15	-.12	-.10	1																							
9	.00	.03	-.08	-.05	.02	-.01	-.04	-.01	1																						
10	.00	-.09	-.18	-.01	-.03	-.05	-.07	-.05	-.04	1																					
11	-.01	-.08	-.15	.07	.00	.04	-.05	-.06	-.01	-.23	1																				
12	.00	-.09	-.16	.06	-.15	.06	-.04	-.04	-.01	-.05	-.04	1																			
13	.00	-.20	.00	-.16	-.32	-.19	-.16	-.10	-.06	-.01	-.05	-.06	1																		
14	.00	.09	.03	.15	.01	.13	-.01	-.01	.04	.03	.05	-.07	.14	1																	
15	-.02	.01	.00	.00	-.03	-.01	-.01	.00	-.01	.01	-.01	.01	.03	.01	1																
16	-.01	.00	.01	.01	.00	-.03	.02	-.02	.01	-.01	-.01	-.03	.01	.00	.09	1															
17	-.01	.02	-.04	-.08	-.01	-.03	-.07	.02	-.13	-.04	.00	.00	-.06	.00	.02	-.03	1														
18	.00	.00	.00	-.01	-.04	.01	.02	.00	.02	-.02	-.03	.02	.02	.00	-.01	-.04	-.09	1													
19	.01	.01	.00	.00	.03	.00	.00	.00	.01	.00	.05	-.01	-.01	.01	-.03	-.03	.01	-.63	1												
20	-.01	-.03	.00	.01	.00	.01	.00	.00	.01	.01	.01	.00	-.02	-.02	-.03	-.20	-.05	-.03	-.07	1											
21	.01	.02	-.02	.01	.00	.02	-.01	.02	.02	.03	-.01	.02	-.02	.01	.00	-.24	-.07	-.05	-.15	-.02	1										
22	-.01	-.02	.01	.00	-.03	.02	.00	.01	-.03	.00	.01	-.01	.02	.02	.04	-.06	-.03	.03	-.11	-.03	-.25	1									
23	.01	.00	.01	.02	-.02	.00	-.01	.01	.02	.00	-.02	-.01	.01	.03	.02	-.11	-.04	-.10	-.03	-.43	.05	-.03	1								
24	.00	.03	-.01	-.01	.00	-.03	.01	-.01	.02	.01	.02	-.01	-.01	-.01	-.01	-.01	.00	-.03	.08	.02	.03	-.03	-.03	1							
25	.02	.01	.02	.00	.01	-.01	.00	.02	-.03	-.04	.02	-.02	-.02	-.01	-.06	-.02	.02	-.03	-.02	-.01	.00	-.02	.03	-.05	1						
26	.00	-.04	.02	.03	-.03	.03	-.03	.02	.02	-.01	-.02	.01	.01	.02	.02	-.06	-.03	-.04	.03	-.06	.04	-.01	.04	-.18	-.09	1					
27	-.02	.02	-.05	-.01	.03	-.02	.00	-.01	.00	-.03	-.01	.02	.00	.01	-.03	.02	.00	.03	.00	-.03	.00	-.04	-.02	-.07	-.23	.01	1				
28	.01	.00	-.02	.01	-.01	-.01	-.02	.00	-.02	.03	.02	-.01	.00	.01	.02	-.01	.00	-.03	-.02	-.01	.01	.04	.02	.21	-.09	.03	-.15	1			
29	-.02	.01	.03	.00	-.01	-.01	.02	.02	.02	.05	-.01	.01	-.01	.02	.04	-.04	.00	-.01	.01	.03	.06	.01	-.01	-.04	-.01	-.03	.02	-.22	1		
30	.01	.02	-.01	.00	-.01	.01	.02	-.01	-.02	-.06	.00	-.01	.00	.01	.00	.00	.01	-.03	.03	-.01	.02	.06	.01	-.03	.02	-.14	.01	-.54	-.11	1	
31	-.03	-.01	.03	.01	.03	.01	.03	.01	.01	.03	-.02	.00	-.02	-.02	-.02	.00	-.03	.06	-.01	.00	-.05	-.02	-.04	-.17	-.11	.03	-.08	-.21	.10	-.11	1

Note. 1 = Intercept, 2 = Subjective Wellbeing, 3 = Global Mindedness, 4 = Growth Mindset about SES, 5 = Relationship with Parents, 6 = Relationship with Friends, 7 = Relationship with Teachers, 8 = Closeness with Surroundings, 9 = Parent-Report SES, 10 = Home Literacy Environment, 11 = Non-School Activity Richness, 12 = Perceived School Climate, 13 = Perceived School Belonging, 14 = School Anxiety, 15 = Teachers' Education Level, 16 = Teachers' SES Training, 17 = Teacher-Report SES, 18 = Teacher-Student Relationship, 19 = Class Activity Atmosphere, 20 = Active Learning Pedagogy, 21 = Class Promotion of SES, 22 = Class SES Evaluation, 23 = SES Feedback, 24 = Average Class Size, 25 = School Activity Richness, 26 = Diversity in Education, 27 = School SES Training, 28 = School Promotion of SES, 29 = SES as School Aim, 230 = School SES Curriculum, 31 = School SES Evaluation.