Impact of Chinese students' perceived parental expectations on academic achievement: The mediating role of academic self-concept

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MSc in Education (Research Design and Methy), 2024

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Abstract

Achieving high academic achievement is crucial in high school education, influencing students' future opportunities and development. Parental expectations are recognized as a significant factor in academic success, with some researchers highlighting the mediating role of academic self-concept. However, limited research has specifically tested this mediating effect, especially in mainland China. This study, based on the Expectancy-Value Theory, examined the relationship between parental expectations and academic achievement, focusing on the mediating role of academic self-concept among Chinese high school students preparing for the Gaokao. A cross-sectional survey collected data on students' perceived parental expectations, academic self-concept, and standardized test scores from 143 senior high school students in Guangdong Province. Bivariate correlation, hierarchical multiple linear regression, and PROCESS macro mediation analysis revealed that higher parental expectations significantly predicted higher academic self-concept and academic achievement, with academic self-concept partially mediating this relationship. These findings inform Chinese parents of high school students in Guangdong Province to set high but realistic expectations and work to enhance their children's perceptions of academic abilities. While the study offers valuable insights into educational practices in China, its cross-sectional design might limit the understanding of causal relationships, and focusing on a single high school tends to restrict generalizability. Future research could employ longitudinal methods and include diverse samples to further explore these relationships and the mediating role of academic self-concept in the context of China.

Keywords: academic achievement, parental expectation, academic self-concept, high school students, Guangdong, China

Acknowledgments

I would like to express my sincere gratitude to my dissertation supervisor, Dr Ariel Lindorff, for the insightful suggestions and guidance throughout my project, which consistently challenged my thinking and enabled me to identify areas for improvement and maintain a fresh perspective.

I am also grateful to the staff at the Department of Education at the University of Oxford for their assistance in various ways. Furthermore, I wish to extend my thanks to my cohort members in the Research Design and Methodology pathway, as well as to Qi, Yu, for their unwavering mental support, companionship, and encouragement throughout the dissertation process. This work would not have been possible without their collective support and encouragement.

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Chapter 1 Introduction

1.1 Background

Pursuing high academic achievement is acknowledged as a critical goal in high school education, recognized as a significant indicator of student learning and a determinant of individual development and future opportunities (Urdan & Mestas, 2006; Kim et al., 2010; Nunes et al., 2022). It is often defined as student performance in class, school grades, exam scores, and education qualifications (Phillipson & Phillipson, 2007; Lindberg et al., 2019).

Parental factors, including the family socioeconomic status (Zhang et al., 2020), parents' education level (Davis-Kean et al., 2021), parenting styles (Areepattamannil, 2010), parental involvement (Wilder, 2023), are considered as important in influencing student academic success, with much empirical research demonstrating their stronger influential power than the other contextual factors like institutional, teachers, and peers influence in high school student's academic performance (e.g., Gao & Xue, 2020; Taş et al., 2016). Among parental factors, parents' expectations for their children's current and future achievement are considered important (Yamamoto & Holloway, 2010), which, according to three meta-analyses involved studies from Asian, Middle Eastern, and Western regions (Castro et al., 2015; Fan & Chen, 2001; Jeynes, 2007), was also the greatest impacting parenting variable for academic achievement among students from kindergarten to high school.

However, according to these meta-analyses, limited research has focused on the context of mainland China, a setting where both academic achievement and parental influence are highly valued and possess unique characteristics (see details in section 1.2 High School Educational Context in Contemporary Mainland China).

Moreover, while the impact of parental expectations on academic achievement is well-documented, the mechanisms underlying this influence remain to be tested. Specifically, researchers claim there should be a mediator as parents' mental states need to be at least directly or indirectly communicated to the child, enabling children

to internalize their expectations (Pinquart & Ebeling, 2019). One potential mediator related to children's internalizing process is academic self-concept, referring to a student's perception of their own academic abilities (Liu & Wang, 2008). However, although its mediating role between parental expectations and academic achievement is suggested by the Expectancy-Value Theory (EVT; Eccles, 1993; Eccles & Wigfield, 1995), limited research has specifically tested this mediating effect (Pinquart & Ebeling, 2019).

Therefore, this dissertation aimed to address these gaps by investigating the relationship between parental expectations and academic achievement, with a specific focus on the mediating effect of academic self-concept among Chinese high school students.

1.2 High School Educational Context in Contemporary Mainland China

In China, the understanding of academic achievement in high school students is highly related to the scores obtained in the National College Entrance Examination, or Gaokao (in Chinese; Yu, 2024). Gaokao is a standardized annual examination for entrance into national higher education institutions in early June each year (Davey et al., 2007). It consists of three mandatory subjects, Chinese, Mathematics, and English, and three elective subjects (Davey et al., 2007). The rules to select the elective subjects were changed during the recent Gaokao reform, which was identified by the Chinese State Council as "the most comprehensive, systematic, and depth reform" of the Gaokao since its reinstatement in 1977 (中国教育报[China Education Daily], 2021). The reform changed the previous three mandatory subjects plus Science electives (Physics, Chemistry, and Biology) or Liberal Arts electives (History, Geography, and Politics) to a more flexible "3+3" or "3+1+2" model depending on the province (Zong & Zou, 2017). In the most widely adopted "3+1+2" model among provinces, the "3" refers to the three mandatory subjects as usual, while the "1" refers to a primary elective subject where students must choose either Physics or History, and the "2" refers to two additional elective subjects chosen from Chemistry, Biology,

Politics, or Geography (中国教育报[China Education Daily], 2021). This change incorporates all 14 high school courses into the examination, providing more combinations for students to choose from. This shift towards personalization, according to the Chinese State Council, aims to guide students toward well-rounded development and to nurture their interests and talents (中国教育报[China Education Daily], 2021). However, as the "3+1+2" policy was newly implemented in 2018, research is required to determine whether and how students and their parents adapt to these reforms.

The importance of conducting research in this sample is also attributed to the nature of Gaokao, which, accordingly (Sun, 2023; Wang et al., 2022), is very competitive and high-stakes. Specifically, the Gaokao is mandatory for admission into all four-year national colleges and universities, with limited exceptions for a very small number of students admitted through other criteria, such as participation in national competitions or admission to high-level sports teams (Davey et al., 2007). For Chinese high school students, the Gaokao is highly competitive nowadays. In 2023, 7.62 million students enrolled for this national exam; however, this accounts for only about 59% of the total participants (Qian, 2023). This means high school students must compete with nearly 5.29 million adults and repeat candidates, who might have more experience in the Gaokao, for about 10 million national university slots (Qian, 2023).

Beyond Gaokao's competitiveness, research in China is crucial due to the country's strong emphasis on academic achievement. Preparation for Gaokao is long and demanding, starting as early as junior high school (Grades 8 to 9, ages 14 to 16) and intensifying through senior high school (Grades 10 to 12, ages 16 to 18), with students often attending additional tutoring sessions and studying long hours to excel (Liu & Helwig, 2022). This prolonged preparation reflects the high value placed on education and academic achievement. One possible reason for such placement of importance is attributed to the social norms influenced by the reform and opening-up

policies of the early 1980s, which promoted higher education as a means to escape rural poverty and low-wage labour in urban centres (Liu & Helwig, 2022).

Another explanation comes from a cultural perspective. Confucianism, which has profoundly influenced Chinese culture for over two millennia, further contributes to the emphasis on education (Kuhn, 2011). Central to Confucian thought is the concept of self-cultivation, where individuals improve themselves from all aspects through learning and moral behaviour, contributing to societal betterment (Yang, 2022). This philosophy places education at the heart of personal and societal advancement, making academic achievement both a personal goal and a moral imperative (Yang, 2022). Confucianism also highlights filial piety, involving deep respect for parents and fulfilling family obligations, such as improving family social status (Hui et al., 2011; Zhang et al., 2020). In education, filial piety motivates young people to excel academically to honour their parents' investments and elevate their family's social standing (Hui et al., 2011). Although these expectations have evolved and their impact has diminished somewhat in contemporary China due to urbanization and modernization, the influence of Confucian values, including filial piety, tends to be long-lasting (Pei, 2023). Consequently, academic achievement remains a significant focus for students in mainland China.

Chapter 2 Literature Review

2.1 Parental Expectations

Parental expectations, the realistic and subjective beliefs parents hold about their children's future achievements, encompass their requirements, demands, and standards (Li et al., 2022; Castro et al., 2015). The term is sometimes used interchangeably with parental aspirations (e.g., Fan & Chen, 2001), while the two constructs are conceptually distinct (Fishman, 2019). Specifically, parental expectations tend to be more firmly rooted in realism and often correlate with parents' perception of the child's capabilities and the available resources for supporting a given level of achievement (Fishman, 2019; Yamamoto & Holloway, 2010). In comparison, parental aspiration emphasizes parents' desires or wishes regarding their children's future attainment, which to the extent reflects the value parents place on certain goals and the community norms about the importance of achieving such goals (Moensted, 2020; Seginer, 1983). In this case, the measurement of two constructs is distinct, with the former commonly asking parents, "how far do your think your child will go?" or "how much schooling your child will complete" (e.g., Carpenter, 2008; Davis-Kean, 2005), while the latter tend to ask questions around "hope" and "wants" (Aldous, 2006; Frenzel et al., 2010). Sometimes, they are measured separately but combined for analytical purposes (e.g., Bandura et al., 1996). In the current research, parental expectations are discussed exclusively, as they are more predictive of students' academic success than aspirations by aligning closely with the child's actual performance and potential (Yamamoto & Holloway, 2010).

2.1.1 Parental Expectations and Academic Achievement

Empirical research consistently demonstrates a positive, small to moderate correlation between parental expectations and academic achievement across diverse cultural contexts, evidenced by a series of meta-analyses including research in Asian, Middle-East, Western, and West-East regions revealed correlation coefficients

ranging from $r = .22$ to $r = .40$ among students from kindergarten to high school (Castro et al., 2015; Jeynes, 2007; Pinquart & Ebeling, 2019). These results indicate that higher parental expectations are generally associated with better academic performance.

The positive influence of parental expectations on academic achievement has been noted in Chinese samples as well. Long and Pang (2016) found that parental expectations significantly predicted mathematics and problem-solving achievement in the Programme for International Student Assessment (PISA) among ninth-grade students in mainland China, with home educational resources and parental education level also showing significant associations. However, the reliability of the scale measuring parental expectations is questionable, as it relied on a single item assessing students' perceptions of the grade level their parents expect them to achieve. Additionally, this method may not capture the parental expectations within the Chinese context. Leung and Shek (2011) evaluated various domains and themes in Chinese parental expectations for their children's future development. They suggested that, in line with Confucian values, Chinese parents emphasized factors including family, academic performance, conduct, self-reliance, and career prospects, which, as they claimed, reflected rooted cultural values in China, such as emphasis on scholarship, effort, filial piety, and moral character, as well as practical values, such as the belief that educational and occupational achievements lead to a promising future and economic success.

Zhao (2013) also found that parental expectations and involvement, as well as family socioeconomic status, positively influenced student academic performance across 53 Chinese high schools, with parental expectations and involvement having a greater impact than socioeconomic status. Based on the results, Zhao emphasized that parents' involvement should focus more on emotional and affective support rather than solely on financial contributions. This supports Hao and Bonstead-Bruns (1998), who emphasized that affective sharing between parents and children improves mutual

understanding of expectations, making parental expectations a significant factor in students' academic achievement.

Specifically, Hao and Bonstead-Bruns (1998) found that adolescents, including native Chinese, who perceived their parents to have similar high expectations often performed better academically, whereas discrepancies led to negative academic outcomes. They further suggested that supportive behaviours such as providing financial resources, being a role model, rewarding success and efforts, and offering affective communication contributed to mutual understanding between parents and children, benefiting academic achievement (Lindberg et al., 2019). This aligns with the following empirical studies (Gill & Reynolds, 1999; Yamamoto & Holloway, 2010), which emphasize that for high parental expectations to have a positive effect, children must perceive these high expectations, underscoring the importance of students' perception of parental expectations.

However, it should be noted that excessively high parental expectations can negatively impact student academic performance. For instance, Hu *et al.* (2024), using the China Education Panel Survey (CEPS) database, found that while parental expectations positively correlated with high school students' academic performance, excessively high expectations could have a negative impact. Literature suggests that excessive expectations can increase student stress levels, potentially affecting students' performance (Ahmad et al., 2023).

Notably, research on mainland Chinese students predominantly focuses on junior high school students (ages 13 to 15) and elementary school students (ages 7 to 12), with fewer studies considering senior high school students. This trend aligns with international research, where meta-analyses often evaluate samples from kindergarten to junior high school students (e.g., Castro et al., 2015; Jeynes, 2003, 2005, 2007). One possible reason for focusing on younger students is that previous research (e.g., Philippson, 2014) has demonstrated that younger children's achievement exhibited stronger associations with parental expectations, likely due to their closer

relationships with their parents. Moreover, some other research (Steinberg, 2016; Chen et al., 2022) suggested that as children grow older, the effects of parental expectations on achievement decline, particularly in adolescence, attributed to increasing autonomy. These findings might suggest that parental influence is more pronounced during early childhood; however, this does not imply that parental expectations are unimportant for high school students in their mid to late adolescence. Given the unique academic challenges the Gaokao poses for Chinese senior high school students, research focusing on this cohort in mainland China is necessary.

2.1.2 Influence of Parents' Education Levels on Parental Expectations and Academic Achievement

Parents' education level is one of the most frequently used indicators of family socioeconomic status (SES) in studies evaluating parents' expectations and academic achievement, as shown in an international research review (Pinquart & Ebeling, 2019). Notably, although combinations of indicators are generally considered better measures of SES (Sirin, 2005), due to resource constraints typical of a master's thesis, this research exclusively considers parental education levels.

Parental education is demonstrated as a significant predictor of higher parental expectations and greater academic achievement in students. Studies in the United States (Hughes et al., 2013) and Quebec (Pingault et al., 2015) have found that parents with higher SES, including higher education levels, tend to have greater educational expectations and aspirations for their children's success. The influence mechanisms are varied. For example, research by Hascoët *et al.* (2021) on Chilean students from elementary to junior high school found that parents with lower education levels tended to set lower expectations for their children, possibly due to feeling they lacked the intellectual resources to support their educational success. Conversely, other studies in the United States (Pandey & Zhan, 2000) and the United Kingdom (Irwin & Elley, 2013) revealed that less educated parents may have high aspirations for their children, hoping they would escape poverty or low social status.

Beyond influencing parental expectations, parents' education levels also affect their children's academic achievement through parental behaviours. Englund *et al.* (2008) discovered that more educated parents in the United States were more involved in their high school children's education than less educated parents, though this study's focus on low-income families may limit its generalizability.

The influence of parental education levels can also be found in Chinese educational settings. While Confucian values tend to lead Chinese parents to view good academic performance as a sign of filial piety and success, prompting some researchers to suggest that parents generally hold high educational expectations and strive to provide educational support to their children regardless of SES (Fu et al., 2016; Li & Xie, 2020), it still significantly affects the extent to which families can provide abundant learning resources. This is evidenced by Long and Pang's (2016) findings on the significant impact of home educational resources and parental education on academic performance. Moreover, due to economic disparities between regions and between urban and rural areas in China, differences exist in school resources (Hou & Li, 2022), such as school infrastructure, teacher quality, availability of learning materials, and extracurricular opportunities. Consequently, families with higher SES, who typically reside in more developed areas or have more access to better educational resources, tend to increase the likelihood of their children's academic success (Liu et al., 2020).

2.2 Academic Self-concept

Self-concept refers to an individual's perception of themselves, particularly focusing on their abilities and status within the external world (Shavelson & Bolus, 1982). The construct is widely acknowledged as both hierarchical and multidimensional (e.g., Waugh, 2001; Marsh, 1987; Shavelson & Bolus, 1982). In such structure, it is the individual's general perception of self at the highest level, which then branches out into more specific areas such as academic self-concept and non-academic self-concept (Senler & Sungur, 2009). Research suggests that academic

self-concept is more closely related to academic outcomes than global or non-academic self-concept (Marsh & Hau, 2004); thus, this study prioritizes the investigation of academic self-concept.

Academic self-concept (ASC), similar to general self-concept, is recognized as a hierarchical, multidimensional construct (Shavelson et al., 1976). It can be broadly defined as students' attitudes or perceptions of their academic abilities in a specific domain, shaped by evaluations and reinforcements from significant others (Liu & Wang, 2008; Marsh & Hau, 2003; Tus, 2020).

2.2.1 Academic Self-concept and Academic Achievement

As a vital self-perception driving students' behaviour (Liu & Wang, 2008), ASC has been found to be generally positively associated with educational achievements, even across different emphases such as self-image, ideal self, self-esteem, effort, and hard work in their measurement.

For instance, Emmanuel *et al.* (2014) explored the connections between high school students' achievement motivation, ASC, and academic success. They defined self-concept in educational settings as an individual's perception of their academic strengths and weaknesses, evaluating it through three aspects: self-image, ideal self, and self-esteem. Their findings revealed a significant positive correlation between ASC and test scores. Using similar emphases on ASC, McInerney *et al.* (2012) demonstrated comparable findings, showing a positively direct relationship between ASC and standardised test scores among high school students in Hong Kong. However, the use of the ASC scale might be challenged as it may not reflect cultural specificities, such as the value placed on hard work in the Hong Kong context (Qiufang, 1997). Specifically, cross-cultural studies have shown that the emphasis on ASC varies across cultures, often categorising ASC into two broad domains: collectivist and individualist. According to Markus and Kitayama (1991) and Shweder and Bourne (1982), individualistic cultures tend to emphasise innate intelligence, fostering an ASC centred around personal attributes and unique talents,

while collectivist cultures prioritise effort, perseverance, and social harmony, resulting in an ASC that is interdependent and situationally adaptive. Therefore, the interchangeable use of the ASC scale emphasising unique aspects tends to result in the measurement less representing the samples' perception of their academic abilities, as Leung *et al.* (2011) suggested in explaining their results of lower ASC presented in Chinese high school students compared with their Australian counterparts. Thus, it is important to have a culturally sensitive ASC scale accounting for the specific cultural values and their manifestations relevant to the students being assessed.

Recognising the impact of cultural differences, Liu and Wang (2005) proposed two primary factors for measuring ASC within a CHC context based on studies conducted in Singapore. Their scale included academic confidence, which measures high school students' perceptions of their academic competence, and academic effort, which evaluates their dedication and interest in schoolwork. They suggested that the development of the scale was based on the fact that Singaporean students emphasise the 'commitment' aspect of ASC, which is deeply influenced by Confucianism's view of learning as a rigorous process of extensive, thorough, and earnest practice. The scale was validated and adopted not only in Singapore (Liu, 2005; Wang & Liu, 2008) but also in other CHC contexts, such as Vietnam (Yorke, 2013), Malaysia (Matovu, 2014), and Pakistan (Ajmal & Rafique, 2018).

However, concerns about the scale's validity and reliability in high school studies within CHC contexts have been raised due to its non-theory-driven nature. This concern is particularly relevant since the Malaysian (Matovu, 2014) and Pakistani (Ajmal & Rafique, 2018) studies validate the scale focused on university students. Therefore, more research in CHC contexts is needed to justify the use of this scale among high school students. Despite these concerns, those studies with such a scale have generally produced results consistent with previous research, indicating a significant, positive relationship between ASC and academic achievement. Moreover, adding to previous research, Liu and Wang also indicated a significant effect for

gender, with female students having significantly higher perceived academic effort in the sub-scale than their male counterparts.

2.2.2 Gender Differences in Academic Self-concept

The gender differences observed in Liu and Wang (2005) 's research are not isolated. Reviews of global samples suggest that gender influences on self-concept, while generally small, are significant (Igbo et al., 2015; Marsh et al., 2006). This difference is often attributed to gender role stereotypes and biases, which involve assigning individuals to specific groups based on assumed characteristics (Igbo et al., 2015; Martin, 2023). For example, a study of German high school students (Jansen et al., 2014) found that female students had a lower academic self-concept in chemistry and physics compared to their male peers, even after controlling for academic achievement. Researchers proposed that this was influenced by social values, suggesting that males tend to excel in science-related subjects (Arens et al., 2022). Similar findings were observed in a study of Chinese high school students (Dai, 2001). Males in regular high schools had a higher mathematics self-concept, while females had a higher language self-concept. In top-tier high schools, where students demonstrate better academic performance and have access to superior educational resources (Dai, 2001), females maintained a higher language self-concept, but their mathematics self-concept was similar to that of males. Additionally, girls in top-tier schools exhibited a higher general academic self-concept than boys. These results suggest that gender differences in self-concept may not solely stem from stereotypes but also reflect individual factors, such as academic ability and school environments. However, given that the study is relatively outdated, its relevance to the current situation is questionable. One possible influence could be the recently reformed Gaokao policy, which allows students to choose subject combinations from both science and liberal arts. This flexibility might reduce the tendency for students to categorize themselves strictly as "science" or "liberal arts" students, thereby mitigating the influence of traditional gender stereotypes on self-concept to some

extent.

2.2.3 Parental Expectation and Academic Self-concept

Parents play a crucial role in shaping their children's self-concept and ASC during their formative years, attributed to their role as close significant others during childhood and adolescence (Alsaker & Kroger, 2020). Expectancy-Value Theory (EVT; Eccles, 1993; Eccles & Wigfield, 1995) explains how parents' expectations can affect their children's ASC. According to this theory, the influence is indirect and occurs through two primary mediators: parental behaviours and attitudes. The general idea is that when parents exhibit behaviours that show they believe in their children's ability to succeed, it fosters a positive self-concept in the children regarding their academic capabilities. Examples of these behaviours include engaging in educational activities at home or school, such as reading together, discussing school experiences, and praising academic achievements (Fan & Chen, 2001; Jeynes, 2003). Davis-Kean (2005) found that such positive parental involvement was linked to higher parental expectations among children aged eight to twelve in the United States.

Despite EVT's suggestion of a positive link between parents' expectations and children's ASC, mediated by parental behaviours and attitudes, empirical research presents mixed findings. For instance, Jodl *et al.* (2001) studied 444 seventh graders from various ethnic backgrounds in the United States and found that the relationship between parental expectations and student ASC was non-significant when SES was controlled for, highlighting SES, instead, as a crucial mediator. Similarly, Neuenschwander *et al.* (2007), using data from longitudinal studies in the USA and Switzerland, found no significant direct link between parental expectations and students' ASC when SES was controlled. Additionally, their study revealed that the link between parental expectations and ASC was not statistically significant in math but was significant, albeit small ($\beta = .19$), in the subject of German language.

A notable observation in research on parental expectations and ASC is the scarcity of studies focusing exclusively on this relationship. Most research also

examines the impact of parental expectations on academic achievement (see examples in the next section).

2.3 The Mediating Role of Academic Self-concept Between Parental Expectations and Academic Achievement

The mediator is a variable that explains the relationship between a predictor and an outcome variable (Baron & Kenny, 1986). Although much empirical research has demonstrated the influence of both parental expectations and ASC on students' academic achievement, only recently have researchers tested the relationships among the three factors in educational contexts, and very few of them examined the mediating role of ASC.

For instance, Hascoët et al.'s (2021) longitudinal study investigated the influence of family SES and parental expectations on students' mathematics self-concept and achievement. The study conducted with a large national sample of Chilean students found that parental expectations and children's self-concept were significant predictors of final test scores. Also, it showed that among SES factors, parental education emerged as a stronger predictor of parental expectations than family income, which suggests the importance of considering family educational background in understanding the relationships. While the study confirmed positive relationships among three factors, it did not specifically explore the mediating role of self-concept in the relationships.

Similarly, Tang and Tran's (2023) research, aiming to investigate the effects of parental involvement, including parental expectations, on high school students' self-concept, anxiety, attitudes, and academic achievement, did not test the mediating role of ASC but demonstrated the relationships among three factors. In their research, a cross-sectional design was used to investigate 1,337 high school students from 11 high schools in Vietnam, selected via convenience sampling. Partial least squares structural equation modelling (PLS-SEM) was utilized to explore the direct and indirect relationships between parental involvement and students' final test

performance. The results revealed that parental involvement, which is parental behaviour that supports students' academic activity at home, and parental expectations were found to both positively affect students' academic achievement. However, parental involvement in this study was found to increase students' self-esteem, while parental expectation increased students' negative self-concept, which is contradictory to the theory (i.e., EVT) proposed earlier. One possible reason is that the authors mentioned that parental expectations measured in the study were very high. Such expectations are prone to put pressure on their children, which causes an increase in their children's negative self-esteem. Moreover, while the study emphasized that the Vietnamese are significantly influenced by Chinese Confucian thought, using many Chinese social and cultural values and policies, such as the high value placed on education and parental authority, to explain the findings of high parental expectations, it might not be entirely applicable to the Vietnamese context. Additionally, it is uncertain whether these high parental expectations and the relationships demonstrated among parental expectations, ASC, and academic achievement are a common occurrence in China, as suggested by the authors.

The more recent research investigating the indirect impact of parental expectations on high school students' academic achievement, with ASC as a mediating factor, was conducted by Tatlah *et al.* (2019). This mixed-method study had its quantitative phase involved 400 high school students in Pakistan, and the qualitative phase included 80 parents. Data collection instruments included the ASC scale by Liu & Wang (2005), a 12-item original parental expectations questionnaire developed by the researchers focusing solely on educational perspective, and students' summative evaluation scores for academic achievement. Results indicated that parental expectations perceived by students positively predict their academic achievement, with a student's ASC partially mediating in between. The qualitative data supported these findings, showing that parents' high expectations are generally motivational, though they can also induce stress. Despite its strengths of a large

sample size and robust mixed-method design to provide more explanation on the actual influence of parental expectations, the study's generalizability is limited by its focus on Pakistani students and narrowed content of parental expectations, which only regard the grade parents expect student obtained on their final report card. This restricted view of parental expectations may not account for the CHC context, which emphasizes cultivating well-rounded individuals (Tu, 1998), potentially failing to capture parental expectations that are fully representative of the broader perspective in this cultural context.

Generally, this confirmation of the mediating role of ASC between parental expectations and academic achievement aligns with the findings of a meta-analysis conducted by Pinquart and Ebeling (2019), which examined all cross-lagged associations between parental expectations and academic achievement among global students under 20 years old before 2019. Although the meta-analysis demonstrated a significant mediating effect of students' ASC, Pinquart and Ebeling (2019) noted the limited number of available studies addressing this effect, which might influence the reliability of the findings.

2.4 Theoretical Framework

The theoretical framework often used to explain the psychological mediator of ASC is the EVT developed by Eccles (1993; Eccles & Wigfield, 1995), which explains the role of parents' beliefs and attitudes in shaping students' achievement-related decisions, persistence, and performance (Tynkkynen et al., 2012). Specifically, in educational contexts, EVT suggests that parents' beliefs about their children's competence and their value on specific domains or tasks are expressed through their behaviours. These behaviours are observed and internalized by young people, shaping their own values and perceptions regarding their academic abilities (ASC) and expectations, which in turn affects their academic motivation and performance.

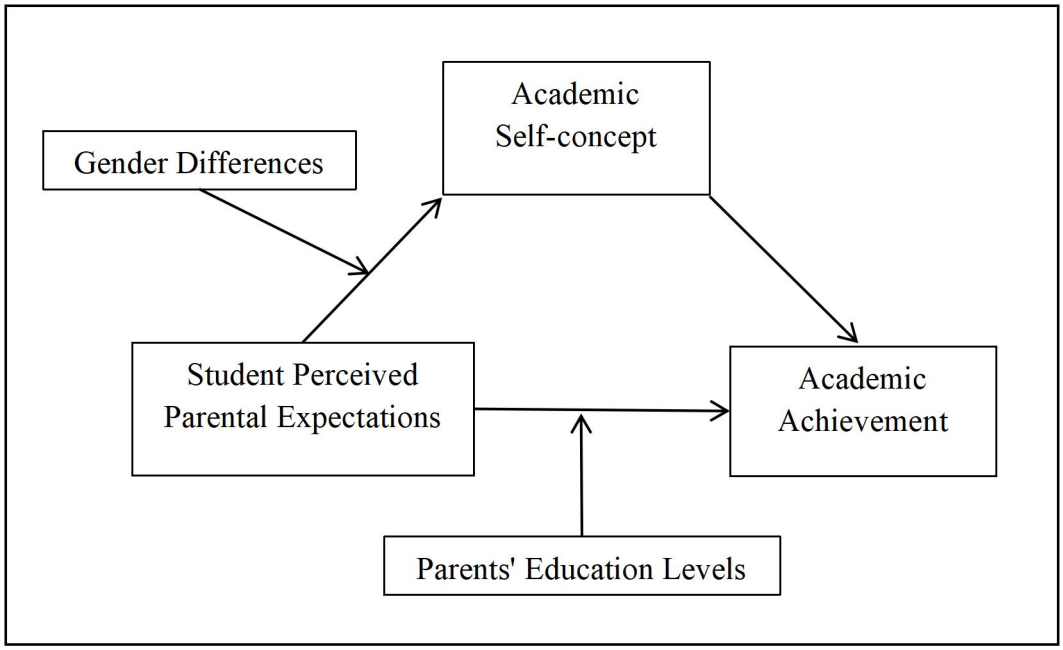
However, the content of parental expectations in EVT and current research were

distinct. Within EVT, parental expectations encompass beliefs about children's abilities and various task values such as intrinsic value, utility value, attainment value, and cost, while the current research focused more specifically on parents' expectations regarding their children's future achievements. Moreover, while EVT considers a diverse set of motivational influences, the current research viewed parental expectations primarily as reflections of parents' requirements, demands, and standards. Therefore, although the current research was informed by the psychological mechanisms proposed by EVT, which explain how parental expectations influence student academic achievement through ASC, it differed in its specific focus and scope.

This study also controlled for sociocultural factors, including parental educational background and gender differences, which have been suggested to influence the associations among the three core variables. Furthermore, since many empirical studies (Gill & Reynolds, 1999; Hao & Bonstead-Bruns, 1998; Yamamoto & Holloway, 2010) suggested that students' perceptions of parental expectations influenced their academic performance more than the expectations reported by parents, this study specifically focused on the role of perceived parental expectations. The developed model guiding research is presented in Figure 1.

Figure 1

Model Developed for the Current Research



2.5 Research Aims, Questions, And Hypothesis

The current research aimed to investigate the relationship between parental expectations perceived by students and their academic achievement, with a specific focus on the mediating role of ASC among Chinese high school students preparing for the newly reformed Gaokao. Previous research has identified parental education background and gender differences as influential factors. However, to accurately assess the primary relationships of interest, specifically, how parental expectations and ASC interact to affect academic achievement, it is essential to control for these influential variables, ensuring these other variables do not confound the main effects.

The primary research questions (RQs) guiding this study were:

RQ1: What were the relationships between students' perceived parental expectations, ASC, and academic achievement among Chinese senior high school students when gender and parents' education levels were controlled?

RQ2: Was the impact of parental expectations on students' academic achievement fully or partially mediated through Chinese students' ASC when gender

and parents' education levels were controlled?

Based on previous research and EVT, the current study proposed three hypotheses:

Hypothesis 1: After controlling for gender and parents' educational levels, higher parental expectations would significantly predict both higher ASC and higher academic achievement among Chinese senior high school students. Specifically, it was anticipated that students who perceived higher parental expectations would report higher ASC and higher academic achievement.

Hypothesis 2: After controlling for gender and parents' educational levels, higher ASC would significantly predict higher academic achievement among Chinese senior high school students. Specifically, it was anticipated that students who reported higher ASC would demonstrate higher academic achievement.

Hypothesis 3: After controlling for gender and parents' educational levels, the impact of parental expectations on students' academic achievement would be partially mediated through students' ASC. This meant that while parental expectations directly influenced academic achievement, a significant portion of this influence was explained through the enhancement of students' ASC.

By identifying the mechanisms through which parental expectations affect academic performance, this study also aimed to inform educational practices in mainland China.

Chapter 3 Methodology

3.1 Research Design

To ensure the data collected aligns with the research questions, the research design was primarily guided by two key research questions (Punch & Oancea, 2014). Specifically, these questions were explanatory, aiming to uncover the mechanisms and pathways linking parental expectations, ASC, and academic achievement among senior high school students in China. A cross-sectional survey design was adopted, as it was considered effective in capturing relationships between variables at a single point in time (Creswell, 2017) and was chosen due to limited time and resources. The choice of using a quantitative survey through a questionnaire allowed the application of statistical techniques to identify and quantify the strength and direction of these relationships. This research used this framework to test three main variables: parental expectations (predictor), academic self-concept (predictor and outcome variable), and academic achievement (outcome variable). Contextual factors, including parents' highest education levels and gender, were also controlled.

3.2 Participants

Participants in the study were full-time senior high school students from a high school in Guangzhou City, Guangdong Province, southern mainland China, who were preparing to take the Gaokao. They were recruited through convenience and voluntary response sampling and were invited to participate by their headteachers due to the time and resource constraints of a one-year master's program. Initially, 155 students consented and successfully submitted their answers. However, 11 were excluded for not meeting the criteria, as they were preparing for the A-Level examination within a different educational system, and one extreme outlier was excluded (see the definition of outliers in Section 3.5, Data Analysis). This resulted in a final analysis that included 143 participants.

The sample included students from the first, second, and third years of high school (i.e., Grades 10, 11, and 12, with ages ranging from 15 to 19), with three

classes from each grade level. Selecting students from all three grades allows the study to account for varying perceptions of parental expectations and self-concept across different grade levels, ensuring a diverse representation of high school adolescents during a critical period of psychological and academic development, which is marked by fluctuations in cognitive perceptions, behaviours, and academic performance (Hazen et al., 2008). Therefore, including students from all grades might provide a broad perspective on these developmental variations. Including three classes from each grade also ensures sample diversity and representativeness, reducing the impact of individual class or teacher variations on the results and enhancing the statistical power and reliability of the findings. Additionally, since all participants are from the same high school, the study benefits from a relatively consistent environment in terms of school climate, teaching quality, teacher styles, and policies, potentially maintaining internal consistency and reducing variability due to external factors to some extent. Nevertheless, using a sample from a single high school might limit the generalizability of the results to a broader population of senior high school students in mainland China.

Participants were chosen from Guangdong Province because it contributes one of the highest numbers of Gaokao candidates in mainland China, with more than 739,000 in 2023 (Qian, 2023). Furthermore, Guangdong is among the first to launch the reform model of "3+1+2" for Gaokao in 2018, instead of previous "3+3" in other provinces (广东省人民政府 [People's Government of Guangdong Province], 2019), making it a unique, vital context to be explored practically. Until 2024, the new policy on the Gaokao had been put in place for four years in Guangdong Province, meaning that current students in the three-year high school system might be getting used to the new Gaokao environment, providing a valid context for studying student and parental perceptions and behaviours under the new reform policy.

Nevertheless, it is important to note that educational resources in Guangdong Province are unevenly allocated, with high-quality teachers and schools concentrated

in the Pearl River Delta region (Jian & Luo, 2023), including municipalities of Guangzhou, Shenzhen, Zhuhai, Foshan, Dongguan, Zhongshan, Jiangmen, Zhaoqing, and Huizhou. Data from 2023 indicated that the top 100 Gaokao examinees from Guangdong province accounted for the Pearl River Delta region (广州省教育部 [Guangzhou Municipal Education Bureau], 2023). The uneven allocation of educational resources might be attributed to the economic differences in the regions. Although Guangdong Province has been the leading province in China's economy for 35 consecutive years and hosts numerous Fortune 500 companies and high-tech enterprises, it is the Pearl River Delta, as a crucial economic zone, that has particularly strong trade ties with Hong Kong, Macau, and Southeast Asian countries (广东省人民政府 [People's Government of Guangdong Province], 2024), leading to substantial investment in local education resources. Therefore, the convenience sample from a Guangzhou City high school in the Pearl River Delta, with its academic performance considered to be in the upper-middle-range for the area based on the information from the school's website, more accurately reflects the situation of high school students in this economically developed region rather than the entirety of Guangdong Province.

3.3 Data Collection Procedure and Ethic

After gaining ethical approval from the Oxford University Department of Education's Departmental Research Ethics Committee (DREC) following the university's procedures (see approval in Appendix A), informed consent was obtained from nine teachers at the focal high school through email, ensuring institutional support and compliance with ethical standards. Parental or guardian consent was not sought because participants, aged 16 to 18, are considered competent youths according to ethical guidelines (Central University Research Ethics Committee, 2022) in this study that involves minimal risk, where participants complete standardized, non-invasive questionnaires.

Headteachers were then asked to distribute a web link or QR code of the

Qualtrics questionnaire (https://www.qualtrics.com, the full questionnaire detailed in Appendix B) to students, with clear communication that participation was entirely voluntary, would not affect their grades or result in any penalties for non-participation. Participants were also offered a chance to win a storybook if they participated in a draw by providing their email addresses. A draw was randomly conducted, and the winners were contacted through the provided email addresses.

In the questionnaire, all participants were provided with an information sheet repeating their rights (detailed in Appendix B), such as they could stop at any time before submitting the survey and requested to sign a consent form by clicking the "yes, I understand all the information presented in the information sheet" before proceeding to the three-section questionnaire. The survey concluded with a thank note to the participant for taking part, and data was automatically saved on Qualtrics servers through a password-protected account to ensure data security.

The anonymized data set with contact information for draw deleted was then stored securely in a Nexus 365 OneDrive folder, while simultaneously, all the questionnaire data was permanently deleted from Qualtrics. This information could only be accessed by the researcher and the supervisor to ensure stringent confidentiality and data protection measures.

3.4 Instrument Designs and Measures

The questionnaire survey included three sections. The first section included demographic questions about the participant's gender, age, and their parents' highest level of education. The second section consisted of three scales: the Student Perceived Parental Expectation Scale (Eisen et al., 2004), the Academic Self-concept Scale (Liu & Wang, 2005), and the Academic Achievement Scale, which measured the core variables of the study. Finally, two optional open-ended questions that encouraged elaboration on the main scales and identified any salient details the primary measures failed to capture were included to provide supplementary information to current research.

Since the target group was Chinese students, all questionnaires were presented in Simplified Chinese, the official written language in mainland China. The questionnaires underwent a translation and back-translation process. Specifically, the original questionnaires were translated from English to Simplified Chinese by researcher familiar with both educational terminology and cultural contexts. Next, the same researcher translated the Chinese version back into English, and the questionnaires were compared with the original English version to identify and resolve any discrepancies or misunderstandings. This iterative process ensured that the final Chinese version accurately conveyed the intended meaning and was appropriate for the cultural context of the participants. This process, although conducted by a single researcher, helped ensure that the final Chinese version conveyed the intended meaning and was appropriate for the cultural context of the participants. Additionally, a pilot study was conducted. Three graduate students from the same department as the researcher individually reviewed the questionnaires and provided feedback and suggestions. Subsequently, eight Chinese high school students, who were conveniently recruited from outside the sample school, tested the questionnaires to determine if they needed help understanding or had potential misunderstandings with the translated versions of the scales.

3.4.1 Parents' Education Levels

The measurement of parents' highest education levels was adapted from the education level sub-scale of the scale developed by Xie *et al.* (2012) for the Chinese Family Panel Studies (CFPS), which is a national longitudinal survey hosted by the Chinese Academy of Social Sciences, involving 16,000 households from 25 provinces, autonomous regions, and municipalities in China.

In the current research, the parent self-reported measures were re-adapted for students to report their parents' educational levels. The two items from the scale asked, "What is the highest level of education your father has obtained?" and "What is the highest level of education your mother has obtained?" The study excluded the items

measuring education levels for respondents still in school or who left school without completing their education due to potential inaccuracies in student reporting. Additionally, an "unknown" option was included for students unaware of their parents' highest education levels.

Parental education level presented to participants was initially categorized into nine levels: "0" for "Illiterate/semi-illiterate," "1" for "Elementary school," "2" for "Junior high school," "3" for "Senior high school," "4" for "Bachelor's/Diploma degree," "5" for "Master's degree," "6" for "Doctoral degree," and "7" for "Unknown." However, due to the low number of participants reporting their parents' education levels as "Illiterate/semi-illiterate" (n = 0), "Elementary school" (n = 3), and "Doctoral degree" (n = 1), some categories were combined for analysis. The resulting four levels were: "1" for "Junior high school or below," "2" for "Senior high school," "3" for "Bachelor's/Diploma degree," "4" for "Postgraduate degree." Participants who reported the term 'Unknown' were treated as having missing values.

Regarding the scoring method, one common approach is to use a single score representing either the mother or the father, based on the highest or lowest education level or depending on the study's focus (e.g., Hernandez & Napierala, 2014; Wang et al., 2016). However, given that the education levels of both parents can independently and jointly influence a student's learning (Wang et al., 2020), this study considered using a weighted average approach. This method assigns different weights to the father's and mother's education levels to calculate an average (Sloczynski, 2018), better reflecting their combined impact on the student's academic performance. However, recent studies have only revealed the potential difference in their impacts on educational levels (e.g. Martinez et al., 2022; Wang et al., 2020), and there is currently insufficient concrete evidence to support specific weight assignments. Therefore, this study opted to consider another common approach in the field of education (e.g., Khan et al., 2015; Ojeda & Flores, 2008), using the educational levels

of both parents separately as control variables, with a higher coding number representing a higher level of education.

3.4.2 Parental Expectations

Parental expectations were assessed using the Parental Expectation Scale (PES; Eisen et al., 2004). This 20-item instrument originally used a 7-point Likert scale, where "0" indicated "Never or almost never true" and "6" indicated "Almost always or always true." The PES covers five dimensions: academic achievement, extracurricular activities, household responsibilities, peer activities, and general success. These diverse aspects of parental expectations potentially address the gap left by prior research that predominantly focused on academic expectations. The decision to use an overall score, rather than focusing solely on the academic achievement dimension, was also based on previous reliability tests of the scale. Specifically, the original PES demonstrated strong overall internal consistency, with Cronbach's alpha scores of .86 for mothers and .87 for fathers, when testing parents of 184 children aged six to 18 from diverse ethnic backgrounds (Eisen et al., 2004). However, the sub-scales for the five different dimensions had lower reliability, with internal consistencies ranging from .52 to .69 for mothers and .56 to .80 for fathers. This lower reliability might partly be due to the limited number of items per dimension (four items each). Thus, this study adopted the overall score of parental expectations.

In line with the study's focus on student-perceived parental expectations, the original questions designed for parents were adapted for student respondents. The adapted questions were, "My parents expect me to receive better grades than I currently do" (academic achievement sub-scale), "My parents expect me to distinguish myself with top performances in my extracurricular activities" (extracurricular activities sub-scale), "My parents expect me to do chores in the home on a regular basis" (household responsibilities sub-scale), "My parents expect me to increase the quantity and/or quality of my friendships" (peer activities sub-scale), and "My parents expect that experiences of success will be the best reinforcers for my

self-confidence" (general success sub-scale). Unlike previous research, such as Keating (2008), where expectations of fathers and mothers were measured independently, this study combined the assessment of both parents under the general term "parents" to align with the study's research questions and aims as well as to reduce the overall number of survey items, ensuring that respondent would not become too exhausted due to fatigue from repetitive questions. Nevertheless, to acknowledge potential differences between maternal and paternal expectations (Dockery et al., 2022), an additional question was included at the end of the scale: "When reporting on parental expectations, are you primarily thinking of your mother, father, both parents equally, or another guardian?"

The scoring method for the PES was identical to that used by Eisen *et al.* (2004), with the scale represented by the sum of the scores. The maximum possible sum score was 120, while the minimum was 0, with a higher value indicating a higher perceived parental expectation. Consistent with the original scale, reliability analysis using Cronbach's alpha for each sub-scale ranged from moderate to high: academic achievement ($\alpha = .65$), extracurricular activities ($\alpha = .76$), household responsibilities ($\alpha = .73$), peer activities ($\alpha = .54$), and general success ($\alpha = .52$). The overall internal consistency was very good ($\alpha = .87$).

3.4.3 Academic Self-concept

ASC was evaluated using the Academic Self-Concept Scale developed by Liu and Wang (2005). This scale originally included 20 items, with 16 adapted from three established instruments (i.e., Battle's Academic Self-Esteem Scale [Battle, 1982]; Marsh's School Subjects, Self-Concept Scale [Marsh, 1990]; Piers and Harris's General and Academic Status Scale [Rich et al., 1979]), and four additional items reflecting the educational experiences of Singaporean secondary school students. Accordingly, this scale was specifically designed for CHC contexts, capturing two key facets of ASC: academic confidence and academic effort. Represented questions for academic confidence were, "I can follow the lectures easily" and "Most of my

classmates are smarter than I am" (negatively worded). Represented questions for academic effort were, "I pay attention to the lecturers during lectures" and "I study hard for my tests."

During the pilot study, one ambiguous item was revised for clarity. Specifically, item 4, "I often do my coursework without thinking," initially translated as "我经常不思考就做我的作业," had dual interpretations: either not thinking while doing homework or starting homework promptly without hesitation. To eliminate this ambiguity, it was refined to "我经常不经过深入思考就完成我的作业," which was directly translated as "I often complete my homework without deep thought," maintaining the original meaning. Additionally, item 16, "I am always waiting for the lecture to end and go home," was excluded due to its inapplicability in a boarding school setting. Participants, therefore, rated their agreement with the remaining 19 items on a 7-point scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). The current scale included both positive and negative statements to mitigate response bias, where participants might uniformly respond favourably or unfavourably to all items (Marsh et al., 1984).

The scoring process involved reverse scoring the negatively worded items (2, 4, 7, 9, 11, 13, 14, 17, and 20) and then calculating the mean scores by averaging the responses for each student, following Liu and Wang's (2005) original methodology. A higher score indicated a stronger ASC of the student. The reliability analysis showed good internal consistency for academic confidence ($\alpha = .70$) and academic effort ($\alpha = .73$), with the overall internal consistency being very good ($\alpha = .81$).

3.4.4 Academic Achievement

Academic achievement was assessed using standardized tests in three core subjects: Chinese, Mathematics, and English. The choice of the subjects was based on their mandatory nature for high school courses and the Gaokao, ensuring their universal relevance regardless of the other elective subjects chosen by students. Furthermore, these three subjects constitute the largest portion of the Gaokao total

score (see details in Sun, 2023), making them reliable indicators of students' future performance in the Gaokao. To ensure the scores reflected recent and relatively comprehensive academic performance, participants were asked to report their most recent exam scores obtained in the standardized assessments at the semester's end, commonly used to evaluate students' learning over the term in Chinese high school. An example question was, "Please report your final score in Mathematics from the last term and the maximum possible score for the test."

Scores obtained in each subject were converted into percentages of their respective maximum possible scores to account for variations in maximum scores by grade level, with a range from 0 to 100. Total academic achievement was measured as the sum of these percentage scores, with a possible range from 0 to 300. In this research, unless otherwise specified, academic achievement refers to the total test scores across all subjects. Higher scores indicated greater academic achievement, whether referring to individual subject scores or the total score.

3.4.5 Optional, Open-ended Questions

At the end of the questionnaire, two optional open-ended questions were included. According to Creswell (2021), open-ended survey questions allow participants to express their views in their own words, uncovering categories and patterns that structured questions might miss. The questions designed in this study were: "In your own words, how do you perceive your parents' expectations? " and "Beyond the factors discussed in this survey, are there any other influences you believe significantly impact your academic achievement?"

These questions acknowledge that while the study's quantitative scales were designed to address specific research questions, other significant dimensions of parental influence may not have been included. These dimensions might include parental behavioural involvement, such as participating in school activities, and parental cognitive involvement, like exposing students to cognitively stimulating materials, as suggested by Grolnick and Slowiaczek's (1994) model of parental

influence on students' learning processes. Additionally, influences beyond parental impacts, such as the school environment and teacher impact, emphasized by empirical research (e.g., Maxwell et al., 2017; Wang & Holcombe, 2010), may also play a role.

3.5 Data Analysis

The study's quantitative data analysis was conducted using SPSS (version 29). After scoring each scale according to their respective scoring methods, missing data was first identified and addressed. Specifically, the study diagnosed the type and pattern of missingness using Rubin's (1976) definitions and Little's MCAR test (Little & Rubin, 2002), which evaluates whether the data are missing completely at random (MCAR), missing at random (MAR), or not missing at random (MNAR). The results suggested that of the 144 participants who submitted their answers and met the research criteria, 97 participants (67.4% of the total sample) provided complete data for all variables. The remaining 47 participants had missing data at least in one section, with 25 participants (17.4% of the total sample) missing part of their academic achievement data, 24 participants (16.7%) missing part of their ASC data, 20 participants (13.9%) missing some parental expectations data, and four participants (2.8%) choosing "unknown" for their father's highest education level, as well as three participants (2.1%) choosing "unknown" for their mother's highest education level. Little's MCR test yielded a p-value greater than 0.05, $X^2(1075) = 1130.63$, $p = .116$, thus accepting the null hypothesis. This result indicates that the missing data for these variables was unrelated to the observed or unobserved data and was characterized as MCAR.

To handle the missing values, although list-wise deletion is a straightforward approach, it can reduce statistical power, particularly when missing values comprise a large proportion of the total sample (e.g., exceed 10%, as identified by Enders, 2010; Field, 2017). Therefore, the study adopted multiple imputation (MI), as it maintains sample size and accounts for the uncertainty inherent in the imputation process by generating multiple imputed datasets and combining results for more reliable

estimates (Rubin, 1987; Schafer & Graham, 2002).

Next, univariate outliers, defined as values more than ±3 standard deviations from the mean, were excluded from the dataset following the statistical guidance from Field (2017). This threshold is based on the assumption of a normal distribution, where approximately 99.7% of the data points are expected to fall within this range (Tabachnick & Fidell, 2006). In the sample, one extreme outlier was identified in the academic achievement data, and the case was removed to ensure the statistical analyses' accuracy and reliability.

Descriptive statistics were then calculated for each core variable, including means, standard deviations, range, skewness, and kurtosis for continuous variables of parental expectation, ASC, and academic achievement, as well as median, frequencies, and percentages for the nominal variable of gender and the ordinal variables of parents' highest education levels and age.

To investigate the relationships among the variables, appropriate bivariate correlation analyses were conducted. The strength of the correlations was determined using Cohen's r-value thresholds: a coefficient of 0.1 or higher indicates a weak correlation, 0.3 or higher indicates a medium correlation, and 0.5 or higher indicates a strong correlation. Subsequently, hierarchical multiple linear regression was employed to understand the unique contributions of parental expectations and ASC to academic achievement while controlling for gender and parents' education levels. Before the regression analyses, diagnostic tests confirmed that the assumptions of multiple linear regression were met, including normality of residuals, homoscedasticity, and the absence of multicollinearity. The main analyses proceeded as follows:

Model 1: Control Variables

- Predictor variables: students' gender, father's highest education level, mother's highest education level
- Outcome variable: academic achievement

Model 2: Parental Expectations

- Predictor variables: students' gender, father's highest education level, mother's highest education level, parental expectations
- Outcome variable: academic achievement

Model 3: ASC

- Predictor variables: students' gender, father's highest education level, mother's highest education level, parental expectations, ASC
- Outcome variable: academic achievement

The baseline model (Model 1) included only control variables to assess their direct impact on academic achievement, providing a clearer understanding of the effects of the primary variables introduced in subsequent models (Keith, 2005). The second model evaluated the incremental explanatory power of parental expectations, while the third tested the independent contributions of parental expectations and ASC.

To examine the second research question, whether parental expectations indirectly affect academic achievement through academic self-concept while controlling for parents' highest education level and student gender, a mediation analysis was conducted using the PROCESS macro (Model 4; Hayes, 2017). PROCESS macro offers advantages compared to traditional mediation testing methods, such as the Baron and Kenny and product-of-coefficients approaches. Specifically, the Baron and Kenny method involves a series of regression analyses to test for mediation (Baron & Kenny, 1986), while the product-of-coefficients approach estimates indirect effects by multiplying path coefficients (MacKinnon et al., 2004). Both methods assume normal data distribution and cannot directly estimate confidence intervals for indirect effects, limiting their sensitivity and precision in detecting weak mediation effects. In contrast, PROCESS macro overcomes these limitations using bootstrap methods to estimate confidence intervals directly for indirect effects and better handle non-normally distributed data (Hayes, 2017). Model 4 of the PROCESS macro was used to test the mediation hypothesis, where parental

expectations (independent variable) influence academic achievement (dependent variable) through ASC (mediator). The macro estimates direct and indirect effects using bootstrapping techniques with 5,000 resamples to provide bias-corrected confidence intervals for the indirect effect. The significance of the mediation effect was determined by examining whether the 95% confidence interval for the indirect effect did not include zero.

Content analysis was employed to examine the qualitative data collected from open-ended survey responses. Given the supplementary nature of the data to the research question, the analysis was straightforward. Specifically informed by Elo and Kyngäs's (2008) qualitative content analysis process, the survey responses were reviewed multiple times to ensure accuracy and familiarity with the content. An initial set of codes was then developed based on the research questions and a preliminary data review. Using Excel to systematically organize and manage the codes, each code was clearly defined in a coding manual to maintain consistency. These codes were subsequently grouped into broader categories relevant to the research questions, each category being defined with specific criteria to ensure clarity and reliability. Finally, rigor was ensured through repeated data reviews.

Chapter 4 Result

4.1 Main Characteristics of the Participants

The sample included 42.0% males (n = 60) and 58.0% of females (n = 83), primarily in their mid-adolescence (Sawyer et al., 2018), with ages ranging from 15 to 19 years (M = 16.55, SD = 0.74). The majority of their parents had at least a Bachelor's or Diploma degree with 51.0% of fathers and 48.3% of mothers reaching this level. A smaller proportion of parents had qualifications above this level, with 11.9% of fathers and 12.6% of mothers holding postgraduate degrees. Conversely, 37.1% of fathers and 39.2% of mothers had educational qualifications below a Bachelor's or Diploma degree (see Appendix C for more details). Given that the average years of education in Guangdong Province in 2020 was about 10.38 years (国务院第七次全国人口普查领导小组[Leading Group of the State Council for the Seventh National Population Census], 2021), corresponding to completing junior high school and being in the first year of senior high school, the sample represented a relatively well-educated family background in the region.

4.2 Descriptive Statistics of Primary Variables

Table 1 displays the mean, standard deviations, range of minimum and maximum values observed, as well as skewness and kurtosis for core measures of parental expectations, ASC, overall academic achievement (measured as the sum of test scores in Chinese, English, and Math), as well as the individual scores for each of these subjects.

Table 1

Descriptive Statistics for Continuous Variables

	M	Min	Max	*SD*	Skewness (*SE*)	Kurtosis (*SE*)
Parental expectations[a]	74.90	32.00	120.00	16.43	0.05 (0.21)	0.20 (0.40)
ASC[b]	4.58	2.63	6.16	0.65	-0.17 (0.21)	0.32 (0.40)

Academic Achievement[c]	192.61	114.67	256.67	29.54	-0.27 (0.21)	0.08 (0.40)
Chinese Language[d]	69.34	47.63	91.00	6.724	-0.35 (0.21)	1.48 (0.40)
Mathematics[d]	53.45	13.33	92.00	16.94	0.10 (0.21)	-0.44 (0.40)
English Language[d]	69.63	16.67	96.32	14.26	-1.02 (0.21)	1.44 (0.40)

Notes. The total number of observations for each variable was 143. *M* = mean. Min = minimum value observed in the sample. Max = maximum value observed in the sample. *SD* = standard deviation. *SE* = standard error. [a] = with a minimum value of 0 and a maximum value of 120. [b] = The variable of academic self-concept had a minimum value of 1 and a maximum value of 7. [c] = with a minimum value of 0 and a maximum value of 300. [d] = with a minimum value of 0 and a maximum value of 100.

The mean values of the three variables all fell within the upper middle range of their respective scales, suggesting that participants generally perceived relatively strong parental expectations, reported relatively positive academic self-perceptions, and achieved relatively high academic results.

4.3 Relationships between Parental Expectations, ASC, and Academic Achievement

This section addressed the first research question regarding the relationships among parental expectations, ASC, and academic achievement in a sample of Chinese senior high school students, while controlling for the potential influential variables of students' gender and parents' educational backgrounds. First, a bivariate correlation matrix was produced. This was followed by hierarchical multiple regression models to examine the predictive powers of students' perceived parental expectations and their ASC on academic achievement, accounting for the aforementioned control variables.

4.3.1 Correlations

Table 2 shows the results from the bivariate, correlational analyses. Given that the continuous variables, except for the scores obtained in Chinese and English

language, satisfied the normality assumption (detailed in Appendix D), Pearson's correlation tests were employed to explore the relationships between continuous variables. The relationships for the remaining non-normally distributed continuous variables, the nominal variable of gender and ordinal variables of parents' education levels and age with continuous variables were tested by Point-Biserial and Spearman's rank correlation tests.

Table 2

Correlation Matrix of Core Variables

Variables	1[b]	2[a]	3[b]	4[b]	5[c]	6[c]	7[c]	8[b]	9[c]	10[b]
1. Age	1.00									
2. Gender (Female)	-.18*	1.00								
3. Father's Highest Education Level	-.12	.05	1.00							
4. Mother's Highest Education Level	-.23**	-.01	.70**	1.00						
5. Parental Expectations	.09	-.05	.14*	.08	1.00					
6. Academic Self-concept	.02	.13	.30***	.21**	.36***	1.00				
7. Academic Achievement	.10	-.02	.33***	.28***	.33***	.49***	1.00			
8. Chinese Language	.06	.21*	.28**	.28**	.03	.22**	.39**	1.00		
9. Mathematics	.15*	-.14	.17*	.14	.04	.35**	.65**	.36**	1.00	
10. English Language	-.11	.20*	.41**	.43**	.19*	.41**	.68**	.59**	.51**	1.00

Notes. [a], Point-Biserial correlation tests. [b], Spearman's rank correlation tests. [c], Pearson's correlation tests. In the variable of gender, male was coded as "0," and female was coded as "1." One-tailed tests. *$p < .05$, **$p < .01$, ***$p<.001$

The correlational analyses revealed moderate, significantly positive relationships among parental expectations, ASC, and total academic achievement. These findings indicate that Chinese high school students who perceived higher parental expectations tended to have a more positive academic self-concept and better overall academic performance. Additionally, although gender did not show significant correlations with the three primary variables, it did present significant correlations with performance in Chinese and English language subjects. These significant positive correlations, though small, suggest that female students performed significantly better than male students in these language-based subjects.

Regarding age differences, the results only indicated a significant but small positive association with Mathematics scores among all key variables of interest, suggesting that older students performed better in Math.

Both parents' education levels showed small to moderate positive correlations with the three core variables, with academic performance having the highest correlation coefficient, followed by ASC, and then parental expectations. Notably, the association between fathers' highest educational qualifications and perceived parental expectations was small (r = .14, p = .046), while the correlation for mothers was not significant (r = .08, p = .178). Additionally, mothers generally showed smaller coefficients for all other correlations. These findings suggest that while both parents' education levels are important, the father's education level may have a stronger association with students' perceptions of self, parental expectations, and academic outcomes.

4.3.2 Hierarchical Multiple Linear Regression Analysis

A hierarchical multiple linear regression analysis was employed to determine to what extent parental expectations perceived by Chinese high school students and their ASC can predict final exam scores obtained at each semester while controlling for students' gender and parents' educational background.

Before the primary analysis, diagnostic tests confirmed that the assumptions of

multiple linear regression, including normality of residuals, homoscedasticity, and the absence of multicollinearity, were met (see Appendix E for details).

The results of the analysis (see Table 3) demonstrated that the overall regression model accounted for 30% of the variance in students' final exam scores, $F(9, 133) = 7.69$, $p < .001$. Within the model, control variables explained 14% of the variance, $F(7, 135) = 4.66$, $p < .001$. Parental expectations further explained the variance by 7%, $\Delta F(1, 134) = 12.10$, $p < .001$. Finally, incorporating students' ASC in Model 3 boosted the explained variance by 10%, $\Delta F(1, 133) = 19.54$, $p < .001$.

Regarding control variables in Model 1, gender did not significantly predict academic achievement, $b = -2.14$, $\beta = -0.04$, $p = .650$. When both parents' highest education levels obtained were compared with a reference group of bachelor's/diploma degree, chosen for its ability to improve interpretability and stability by its largest proportion among the sample (Harrell, 2001), any fathers' education level differed did not show significant change in student academic achievement, while mothers with lower education levels, specifically when they only had a junior high school education or below tended to have students who scored significantly lower by 21.26 unstandardized score, $\beta = -0.27$, $p = .016$, 95% CI [-38.56, -3.96].

For the core variables of interest, Model 2 suggested that parental expectations were a significant predictor of student academic achievement. When controlling for gender and family educational background, each one-point increase in perceived parental expectations was associated with a 0.48-point rise in academic achievement, $\beta = 0.27$, $p < .001$, 95% CI [0.21, 0.75]. Even after accounting for ASC in Model 3, parental expectations remained a significant predictor ($\beta = 0.16$, $p < .001$, 95% CI [0.01, 0.55]), though the unstandardized coefficient reduced to a 0.28-point increase per point rise in expectations. In Model 3, ASC itself was also a strong predictor of academic achievement. A one-point increase in students' perceived academic abilities corresponded to a 16.10-point (unstandardized) increase in final exam scores, $\beta =$

0.35, $p < .001$, 95% CI [8.90, 23.30].

Table 3

Hierarchical Regression Analysis Predicting Total Academic Achievement: Parental Expectations and Academic Self-concept (ASC) Controlling for Gender and Parental Highest Education Levels

	Model 1			Model 2			Model 3		
	b (SE)	*β(SE)*	*p*	*b (SE)*	*β(SE)*	*p*	*b(SE)*	*β(SE)*	*p*
Control Variables									
Intercept	205.33 (10.83)			167.21 (15.12)			112.48 (18.82)		
Gender (Female)	-2.14 (4.70)	-0.04 (10.86)	.650	-1.25 (4.53)	-0.02 (11.32)	.784	-3.92 (4.29)	-0.07 (12.17)	.363
Father's Highest Education Level (Bachelor's/Diploma Degree)									
Junior High School or below	-12.56 (7.89)	-0.16 (23.68)	.114	-10.59 (7.60)	-0.14 (24.68)	.166	-8.24 (7.14)	-0.11 (26.37)	.251
Senior High School	-4.91 (7.96)	-0.08 (22.88)	.539	-4.30 (7.66)	-0.07 (23.78)	.575	-5.24 (7.18)	-0.09 (25.28)	.467
Postgraduate Degree	22.61 (11.47)	0.25 (40.39)	.051	18.46(11.09)	0.20 (42.34)	.098	11.05 (10.53)	0.12 (45.59)	.296
Mother's Highest Education Level (Bachelor's/Diploma Degree)									
Junior High School or below	-21.26 (8.75)	-0.27 (23.63)	.016	-20.47 (8.41)	-0.26 (24.61)	.016	-16.92 (7.92)	-0.21 (26.31)	.035
Senior High School	-8.10 (7.38)	-0.12 (16.86)	.274	-7.29 (7.10)	-0.10 (17.54)	.306	-6.67 (6.66)	-0.10 (18.65)	.318
Postgraduate Degree	-16.19 (8.63)	-0.18 (29.64)	.063	-13.50 (8.33)	-0.15 (30.96)	.107	-9.94 (7.85)	-0.11 (33.11)	.207
Primary Variables									
Parental Expectations				0.48 (0.14)	0.27 (0.01)	<.001	0.28 (0.14)	0.16 (0.01)	<.001
Academic Self-concept							16.10 (3.64)	0.35 (7.88)	<.001
ΔR^2				0.07	$F(1, 134) = 12.10$	< .001	0.10	$F(1, 133) = 19.54$	< .001
Adjusted R^2	0.14	$F(7, 135) = 4.66$	< .001	0.20	$F(8, 134) = 5.46$	< .001	0.30	$F(9, 133) = 7.69$	< .001

Notes. In the variable of gender, male was coded as "0," and female was coded as "1." "Bechlor's/Diploma Degree" was the reference group for both father's and mother's highest education level in the analysis. *b* = unstandardized coefficient. *SE* = standard error of the coefficient. *β* = standardized coefficient. Adjusted R^2 = adjusted coefficient of determination. ΔR^2 = change in R^2. One-tailed tests.

4.4 PROCESS Macro Mediation Test

To investigate the second research question of whether ASC serves as a mediator between student-perceived parental expectations and academic achievement among Chinese high school students, while controlling for parents' highest education levels and gender, a simple mediation analysis was performed using PROCESS SPSS macro (Model 4; Hayes, 2022).

As illustrated in Table 4, the standardized regression coefficients were statistically significant for both the relationship between parental expectations and students' ASC and the relationship between students' ASC and academic achievement. However, the coefficient for the former was quite small, b = 0.01, 95% CI [0.01, 0.02]. Based on 5,000 bootstrap resamples, the confidence interval for the indirect effect was entirely above zero (95% CI [0.09, 0.39]), indicating that ASC significantly mediated the relationship between parental expectations and academic achievement. Additionally, since the direct effect of parental expectations on academic achievement remained significant even after accounting for ASC, the mediation was identified as partial, thus confirming the third hypothesis.

Table 4

Mediation Analysis of Academic Self-concept Between Predictor of Parental Expectations and Outcome of Academic Achievement

Path	*b*	*SE*	*t*	*p*	95% CI [Lower Bound, Upper Bound]
Direct effect	0.30	0.14	2.18	.031	[0.03, 0.57]
Indirect effect	0.23	0.08			[0.09, 0.39]
Total effect	0.53	0.14	3.79	<.001	[0.25, 0.80]
Parental Expectations -> Academic Self-concept	0.01	0.01	4.32	<.001	[0.01, 0.02]
ASC -> Academic Achievement	17.39	3.63	4.80	<.001	[10.23, 24.55]

Notes. *b* = unstandardized coefficient. *SE* = standard error of the coefficient. The indirect effect was tested using 5,000 bootstrap resamples. *p* values are reported as one-tailed due to the directional nature of the hypotheses.

4.5 Quantitative Analysis of Open-Ended Responses on Parental Expectations and Influences

To supplement the understanding of parental expectations perceived by students, 119 participants specified which parents or guardians they primarily considered. Most students (*n* = 66, 46.2%) defined parental expectations as coming equally from both parents. 31.5% (*n* = 45) primarily referred to their mother's expectations, while only 4.2% (*n* = 6) and 1.4% (*n* = 2) of students primarily considered their father's expectations and other guardians, respectively.

In the open-ended questionnaires, 78 participants shared their perceptions and experiences regarding parental expectations and academic life. Students generally described parental expectations from three angles: what their parents expected, how these expectations were communicated, and how the students felt and reacted to them (see details in Table 5).

Regarding the content of parental expectations (*n* = 35, 44.9% of 78 participants), the results showed two main types: specific goals and general requirements. Specific goals included achieving high grades or attending a prestigious university, and notably, these goals reported by respondents were entirely academic-related. The general requirements typically included being better than peers, constantly improving oneself, and, in the most frequently mentioned term, making an effort. The emphasis on effort was evident in the respondents' own words. Representative answers included, "They think it is already enough to make an effort" and "They seem not to value my academic progress or any achievements, only the effort."

When reporting on the expression of parental expectations (*n* = 39, 50%), nine students mentioned that their parents did not specifically discuss or articulate their expectations, with some explicitly stating they had no expectations. For example, one

participant quoted their parents saying, "We don't have any expectations for you; what you want to do or achieve is entirely up to you." However, even among those who reported that their parents claimed not to have expectations, two participants perceived underlying expectations, with sentiments like, "Deep down they still hope for me to achieve."

For those who reported understanding their parents' expectations through explicit words and behaviours, 19 described positive experiences, including verbal encouragement and supportive actions, such as helping solve problems and paying for tutoring, to satisfy certain expectations. Conversely, 11 participants reported negative experiences, mentioning discouragement, criticism, and sarcasm when their parents delivered their expectations to them. Beyond verbal expressions, one participant mentioned sensing parental expectations through indifferent attitudes and body language, such as cold stares, side-eye glances, and crossed arms, when academic performance was deemed unsatisfactory.

Students' responses to perceived parental expectations were the most frequently reported category, with nearly all participants addressing this point (n = 77, 98.7%). In their reports, over half (n = 43) of them felt motivated and encouraged by their parents' expectations. However, 11 students felt demotivated, with some (n = 5) displaying resistant behaviours such as reluctance to attend school or complete homework. Notably, two students reported mixed feelings, sometimes finding their parents' expectations motivating and at other times demotivating, describing their parental expectations as "polarized" or "extreme."

Many students talked about whether their parents' expectations matched their own as well. More of them reported misalignment (n = 8), such as parents having too high or unrealistic expectations, than alignment (n = 2), where students acknowledged and accepted their parents' expectations. One student who reported alignment showed their assimilation of their parents' expectations: "At first, I was really stressed because I didn't want to go to that school. But once I accepted it, I felt a lot better. The school

is actually good, and now I'm more motivated and less depressed." Regarding pressure related to parental expectations, most students reported increased stress (*n* = 11) than relieve stress (*n* = 2). However, opinions on whether the heightened stress was beneficial varied among participants.

Comparing the three categories revealed that students who reported positive parental delivery of expectations also reported feelings of motivation (*n* = 13). Conversely, negative expressions and transfers were more often accompanied by feelings of demotivation (*n* = 4) and increased pressure (*n* = 4). In the four cases where negative expressions and pressure were reported together, all students mentioned their self-coping mechanisms. Examples included statements like "I try not to place too much value on my parents' expectations" and "I often remind myself that my parents behave this way because they didn't receive much education." Another common combination was the presence of specific goals set by parents, which were reported frequently with both feelings of motivation (*n* = 9) and increased pressure (*n* = 6).

Beyond parental expectations, students reported other factors influencing their academic experiences and achievement in the second open-ended question. The most frequently mentioned categories were from personal perspectives (*n* = 39, 50.0%), peer influence (*n* = 31, 39.7%), sociocultural values (*n* = 29, 37.2%), and teacher influence (*n* = 27, 34.6%). Table 6 provides a detailed breakdown of these categories, along with definitions and representative examples.

Notably, the majority of participants (95.7%) reported that these factors negatively impacted their academic achievements. They used expressions such as, "Social expectations place high pressure on the student group, and to some extent, I feel it adversely affects my academic performance and learning attitudes." In contrast, a small minority (4.3%) indicated positive effects, sharing statements like, "I encountered the best teacher who helped me achieve higher scores and changed my thoughts regarding learning."

Figure 2 presents the large overlaps among the four categories indicated by students, revealing that they often perceived multiple influences simultaneously affecting their academic performance rather than single factors. Personal perspectives emerged as the central factor, interacting with all other categories, with the most prominent overlap being with peer influence, followed by sociocultural values and teacher influence.

Table 5

Categories Derived From the Sample Answered the Open-ended Questions Regarding Perceived Parental Expectations

Categories	*n*	Percentage	Sub-categories	Definitions	*n*	Percentage	e.g.
Content	35	44.9%	Specific Goals	Stated specific goals, including achieving grades, getting into a university, participating in more competitions and winning awards	20	25.6%	"My parents hope I can get into college."
			General Requirements	Stated general goals, including being better than others, continuously improving oneself, and working hard	15	19.2%	"My parents hope that I can be better than others."
Expression and Transfer	39	50.0%	Implicit	Parents do not explicitly state their expectations, but students sense them through their behavior or words	9	11.5%	"Even though they say they don't expect good grades, deep down they still hope for me to achieve it. "
			Explicit	Parents' positive behaviors or words to transfer their expectations, including behavioral, emotional, and financial support provided by parents.	19	24.4%	"Their daily encouraging words are motivating. For example, when I don't perform well, they don't criticize me but instead analyze the issues and provide encouragement."
				Parents' negative behaviors or words to transfer their expectations, including verbal discouragement,	11	14.1%	"When I don't do well like my test scores aren't good, they criticize and blame me, often using negative and extremely

				criticisms, or sarcastic remarks.			dismissive language like 'With grades like yours, forget about getting into a university; you'll struggle to get into a vocational school.' I find such comments very discouraging."
Students' Responses	77	98.7%	Expectation Alignment	An alignment between what students perceive parents expect and what students themselves aspire to achieve	2	2.6%	"They keep telling me to get into a certain university. Though it's stressful, but that's also what I expected to have."
				A misalignment between what students perceive parents expect and what students themselves aspire to achieve	8	10.3%	"They don't have high expectations for me and believe it's enough for me to just get through college. However, I don't want to be that casual; I want to do better."
			Motivation Perception	Students feel motivated by their parents' expectations.	43	55.1%	"My parents' encouragement and support are very motivating."
				Students feel demotivated by their parents' expectations.	11	14.1%	"They think I should sacrifice weekend rest time for studying, which makes me do not want to study hard or even learning at school."
			Pressure Perception	Students experience heightened stress and anxiety from their parents' expectations	11	14.1%	"I understand my parents' expectations, but I often feel that they bring a lot of pressure."

	Students feel less stressed and more at ease with their parents' expectations	2	2.6%	"My parents don't have high expectations for my studies; they just want me to do my best. I think this helps me stay calm. When I'm down, they comfort me, telling me it's okay, reducing my study pressure."

Notes. *n* = number of observed in the sample of 78 who answered the open-ended questions. Percentage = proportion of the category in the sample of 78 who answered the open-ended questions. e.g. = examples in the sample's answers.

Table 6

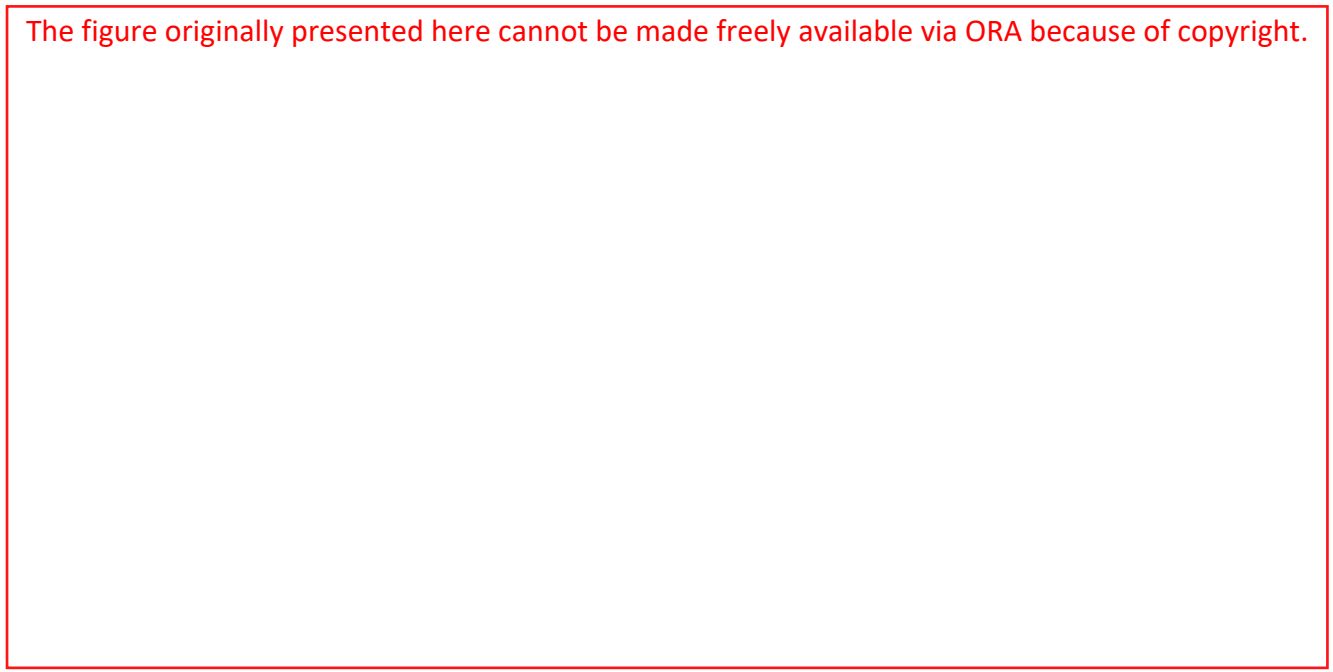
Categories Derived From the Sample Answered the Open-ended Questions Regarding Factors Influencing Academic Achievement

Categories	*n*	Percentage	Sub-categories	Definition	*n*	Percentage	e.g.
Personal Factors	39	50.0%	Subject Interests	ersonal interests in subjects	12	15.4%	"Subject interests drive me to learn."
			Mental Health Problems	mental health problems like depression, anxiety	21	26.9%	"I am quite sensitive and emotional, sometimes get really depressed."
			Physical Health Problems	physical health problems such as fatigue	6	7.7%	"My physical condition is very poor. I feel tried easily."
			Future Goals	personal aspirations and goals regarding the future	3	3.8%	"When I know what job I want to do, I feel motivated and achieve better grades."
Peer Influence	31	39.7%	Peer Pressure	the influence exerted by peers that encourages an individual to conform to certain behaviors, values, or academic practices	26	33.3%	"Peers slacking off influences my own academic behaviors." "Those around me are all better than me."
			Peer Relationships	the nature and quality of interactions with peers	11	14.1%	"Interpersonal relationships. I think teenage girls are easily influenced by those relationships, which can largely influence my final exam scores," "betray of friendships and romantic relationships"

Sociocultural Values	29	37.2%	-	societal emphasis on achieving good grades as a measure of success, repaying parents' efforts, future success	-	-	"The deep-rooted importance Chinese people place on exams greatly influences me." "Social expectations, everyone has high goals."
Teacher Influence	27	34.6%	Teaching Quality	the effectiveness of teachers in delivering instruction, engaging students, fostering a positive learning environment	13	16.7%	"In my first year of high school, I met the best teacher who knew how to effectively deliver the course, and had a great impact on my studies and thoughts."
			Teacher Attitudes	the perceptions and behaviors of teachers toward students, including their supportiveness, expectations, and interactions	16	20.5%	"Teachers discriminate students who achieved low grades."

Notes. *n* = number of observed in the sample of 78 who answered the open-ended questions. Percentage = proportion of the categories in the sample of 78 who answered the open-ended questions. e.g. = examples in the sample's answers.

Figure 2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Chapter 5 Discussion

The present research aimed to investigate the relationships between parental expectations, ASC, and academic achievement among Chinese senior high school students preparing for the Gaokao. Specifically, it focused on whether ASC mediated the influence of parental expectations on student academic achievement. The results confirmed all three research hypotheses: higher parental expectations, as perceived by students, positively predicted both higher self-perceptions of academic abilities and higher final exam scores; students' self-perceptions of academic abilities positively predicted higher exam scores; and students' self-perceptions of academic abilities partially mediated the influence of parental expectations on academic achievement in terms of exam scores. These findings remained significant even when controlling for parental education levels and gender. The following sections discuss how these findings contribute to existing research.

5.1 Parental Expectations and Academic Achievement

The results revealed a positive association between parental expectations and academic achievement, which is consistent with findings from international meta-analyses (Castro et al., 2015; Jeynes, 2007; Pinquart & Ebeling, 2019), with the coefficient falling within the identified range of $r = .22$ to $r = .40$. This positive coefficient may be attributed to supportive parental behaviours leading to higher perceived expectations, which, in turn, result in better academic achievement, as suggested by empirical research (Gill & Reynolds, 1999; Hao & Bonstead-Bruns, 1998; Yamamoto & Holloway, 2010). This was evidenced in the study by reports from many students that their parents exhibited encouraging and supportive behaviours, such as praising achievements, comforting them after poor scores, and helping them identify areas for improvement.

Moreover, the positive influence of parental expectations on students' standardized scores aligns with findings from Long and Pang (2016), who studied ninth graders in mainland China taking the PISA, and Zhao (2013), who examined

Chinese junior high school students taking national examinations. This consistency might suggest that senior high school students in China exhibit similar patterns in how perceived parental expectations influence academic achievement, akin to their junior high school counterparts, irrespective of the educational system. Another possible explanation for this consistency might be the similar age range across the studies, with a significant overlap around 15 years old. This similar age range might not exhibit significant differences in the development of autonomy in adolescence, which, according to Steinberg (2016) and Chen *et al.* (2022), is a critical factor in how parental expectations influence academic achievement.

Beyond confirming previous findings, this study extends the scope of research by incorporating parental expectations that include more than just exam scores or grade levels adopted by Long and Pang (2016) and Zhao (2013). It encompasses aspects relevant to the Chinese cultural context, such as family obligation, academic achievement, and self-reliance. According to Leung and Shek (2011), these aspects better represent parental expectations in China, emphasizing filial piety, scholarship, and moral character.

5.2 Parental Expectations and Academic Self-concept

The present study also revealed a small but significant influence of parental expectations on students' ASC, even when controlling for parents' highest education levels. This finding contrasts with the non-significant results found in studies conducted in the United States and Switzerland (Jodl et al., 2001; Neuenschwander et al., 2007). Despite context differences, the discrepancy might also stem from the current study controlling only for parents' educational background as an indicator of family SES, whereas previous studies additionally included family income. Research measuring SES with diverse indicators (Davis-Kean et al., 2021; Hascoët et al., 2021; Pingault et al., 2015) suggests that each indicator uniquely influences parental expectations and ASC through distinct pathways. For example, Phillipson and Phillipson (2012) argued that parental income provides access to resources, while

higher education equips parents with informed knowledge and actions, thereby offering different educational resources to students.

The positive influence of parental expectations on students' ASC also contradicts Tang and Tran's (2023) findings on high school students in Vietnam, where parental expectations significantly increased students' negative self-concept. The current study tends to attribute the positive influence to supportive parental behaviours, informed by EVT positing that such behaviours help students form a higher ASC (Eccles & Wigfield, 1995). However, although Tang and Tran attributed their negative results to extensively high parental expectations, causing stress. The current study observed similar findings, where many more students reported that parental expectations were too high and mismatched with their own when compared with those who reported acceptance and alignment, and many of those students reported stress simultaneously. A potential explanation for the difference in results with similar observations could be that the current study's open-ended questions were optional and did not specifically ask if students perceived their parental expectations as high and unrealistic. This may have led to response bias and reporting bias, where participants who have experienced misalignment and stress feel more compelled to share their experiences, or negative experiences from misalignment and stress might be more memorable, leading to a disproportionate focus on negative outcomes.

Moreover, the relatively small coefficient for the positive influence of parental expectations on students' ASC, compared to the stronger associations suggested by Eccles (1998) and Partridge *et al.* (2013), might relate to the maturation of cognitive ability during adolescence. Adolescents infer their competence from multiple sources, such as performance feedback and reflected appraisals from significant others (Amorose, 2003). According to Dweck's (2002) review of the development of self-perception, the educational environment changes significantly beyond elementary school, with students receiving more feedback and judgments from teachers, reducing the proportion of parental influence on students' self-perceptions. This was evidenced

by students' responses to open-ended questions as well, which highlighted the overlap between personal, peer, sociocultural, and teacher influences on academic life rather than reporting the influence of parents alone. Furthermore, participants reported that the control and criticism expressed by Chinese parents align with observations from Yamamoto and Holloway's (2010) cross-racial research in Asian America, which suggested that such parental behaviour can hamper positive ASC formation to some extent. However, this suggestion might be questionable due to differences between Chinese immigrants and native Chinese.

5.3 Academic Self-concept and Academic Achievement

A positive predictive influence of students' ASC on their academic achievement was also revealed. This finding aligns with the majority of research conducted in both Asian and non-Asian countries discussed earlier, confirming the critical role of ASC among Chinese high school students in driving academic achievement-related outcomes. The current research also contributes to previous studies by using a more context-specific ASC scale, which emphasizes effort and academic competence. Liu and Wang (2005) suggested that this approach is more suitable for capturing students' ASC in cultures deeply influenced by Confucian values. Although this study did not specifically explore students' perceptions of their academic abilities, effort and academic competence were frequently reported in how they perceived parental expectations in the CHC context of China. Regarding the influence of parental expectations on adolescents' formation of ASC, the current research implies the scale's relevance to the CHC context in mainland China to some extent. Nevertheless, specific tests of validity and reliability are still necessary to confirm the scale's applicability and robustness across diverse CHC settings.

5.4 Parents' Educational Levels

The results of this study indicate a significant positive association between parents' educational levels and the key variables of parental expectations, ASC, and academic achievement among Chinese senior high school students. These findings

align with previous studies highlighting the benefits of higher parental educational backgrounds (Sirin, 2005). As previously suggested, this positive association might be explained by the higher self-efficacy and greater ability of more educated parents to set higher expectations and provide more educational resources and support (Englund et al., 2004; Hascoët et al., 2021). This pattern might be shown in the current study, where the sample largely consisted of students from highly educated families, with over one-quarter reporting active parental involvement and support in their learning.

Notably, the research found differences in the strength of associations between paternal and maternal education levels and the core variables. Paternal education levels exhibited stronger associations with all three variables related to adolescents' academic experiences and outcomes. A significant difference was observed in students' perceived parental expectations based on parental education levels. Specifically, paternal education levels had a stronger and significant association with these expectations, while maternal education levels did not show a significant association. This may be explained by traditional Confucian values, where fathers are regarded as more authoritative figures (Hershock & Ames, 2012). Thus, their educational success serves as a powerful example for children to follow. Conversely, mothers' educational achievements and expectations are often perceived as more subtle and less formal (Hershock & Ames, 2012). However, the current study challenges these traditional explanations. First, an increasing body of research highlights the diminishing value of the highly authoritative role of fathers and the evolving roles of mothers in contemporary Chinese cultural contexts (Li, 2021). Moreover, approximately half of the participants in this study referred to their mothers' expectations when rating the scale, contradicting the notion that maternal expectations or influence are less valued. The non-significant association between maternal education levels and perceived parental expectations might instead be

explained by the possibility that mothers express equivalent levels of expectations for their children's success regardless of their own academic achievements.

In the multiple regression analysis, parents' educational level and gender together accounted for 14% of the variance in students' academic achievement, aligning with previous research indicating these factors as significant influences on academic achievement (Marsh et al., 2006; Igbo et al., 2015). When using a bachelor's/diploma degree as the reference group, the paternal educational level did not show a significant difference in its influence on academic achievement compared to other educational levels. However, a different pattern emerged when examining mothers' educational levels, indicating that mothers with a bachelor's/ diploma degree positively influenced their children's academic performance more significantly than mothers with either lower educational levels of junior high school or below or higher educational levels of postgraduate degrees. This suggests that within this sample, a mother's education at the bachelor's/diploma level, instead of the father's, is beneficial for Chinese students' test scores compared to other educational levels. Nevertheless, the disproportionately smaller sample sizes for mothers with elementary school or below or postgraduate degrees when compared with those with bachelor's/diploma degrees may potentially limit the validity and reliability of the conclusions. Future research with larger, more balanced samples is needed to confirm these results.

5.5 Gender Differences

The results revealed significant gender differences in the associations with scores obtained in Chinese and English language subjects. Specifically, based on their self-reported scores from the last standardized tests, female students performed better than male students in these language-based subjects. Although there was an indication that female students tended to perform worse than their male counterparts overall, this was not statistically significant. This finding aligns with a previous study conducted in a regular senior high school in mainland China (Dai, 2001), as well as with results from international meta-analyses (Igbo et al., 2015; Marsh et al., 2006), all of which

have shown significant gender differences in ASC and subsequent academic achievement. Moreover, it may coincide with pervasive gender stereotypes to some extent, suggesting that female students tend to have higher verbal-related self-concept (Arens et al., 2022) and further supports the claim that such stereotypes can adversely influence students' ASC when their self-concept does not align with gender expectations (Ertl et al., 2017). However, the validity and reliability of these results can be challenged since academic achievement in the current research was measured by students' self-report scores. This method might result in social desirability bias, where students over-report their test scores to appear more competent or recall bias, where students cannot accurately remember their scores from the previous term, which potentially leads to overestimation or underestimation of academic achievement aimed to measure. Future research could collaborate with schools to obtain objective academic scores directly from school records to enhance the accuracy and reliability of the findings.

5.6 Mediating Effect of Academic Self-concept between Parental Expectations and Academic Achievement

The main results revealed a partial mediating effect of ASC between the influence of parental expectations on students' academic achievement, suggesting that while parental expectations directly influence academic achievement, a significant portion of this influence is exerted indirectly through students' ASC. This finding aligns with the results of Tatlah *et al*. (2019) conducted in Pakistan, which also identified a mediating role of ASC. However, the current study extends this analysis by examining parental expectations in a more multifaceted manner, specifically within the context of CHC, rather than focusing solely on grades obtained in school. Additionally, the findings are consistent with Pinquart and Ebeling's (2019) meta-analysis of global students under 20 years old, thereby extending their findings to include new participant samples from mainland China.

5.7 Implications of the Main Findings

The findings of this study are broadly consistent with Eccles' EVT framework (Eccles,1993), particularly in explaining the psychological mediator role of academic self-concept between parental expectations and academic achievement (Eccles & Wigfield, 1995). Although this research focuses on a relatively small sample from one Chinese senior high school, the findings may offer some insights into potential expansions of the EVT model. Specifically, the study focused on parents' future expectations for their children's achievement rather than on parents' beliefs about their children's abilities and task values, showing a significant impact on students' ASC and academic achievement. This might suggest that EVT could benefit from incorporating a broader categorization of parental expectations, especially in academic contexts where future-oriented goals are indicated to be important. Additionally, this study found a significant influence of students' perceptions of parental expectations on their educational experiences and outcomes, supporting the importance of students' subjective perceptions rather than parents' reported expectations alone, as suggested by previous empirical research (Gill & Reynolds, 1999; Hao & Bonstead-Bruns, 1998; Yamamoto & Holloway, 2010). This might imply that EVT could also place greater emphasis on the subjective experiences of students regarding their parents' expectations.

Practically speaking, this research might inform Chinese parents with children studying at senior high schools in Guangzhou about the importance of setting and expressing realistic expectations for their children's future achievement. More importantly, it emphasizes communicating these expectations positively, providing warm support and encouragement for their children to internalize. Moreover, the mediating effect of students' ASC suggests that parents should not only set and express their expectations but also actively support and enhance their children's self-perceptions regarding their academic abilities, which can significantly improve their academic outcomes. Additionally, the study highlights the potential influence of gender stereotypes and biases in various subjects. It calls for both parents and

educators to be aware of these biases and work to combat them to reduce their negative influence on students' self-perceptions and academic performance. By integrating these findings into their daily interactions and support strategies, parents and educators can create a nurturing environment that supports the academic and personal growth of senior high school students in Guangzhou.

5.8 Limitations and Future Research

One methodological limitation lies in the single indicator of parental educational background used to measure family SES. SES is multifaceted, encompassing indicators such as occupational status, family income, and household resources (Liu et al., 2020). Each of these factors affects academic performance in different ways (see review by Davis-Kean et al., 2021). By focusing solely on parental education, the study may only partially capture the broader influence of SES on academic achievement. This narrow scope might explain why the influence of family SES on students' academic achievement appeared generally non-significant. To gain a more comprehensive understanding of SES's impact on academic outcomes, future research should employ a composite measure that encompasses multiple dimensions of SES.

Additionally, the convenience sampling from only one senior high school in Guangzhou potentially hinders the generalizability of the results to all mainland Chinese high school students. Future studies could include a more diverse sample from multiple regions to enhance the external validity of the findings.

Another limitation of the current study lies in its cross-sectional nature. Although the temporal sequence was identified in the study, it cannot confirm that parental expectations lead to changes in ASC and subsequently influence academic achievement among Chinese senior high school students. The unclear causal direction could also reflect a reverse direction, where high academic achievement influences parental expectations or ASC. Empirical research has suggested reciprocal influences between parental expectations and academic achievement (Zhang et al., 2011), as well as between ASC and academic achievement (Wu et al., 2021). Therefore, a

longitudinal study is necessary to rigorously determine these relationships and to better understand the potential mediating role of ASC.

Moreover, a longitudinal approach would provide an additional understanding of how parental expectations evolve and influence adolescents' perceptions of their academic abilities and outcomes throughout their high school years. Practically, such research is important in the context of the Gaokao since the preparation for the exam begins as early as middle school (around age 14) and continues until the end of senior high school (around age 18). Given this extended preparation period, it is critical to identify whether there are specific phases during which parental expectations have a heightened impact on students' academic performance. Understanding these critical periods could offer valuable insights into optimizing parental support and intervention strategies to enhance academic outcomes.

5.9 Conclusion

This study examined the relationships between students' perceived parental expectations, their academic self-concept, and academic achievement among 143 senior high school students in mainland China after controlling for parents' educational background and gender. The aim was to provide valuable insights into educational practices in China under the newly reformed Gaokao.

Results revealed that higher parental expectations perceived by students predict higher self-perceptions regarding academic abilities and higher exam scores, with academic self-perceptions playing a significant, partially mediating role. This study supported and extended the theoretical model informed by Eccles' Expectancy-Value Theory (1993), focusing on the relatively innovative aspect of requirements in parental expectations as perceived by students themselves.

However, the study is limited by its reliance on a cross-sectional design, a single indicator of SES, and a specific focus on one high school in mainland China. These factors may affect the comprehensive understanding of the parental effect on student's academic achievement and its generalizability to mainland Chinese high school

students. Future research should consider a longitudinal study to test the causal relationships between the three constructs and adopt a composite measure of SES in more high schools from different regions in China.

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Appendix A: DREC Confirmation of Ethical Approval

Research title: Impact of Chinese students' perceived parental expectations on academic achievement: The mediating role of academic self-concept
Research ethics reference: EDUC_C1A_24_033

The above application has been considered on behalf of the Education Departmental Research Ethics Committee (DREC) in accordance with the University's procedures for ethical approval of all research involving human participants.

I am pleased to confirm that, on the basis of the information provided to the DREC, ethics approval has now been granted for this study.

Please note the following:
Personal data: It is the responsibility of the PI to ensure that all personal data collected during the project is managed in accordance with the University's guidance and legal requirements.
In-person activities: Any data collection involving in-person interactions with participants must have an up-to-date fieldwork risk assessment in place; further guidance is available from the Safety Office's website.
Amendments: Please notify the committee if you intend to make any amendments to the information in your ethics application as submitted at date of this approval, as all changes must receive ethical approval prior to implementation. The amendment form is available on the SSH IDREC webpage.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to staff.curec@education.ox.ac.uk / student.curec@education.ox.ac.uk or ethics@socsci.ox.ac.uk.

Yours sincerely
Robert Klassen

Appendix B Information Sheet, Consent Form, Questionnaires

Impact of Chinese Students' Perceived Parental Expectation on Academic Achievement: The Mediating role of Academic Self-concept

CUREC Approval Reference: EDUC_C1A_24_033

General Information

The aim of this research is to investigate the relationships between parental expectation perceived by Chinese students, their academic self-concept, and academic achievement in the context of the Gaokao, the national college entrance exam.

We appreciate your interest in participating in this survey. You have been invited to participate as you are a senior high school student, aged 16 to 18, who are going to attend Gaokao in China. Please read through this information before agreeing to participate (if you wish to) by ticking the 'yes' box below.

You may ask any questions before deciding to take part by contacting the researcher (details below).

The Principal Researcher is , who is attached to the Department of Education at the University of Oxford. This research is being completed under the supervision of Ariel Lindorff.

Upon agreeing to participate, you will be required to complete a questionnaire assessing your perceptions of parental expectations, academic self-concept and academic achievement. This should take about 10 minutes. No background knowledge is required.

By participating, you are contributing valuable insights that will help in assessing the impact of parental expectations on students' academic self-concept and achievement, as well as in identifying potential mediators, like academic self-concept, in the relationship between parental expectations and academic performance. Researchers will analyse the data to draw meaningful conclusions and publish findings in academic journals and presentations. These insights aim to inform educational policies, teaching strategies, and parental involvement approaches in senior high schools, ultimately benefiting Chinese students' academic and personal development.

To uphold the integrity of scientific research, anonymised data may be shared with third-party academic collaborators for purposes of validation, peer review, or further research. Be assured that in such cases, all personal identifiers will be removed to protect your confidentiality and privacy. No commercial entities will have access to your data.

Do I have to take part?

No. Please note that participation is voluntary. If you do decide to take part, you may withdraw at any point for any reason before submitting your answers by pressing the 'Exit' button/ closing the browser. All questions are optional.

How will my data be used?

We will not collect any data that could directly identify you. Your IP address will be stored. We will take all reasonable measures to ensure that data remain confidential.

The responses you provide will be stored in a password-protected electronic file on University of Oxford secure servers and may be used in academic publications and conference presentations. Identifiable information will be deleted as soon as it is no longer required for the research.

Research data will be stored for three years after publication or public release of the work of the research.

Who will have access to my data[1]?

The University of Oxford is the data controller with respect to your personal data and, as such, will determine how your personal data is used in the research. The University will process your personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest. Further information about your rights with respect to your personal data is available from https://compliance.admin.ox.ac.uk/individual-rights.

The data you provide may be shared with researchers from partnering universities or institutions, who may have access to the anonymised data for validation, peer review, or extended studies. This collaboration enhances the depth and breadth of the research, contributing to a more comprehensive understanding of the subject matter. Tools like Qualtrics, used for survey distribution and data collection, inherently process the data. However, these tools are chosen for their stringent data security standards and compliance with privacy regulations. Entities involved in data processing, such as SPSS, may be utilised for their expertise in handling large datasets. They will operate under strict guidelines to ensure data privacy and integrity.

The results will be written up for a MSc degree.

Who has reviewed this research?

This research has been reviewed by, and received ethics clearance through, a subcommittee of the University of Oxford Central University Research Ethics Committee [**EDUC_C1A_24_033**].

Who do I contact if I have a concern or I wish to complain?

If you have a concern about any aspect of this research, please speak to Xinyue Fu (xinyue.fu@education.ox.ac.uk) or my supervisor Ariel Lindorff (ariel.lindorff@education.ox.ac.uk), and we will do our best to answer your query. I/ We will acknowledge your concern within 10 working days and give you an indication of how it will be dealt with. If you remain unhappy or wish to make a formal complaint, please contact the Chair of the Research Ethics Committee at the University of Oxford who will seek to resolve the matter as soon as possible:

Social Sciences & Humanities Interdivisional Research Ethics Committee; Email: ethics@socsci.ox.ac.uk; Address: Research Services, University of Oxford, Boundary Brook House, Churchill Drive, Headington, Oxford OX3 7GB

If you have read the information above and agree to participate with the understanding that the data you submit will be processed accordingly, please tick the box below to start.

☐ Yes, I agree to take part

Questionnaires

Background questions

1. What is your gender? Male Female Other Prefer not to say

2. What is your age in years? _____

3. What is your father's highest educational qualification? Illiterate/semi-illiterate, Elementary school, Junior high school, Senior high school, Bachelor's/diploma degree, Master's degree, Doctoral degree, Unkonwn

4. What is your mother's highest educational qualification? Illiterate/semi-illiterate, Elementary school, Junior high school, Senior high school, Bachelor's/diploma degree, Master's degree, Doctoral degree, Unkonwn

Student Perceived Parental Expectation Scale

Please indicate to what extent the following statements reflect your perceived parental concerns, perceptions and expectations. Please choose the number representing the level to which each statement is "true of you." "0" indicates "Never or almost never true" and "6" indicates "Almost always or always true."

1. My parents expect academic success will be an important goal for me.

2. Concerning extra-curricular activities such as athletics,dance,music instruction,art instruction or other organized hobbies, my parents expect me to always do my best.

3. My parents expect me to pursue only those activities at which I can excel.

4. My parents expect that popularity and an active social life will be important goals for me.

5. My parents expect me to receive better grades than my currently do.

6. My parents expect me to become more responsible and self-sufficient in home-related activities.

7. My parents expect to play an important role in helping me to socialize, establish new friendships, and maintain current friendships.

8. My parents expect me to perform better in my extra-curricular activities such as athletics, dance, music instruction, art instruction, or other organized hobbies.

9. My parents expect that experiences of success will be the best reinforcers for my self-confidence.

10. My parents expect me to increase the quality and/or quantity of my friendships.

11. My parents expect me to participate in many extra-curricular activities such as athletics,dance,music instruction,art instruction,or other organized hobbies.

12. My parents' expectations for my peer relations differ from my own.

13. My parents expect me to do chores in the home on a regular basis.

14. My parents expect me will achieve my full potential in life.

15. My parents' academic expectations for me differ from my own.

16. My parents expect me will distinguish myself with top performances in extra-curricular activities.

17. My parents believe whether a child becomes a successful adult depends greatly upon the guidance and encouragement provided by his/her parents.

18. My parents expect me to take initiative in helping out in the home.

19. If I have not received a good grade in school, my parents always expect me to try harder.

20. My parents expect me to exhibit exemplary behavior and be very well-mannered when they have guests in home.

Academic Self-concept Scale

Please indicate to what extent the following statements reflect your academic self-concept. 1 refers to "strongly disagree" and 7 refers to "strongly agree"

1. I can follow the lectures easily.

2. I day-dream a lot in lectures.

3. I am able to help my course mates in their school work.

4. I often do my course work without thinking.

5. If I work hard, I think I can get better grades.

6. I pay attention to the lecturers during lectures.

7. Most of my course mates are smarter than I am.

8. I study hard for my tests.

9. My lecturers feel that I am poor in my studies.

10. I am usually interested in my course work.

11. I often forget what I have learned.

12. I will do my best to pass all the courses this semester.

13. I get frightened when I am asked a question by the lecturers.

14. I often feel like quitting the degree course.

15. I am good in most of my courses.

17. I always do poorly in course works and tests.

18. I do not give up easily when I am faced with a difficult question in my course work.

19. I am able to do better than my friends in most courses.

20. I am not willing to put in more effort in my course work.

Academic Achievement Scale

1. Please report your final score in Chinese Language from the last term and the maximum scores for the exam. Enter your score as a numerical point (e.g. 60) _____ .

2. Please report your final score in Mathematics from the last term and the maximum scores for the exam. Enter your score as a numerical point (e.g. 60) _____ .

3. Please report your final score in English Language from the last term and the maximum scores for the exam. Enter your score as a numerical point (e.g. 60)_____ .

Optional questions

1. When reporting on parental expectations, are you primarily thinking of your mother, father, both parents equally, or another guardian? Please specify. Mother Father Both parents equally Another guardian _____

2. In your own words, how do you perceive your parents' expectations regarding your academic performance?

3. Beyond the factors discussed in this survey, are there any other influences you believe significantly impact your academic experiences and achievement?

Beyond the factors discussed in this survey, are there any other influences you believe significantly impact your academic achievement? Please feel free to elaborate.

Thank you for your invaluable contribution to this research!

Appendix C Descriptive Statistics for Nominal and Ordinal Variables

	n	Percentage (%)	Median
Gender (in total)	143	100.0	1
Male	60	42.0	
Female	83	58.0	
Father's highest education level (in total)	143	100.0	3
Junior high school or below	25	17.5	
Senior high school	28	19.6	
Bachelor's/Diploma degree	73	51.0	
Postgraduate degree	17	11.9	
Mother's highest education level (in total)	143	100.0	3
Junior high school or below	23	16.1	
Senior high school	33	23.1	
Bachelor's/Diploma degree	69	48.3	
Postgraduate degree	18	12.6	

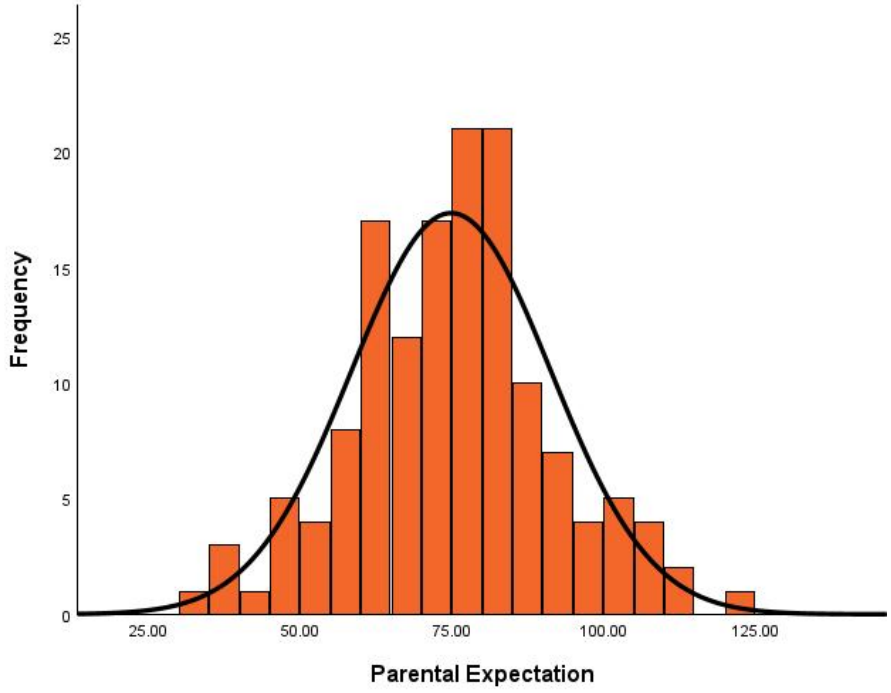
Note. Male was coded as 0 and Female was coded as 1.

Appendix D Normality Tests of Continuous Variables

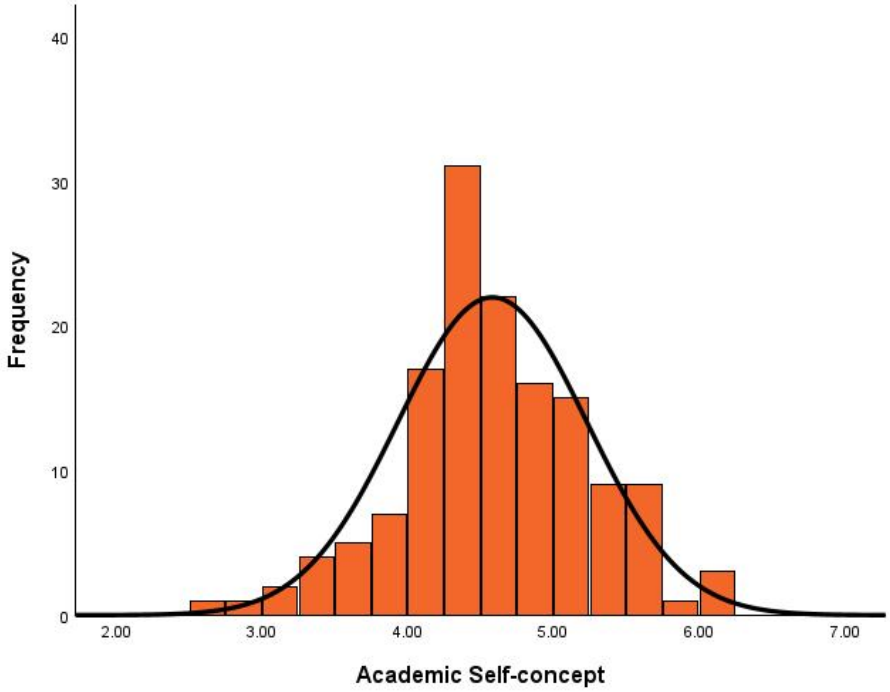
Shapiro-Wilk Tests for Continuous Variables

	W	degree of freedom	*p*
Parental Expectations	0.993	143	0.714
Academic Self-concept	0.991	143	0.515
Academic Achievement (total)	0.986	143	0.148
Chinese Language Exam Scores	0.978	143	0.019
Mathematics Exam Scores	0.987	143	0.199
English Language Exam Scores	0.955	143	<.001

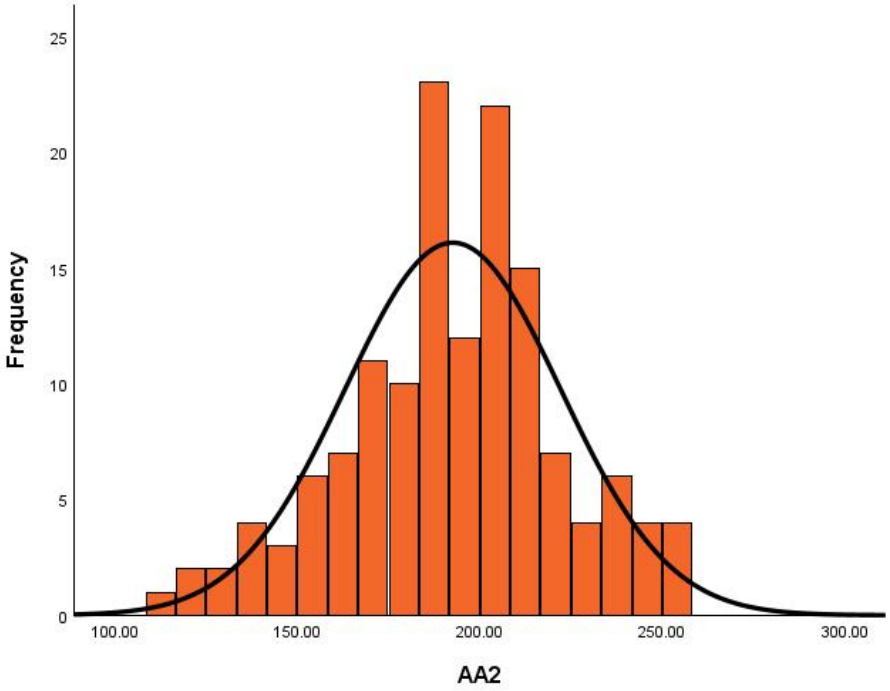
Histogram for Parental Expectations



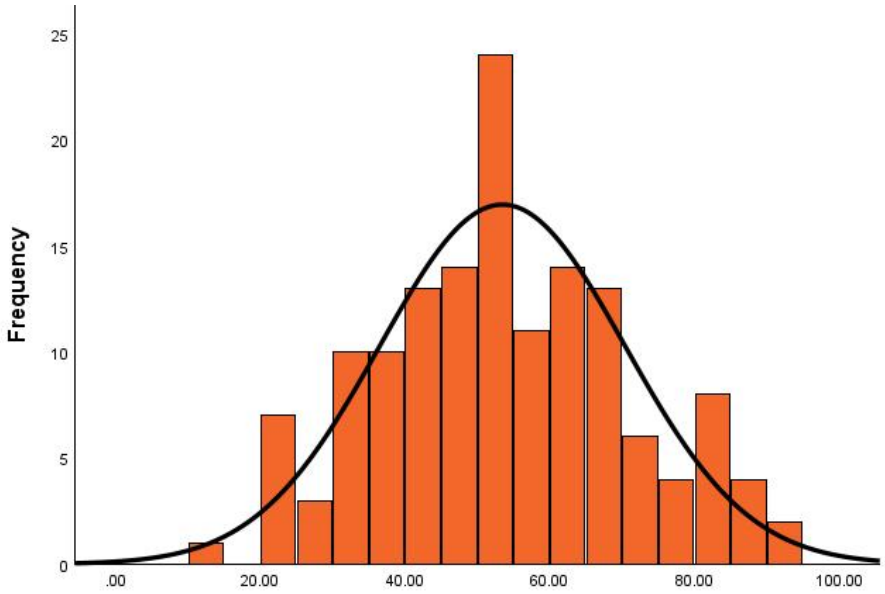
Histogram for Academic Self-concept



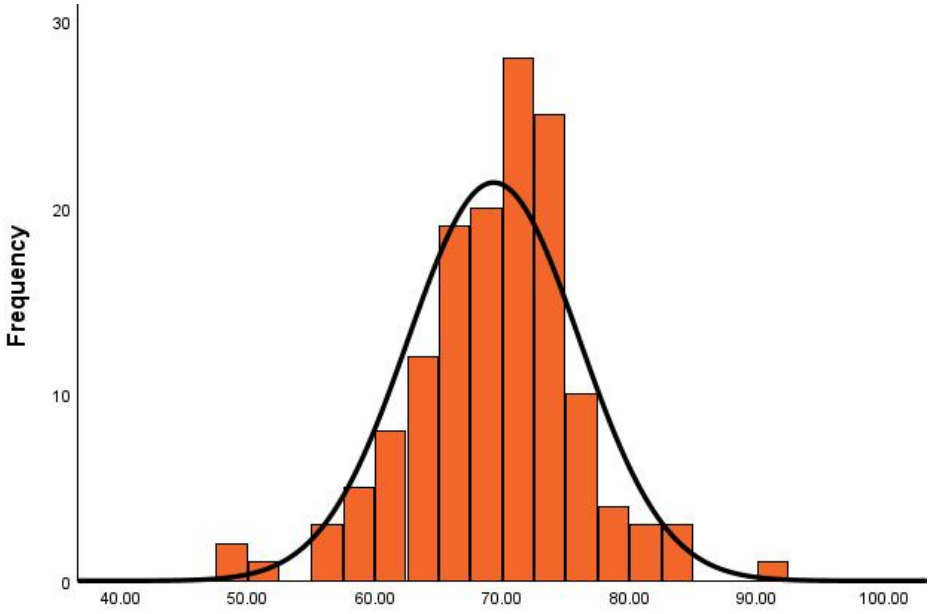
Histogram for Academic Achievement



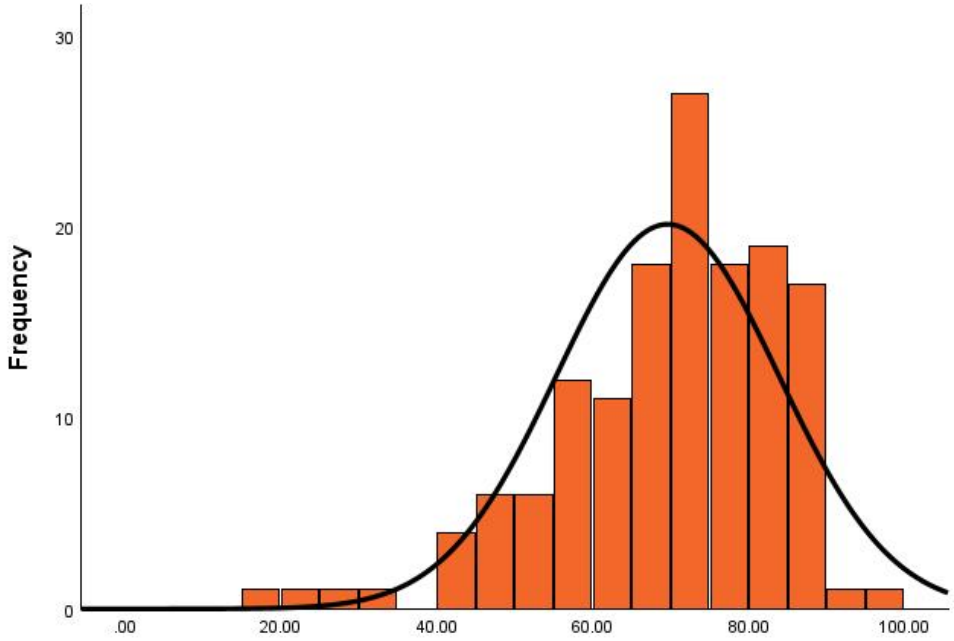
Histogram for Mathematics Exam Scores



Histogram for Chinese Language Exam Scores

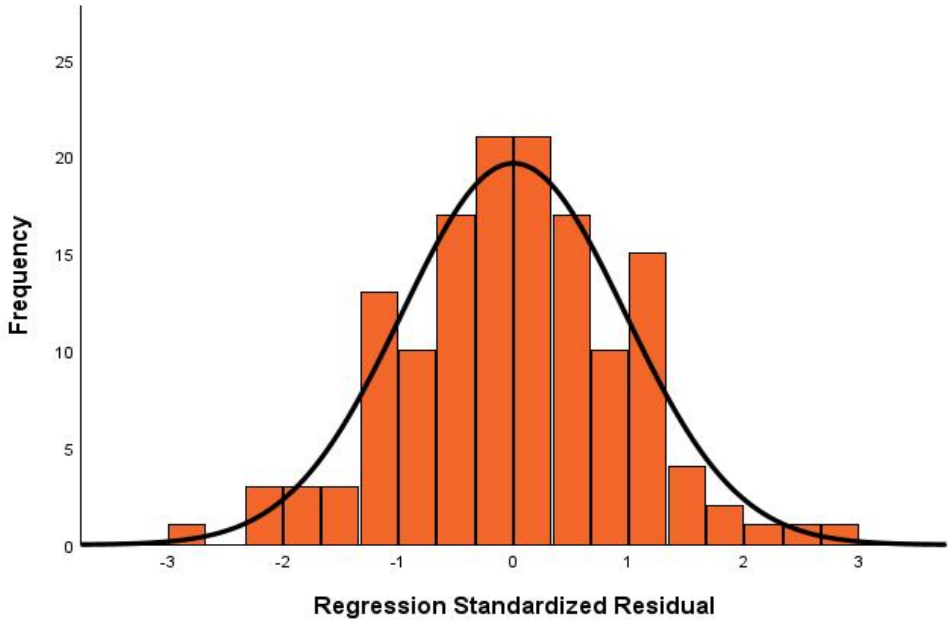


Histogram for English Language Exam Scores

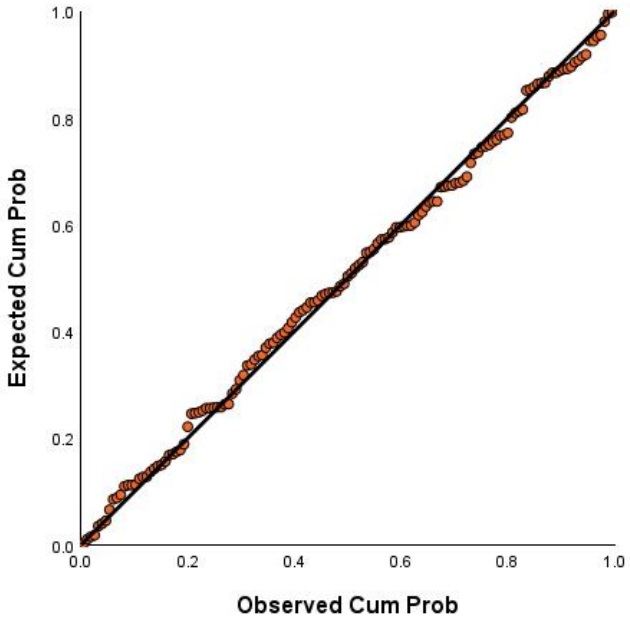


Appendix E Diagnostics of Multiple Regression Assumptions

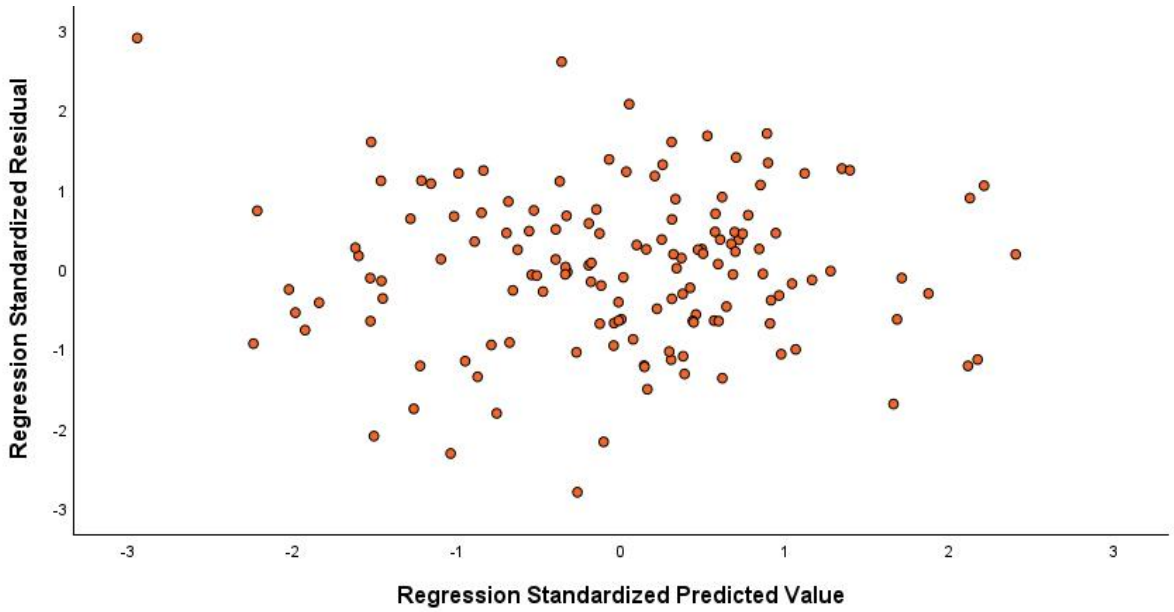
Histogram of Standardized Residual for the Outcome Variable: Academic Achievement



Normal P-P Plot of Regression Standardized Residual for the Outcome Variable: Academic Achievement



Scatterplot for the Ourcome Variable: Academic Achievement



Collinearity Statistics for Variables in Multiple Regression Analysis

	Collinearity Statistics	
	Tolerance	VIF
Model 1		
Gender (Female)	0.98	1.02
Father's Highest Education Level		
Junior High School or below	0.58	1.69
Senior High School	0.33	3.00
Postgraduate Degree	0.38	2.61
Mother's Highest Education Level		
Junior High School or below	0.51	1.95
Senior High School	0.54	1.83
Postgraduate Degree	0.64	1.55
Model 2		
Gender (Female)	0.97	1.02
Father's Highest Education Level		
Junior High School or below	0.58	1.70
Senior High School	0.33	3.00
Postgraduate Degree	0.37	2.64
Mother's Highest Education Level		
Junior High School or below	0.51	1.96
Senior High School	0.54	1.84
Postgraduate Degree	0.63	1.56
Parental Expectations	0.95	1.04
Model 3		
Gender (Female)	0.95	1.04
Father's Highest Education Level		
Junior High School or below	0.58	1.72
Senior High School	0.33	3.01
Postgraduate Degree	0.36	2.71
Mother's Highest Education Level		
Junior High School or below	0.50	1.98
Senior High School	0.54	1.84
Postgraduate Degree	0.63	1.58
Parental Expectations	0.85	1.17
ASC	0.77	1.29