



# Too Much of a Good Thing Might Be Bad: the Double-Edged Sword of Parental Aspirations and the Adverse Effects of Aspiration-Expectation Gaps

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## Abstract

Conventional wisdom suggests that parents' educational expectations (how far they expect their children to go) and aspirations (how far they want their children to go) positively impact academic outcomes and benefits from attending high-ability schools. However, here we juxtapose the following: largely positive effects of educational expectations (of parents, teachers, and students); small, mixed effects of parent aspirations; largely adverse effects of parental aspiration-expectation gaps; and negative effects of school-average achievement on expectations, aspirations, and subsequent outcomes. We used a large, nationally representative longitudinal sample (16,197 Year-10 students from 751 US high schools).

Controlling background (achievement, SES, gender, age, ethnicity, academic track, and a composite risk factor), Year 10 educational expectations of teachers and parents had consistently positive effects on the following: student expectations in Years 10 and 12, Year 10 academic self-concept, final high-school grade-point-averages, and long-term outcomes at age 26 (educational attainment, educational and occupational expectations). Effects of parent aspirations on these outcomes were predominantly small and mixed in direction. However, the aspiration-expectation gap negatively predicted all these outcomes. Contrary to our proposed Goldilocks Effect (not too much, not too little, but just right), non-linear effects of expectations and aspirations were small and largely non-significant.

Parent, teacher, student expectations, and parent aspirations were all negatively predicted by school-average achievement (a big-fish-little-pond effect). However, these adverse effects of school-average achievement were larger for parents and particularly teachers than students. Furthermore, these expectations and aspirations partly mediated the adverse impacts of school-average achievement on subsequent grade-point-average and age-26 outcomes.

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**Keywords** Expectations and aspirations · School composition effects of achievement and SES · Big-fish-little-pond-effect · Goldilocks Effect · Sum-and-difference within-person transformation

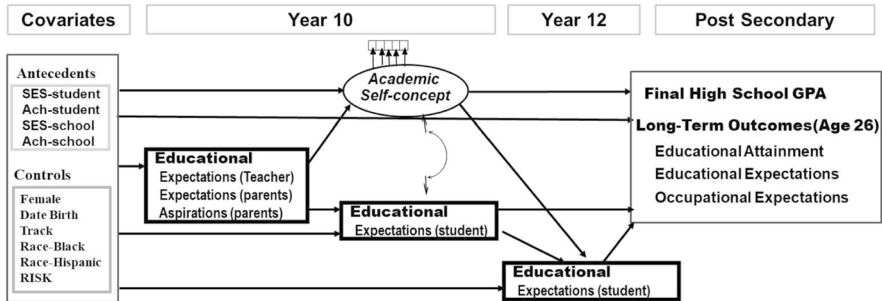
The impacts of one's own expectations and the expectations of significant others on self-beliefs, performance, and behavior have been studied widely in many disciplines and concerning many outcomes (Jeynes, 2022; Pinguart & Ebeling, 2020a b; Schoon et al., 2021). Here, we focus on parents' aspirations for their adolescent children and the educational expectations of parents, teachers, and students. Conventional wisdom and research suggest that expectations and aspirations have positive effects. However, are the consequences of positive expectations and aspirations uniformly positive, or might too much of a good thing be bad? Is it good to have aspirations that exceed expectations?

The overarching purpose of our study is to evaluate the short- and long-term effects of parents' educational expectations (how far they expect their children to go in school), aspirations (how far they want their children to go), and the aspiration-expectation gap (the difference between aspirations and expectations) on their children's academic outcomes. In addition, we evaluate the consequences of expectations and aspirations on short-term (Years 10–12 in high school), GPA at the end of high school, and long-term (age-26) outcomes (see Fig. 1 for the variables considered and the design of our study).

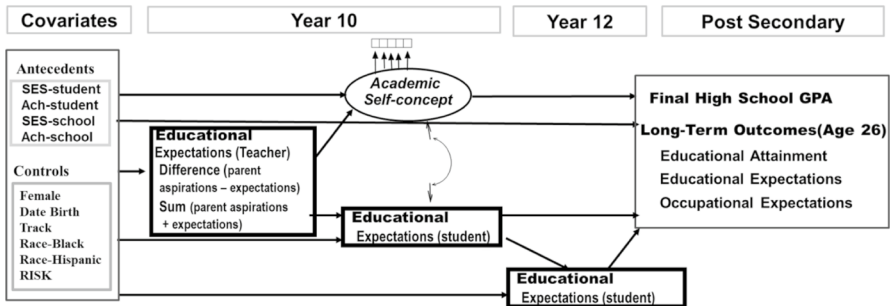
We also evaluate the antecedents of expectations and aspirations. We are particularly interested in the effects of socioeconomic status (SES) and achievement on expectations and aspirations. However, we consider these variables at individual-student and school-average levels. Conventional wisdom suggests that there are benefits to attending a school where the average achievement is high. However, a growing body of research shows the negative effects of school-average achievement, particularly on academic self-concept (ASC), the big-fish-little-pond effect (BFLPE; Fang et al., 2018; Marsh & Seaton, 2015). Students form their ASCs by comparing their self-perceived academic accomplishments with those of their classmates. Thus, students have lower ASCs in high-ability schools and classes than equally able students in low- and mixed-ability schools and classes (see subsequent discussion). Here, we ask whether the BFLPE generalizes to parent aspirations and educational expectations by parents, teachers, and students and how this relates to short- and long-term (age-26) outcomes (Fig. 1).

Raising the aspirations and expectations of students and their parents is a widely adapted policy target for improving educational outcomes (e.g., Harrison & Waller, 2018; Schoon & Burger, 2021; Schoon et al., 2021; St. Clair et al., 2013). For example, Spohrer et al. (2018) note that a perceived lack of aspirations, particularly for disadvantaged students, has been a focus of Labour (poverty of aspiration) and Conservative (aspirational nation) UK governments. This deficit perspective is used to explain the persistent gap in outcomes for students from different SES backgrounds. To address this problem, successive governments have embraced policy strategies to raise aspirations, unleash aspirations, open doors and break down barriers, and help students break

## A (Model 2)



## B (Model 3)



**Fig. 1** Schematic diagrams of variables and their temporal ordering considered in the present investigation. Note. I, individual-student level; SA, school-average level; SES, socioeconomic status (I and SA); Ach, achievement; GPA, grade point average; Track, academic track. **A** is based on untransformed parent expectations and aspirations. **B** is the same model based on the sum-and-difference transformation of parent expectations and aspirations

free from cultural limitations (Spohrer et al., 2018). More broadly, a meeting of OECD Ministers of Education highlighted the need to foster student educational aspirations, support educational systems to accomplish this goal, and raise the aspirations of all students—including those who face disadvantages (OECD, 2004, 2019). Hence, our study has important implications for educational policy and practice.

### Parents’ Expectations and Aspirations

Parents are central to developing values, self-beliefs, and expectations of their children (e.g., Benner and Boyle, 2016; Eccles & Wigfield, 2002; Reynolds & Johnson, 2011). Conventional wisdom and many studies suggest that parental educational expectations and aspirations are positively related to their children’s academic outcomes (e.g., Fan & Chen, 2001; Jaynes, 2022; Phillipson & Phillipson, 2017; Pinquart & Ebeling, 2020a, b; Wu et al., 2018; Yan & Lin, 2005). Thus, Fan and Chen’s (2001) meta-analysis of the

relations between academic achievement and different components of parental involvement found that the links were strongest for parental aspirations and expectations. Likewise, Pinquart and Ebeling's (2020a) meta-analysis reported positive associations between parental expectations and achievement for cross-sectional ( $r=0.30$ ) and longitudinal studies; these effects persisted after statistically controlling for SES. Similarly, Jeynes' (2022) meta-analysis of 54 studies of the relations between parent expectations and achievement found significant relations that were consistent over gender, age, ethnicity, and nationality. More broadly, Hattie's (2009) meta-analysis of meta-analyses concluded that across all home variables, parental aspirations and expectations had the strongest relations with achievement ( $d=0.80$ ).

The positive effects of parent expectations and aspirations are consistent with Coleman et al.'s (1966) early work on parental beliefs as a source of social capital. Positive expectations are central to numerous theoretical models (e.g., expectancy-value theory, Eccles & Wigfield, 2002; control-value theory, Pekrun et al., 2023, achievement motivation theory Atkinson, 1957; social-cognitive theory, Bandura, 1977; goal theory, Covington, 2000; ecological systems theory, Bronfenbrenner, 1979, Bronfenbrenner, 1979; self-fulfilling prophecies, Rosenthal & Jacobson, 1968; strain theory, Knight et al., 2016; status attainment model, Hauser, et al., 1983). Thus, the sociological status attainment model posits that parental educational aspirations mediate the effects of family background on educational attainment (e.g., Coleman et al., 1966; Coleman and Hoffer, 1987; Sewell et al., 1970). From a psychological perspective, expectancy-value theory and control-value theory suggest that students' expectations of success and academic self-concept mediate relations between parental expectations and student achievement (Fredricks & Eccles, 2002; Frome & Eccles, 1998; Pekrun, 2006; Simpkins et al., 2015). However, the characteristics of parents (e.g., SES, educational level, ethnicity) and their children (e.g., prior achievement, gender, risk factors) influence parents' expectations and aspirations for their children (e.g., Schoon & Burger, 2021).

Schoon and Burger (2021) noted that the distinction between expectations and aspirations has a long history in psychology (Lewin et al., 1944) and sociology (Haller, 1968). Similarly, Huguley et al., (2018) distinguished between parents' realistic expectations and aspirations, noting that both positively affect achievement outcomes. However, in his control-value theory, Pekrun (2006, 2021) argued that overly high parental aspirations could reduce students' sense of control and their academic self-concept, thus generating negative emotions like anxiety and jeopardizing their achievement. Therefore, consistent with control-value predictions, Murayama et al. (2016) found that although parental aspirations were positively associated with achievement, aspirations that exceeded parents' realistic expectations were negatively associated with achievement. Unfortunately, few studies have juxtaposed the effects of parent aspirations and expectations or evaluated the impact of the possible difference between the two (the aspiration-expectation gap).

Trinidad (2019) found that parental aspirations can have adverse effects when they are substantially higher than their child's expectations. Similarly, Schoon and Burger (2021) found that gaps between parents' aspirations and their children's expectations were associated with lower levels of educational attainment. Furthermore, Hagen (2019; also see Luthar & Becker, 2002; Ma et al., 2018; Wang & Heppner, 2002)

reported that high expectations by parents who demand excellence from their children were associated with negative affect (e.g., student anxiety and distress-related outcomes). Based on their review of this literature, Schoon and Burger (2021, p. 4) concluded that “studies used different approaches, yet all point to potential negative educational or health outcomes associated with parental over-ambitiousness.”

## Student and Teacher Expectations

Our study focuses on parents' educational expectations and aspirations for their children, but it is also important to consider students' own educational expectations. For example, Pinquart and Ebeling's (2020b; also see Danisman, 2017) meta-analysis of 261 studies reported that student expectations were consistently higher than actual achievement, but this gap declined over time. Furthermore, achievement had similar correlations with short-term expected grades ( $r=0.35$ ) and long-term educational attainment expectations ( $r=0.33$ ). Pinquart and Ebeling concluded that expectations reflect past and future performance as well as hope for improving one's achievement. Based in part on expectancy-value theory (Eccles & Wigfield, 2002), Danisman (2017) argued that students' self-expectations and self-beliefs are likely to be based on their prior achievement and the expectations of their parents and teachers (also see Rubie-Davies et al., 2006; Rubie-Davies, 2010). In a meta-analysis of relations between student expectations and achievement, Danisman reported an average correlation of 0.32 that was highly consistent over pre-university levels of education (from pre-school to high school) and different academic disciplines (language, math, other subjects, and general education). Boxer et al (2011) evaluated aspiration-expectations discrepancies for early adolescents. They found that students who aspire to achieve more than they expect tend to come from more disadvantaged backgrounds and have lower levels of achievement, but higher levels of behavioral and emotional difficulties. Based on their research, Boxer et al. argued that aspirations and expectations are important, but it is essential to consider both in predicting outcomes.

Similarly, teacher expectations are relevant. Many teacher-expectation studies investigated self-fulfilling prophecies (Rosenthal & Jacobson, 1968) and how teachers' expectations vary for different minority groups. Thus, Danisman (2017) argued that teachers' expectations influence students' academic outcomes. Research on self-fulfilling prophecies suggests that teachers' expectancies may positively or negatively influence students' academic outcomes (Good & Brophy, 2008; Rubie-Davies, 2010). Teachers' expectations are substantially influenced by student achievement (Rubie-Davies, 2010) but are also related to students' social background and ethnicity. For example, Tenenbaum and Ruck's (2007) meta-analysis found that teacher expectations were highest for Asian students but lower for Latino/a and African-American students. Nevertheless, Jussim et al. (1995; also see Smith et al., 1999; Wang et al., 2018) note that teacher perceptions of their students' achievement tend to be very accurate and their expectations for their students are substantially based on these perceptions. Furthermore, teachers' perceptions of students from different groups reflect actual differences in those groups. Thus, teachers' expectations mostly predict student outcomes because they are accurate. More broadly, Jussim

(2017, p. 1) argues: “The weight of the evidence—including some of the most classic research widely interpreted as testifying to the power of biased and self-fulfilling processes—is that interpersonal expectations relate to social reality primarily because they reflect rather than cause social reality.”

### Comparing Parent, Teacher, and Student Expectations

In a review of meta-analyses of relations between expectations and student achievement, Danişman (2017) argued that previous meta-analyses focused on a single source—expectations by teachers, parents, or students. He contrasted claims by different authors that teachers are the most important and influential on achievement or that parents’ expectations have a greater effect than teachers’ expectations. Thus, Ma (2001) reported that for predicting critical outcomes (advanced coursework, prior student achievement, student expectations), parent expectations had strong effects, whereas the effects of peer influence and teacher expectations were weak. Muller (1997) reported that teachers’ expectations were more important than students’ expectations in predicting proficiency and learning gains in mathematics. To address this limitation, Danişman’s (2017) meta-analysis found that correlations between achievement and expectations varied significantly with the source of expectation—parents, teachers, or students. Teacher expectations correlated most highly with achievement ( $r=0.40$ ), followed by students’ self-expectations ( $r=0.34$ ), and then parents’ ( $r=0.23$ ). However, in addressing the limitations of his meta-analysis, Danişman argued for the need for more in-depth studies comparing the effects of expectations. In particular, almost none of the studies in the Danişman meta-analysis included results based on the expectations of teachers, parents, and students simultaneously. Hence, comparisons between the different sources of expectation are based on different studies that do not control for the many unique aspects of each study (e.g., different samples, measures, control variables, and design).

Nearly all educational expectations and aspirations studies focus on linear effects. Although not explicitly applied to educational expectations, a growing body of research supports Goldilocks Effects in different settings and disciplines (education, psychology, medicine, public health, economics, communication, and marketing; Han et al., 2019; Kidd et al., 2012; Przybylski & Weinstein, 2017). The Goldilocks Effect is based on the children’s story of Goldilocks and the three bears. Goldilocks tests three bowls of porridge and chooses the one that is not too hot and not too cold, but just the right temperature. In psychology, the main application has been in developmental psychology. Thus, Kidd et al. (2012) found that infants prefer visual stimuli that are not too simple, not too complex, but just right. The Goldilocks Effect is implicit in the Yerkes-Dodson law (Teigen, 2016; Yerkes & Dodson, 1908) on the relation between stress and performance in which the optimal stress level is not too little, not too much, but just right. Similarly, Aristotle’s Golden Mean (Lawrenz, 2021) dictated that nothing should be in excess.

Here, we apply the Goldilocks Effect to the educational expectations of parents, teachers, and students, and parent aspirations (noting that we only have data on aspirations for parents). According to the Goldilocks Effect, educational expectations

and aspirations should be not too low, not too high, but just right. Support for the Goldilocks Effects requires that expectations and aspirations be curvilinearly (an inverted U shape) related to subsequent outcomes.

## **Antecedents: Disentangling Effects of Expectations and Aspirations from School Contextual Effects of SES and Achievement**

### **Control for Individual Student/Family Level Variables**

A critical issue in testing educational expectations and aspirations is disentangling their effects from antecedent effects of background-demographic variables and covariates associated with parental beliefs and subsequent academic outcomes. Thus, the Jeynes (2022) meta-analysis reported that the average correlation between parent expectations and achievement dropped from 0.37 to 0.31 with the inclusion of sophisticated control (e.g., ethnicity, SES, gender, and previous academic achievement). However, because the controls used in each study differed, the meta-analysis likely underestimated the combined effects of controlling all these covariates. Moreover, Jeynes found that the impact of these controls varied substantially with the outcome variables—they had greater effects on school grades assigned by teachers than on more objective test scores based on standardized tests. These antecedent effects on expectations are also important to understanding the formation of expectations. Whereas most research considers antecedents at the individual student level, here we also focus on the antecedent effects of school-average variables.

### **Antecedents: School-Average SES and Achievement**

School compositional effects are the extent to which the composition of groups of students impacts academic outcomes beyond the effects of an individual student characteristic (Becker et al., 2002; Dicke et al., 2018; Gamoran, 2009). Thus a school's social, economic, and achievement context can influence students' educational expectations beyond the characteristics of an individual student. This can be an assimilation effect (shifting in the direction of the group), a contrast effect (moves away from the group), or a combination of both Marsh, 2007). Kelly's (1952) reference group theory emphasized that these effects can be normative in forming identity or comparative in forming self-appraisals. Normative theories posit positive effects of school context (e.g., school-average SESs)—assimilation, group identification, or reflected glory effects (e.g., Meyer, 1970; Becker et al., 2022). Comparative theories propose that school contexts (e.g., high school-average achievement) have negative effects (e.g., Alwin & Otto, 1977; Marsh, 1991, 2007; Marsh, Pekrun, et al., 2023; Meyer, 1970).

Studies of parent expectations and aspirations routinely control background and relevant covariates at the individual level. However, few studies or related meta-analyses have systematically evaluated the effects of school-average variables (e.g., achievement and SES) on the expectations of parents, teachers, and students. This is surprising in that Alwin and Otto's (1977) early review of sociological research on educational and

occupational aspirations found adverse school-average achievement effects but positive effects of school-average SES. Bachman and O'Malley (1986, p. 35) similarly emphasized the importance of the longstanding debate regarding the impact of school-average SES and school-average achievement, noting that “two different types of school context effects on such outcome variables as college plans and occupational aspirations...The ability context of the school shows negative effects, but the school's socioeconomic context shows positive effects (Alwin & Otto, 1977; Meyer, 1970).”

In reviews of school-average compositional effects, Göllner et al., (2018; also see Marsh & O'Mara, 2008; Marsh, Pekrun, et al., in press; Parker et al., 2016) reported that few studies juxtapose the effects of all four compositional variables (individual and school-average measures of achievement and SES) on a range of educational outcomes. Using historical archive data from the early 1960s, Göllner et al., (2018; also see Marsh, 1987, 1991; Marsh & O'Mara, 2008) showed that school-average SES had largely positive effects (on educational expectations, attainment, and occupational status). In contrast, school-average achievement effects were largely negative. Based on these results, Göllner et al. (p. 10) concluded, “It appears that the optimal combination would be a school with a high socioeconomic composition combined with a modest achievement composition” and “Students who attend more socioeconomically advantaged schools benefit from the positive social environment but can be harmed if a high socioeconomic composition is combined with a high achievement composition” (p. 10). Marsh, Pekrun, et al. (2023) subsequently replicated these results with more recent data.

### **Juxtaposing Effects of Individual and School-Average Achievement: Academic Self-concept Research**

The juxtaposition of individual and school-average achievement has been studied extensively with ASC, which is closely related to students' academic expectations. ASCs are student self-perceptions formed through experience with their environment and impacted by the evaluations and expectations of significant others (Marsh, 2007; Shavelson et al., 1992). Indeed, even though theoretical models such as expectancy-value and control-value theory treat ASC and academic expectations as distinct variables, there is considerable overlap between the two constructs, and they are sometimes difficult to distinguish (Eccles & Wigfield, 2002; Marsh et al., 2019). Hence, the extensive literature on ASCs is likely to be heuristic concerning the study of expectations.

ASCs are reciprocally related to academic achievement (test scores and particularly school grades) such that each is a cause and an effect of the other (Huang, 2011; Marsh & Craven, 2006; Marsh et al., 2022; Valentine et al., 2004). In addition to these short-term effects, ASCs predict long-term educational attainment even after controlling variables such as SES, IQ, standardized test scores, and school grades (Guo et al., 2015; Marsh, 2007; Marsh & Seaton, 2015).

In contrast to the assumptions of many parents, students, teachers, policymakers, and even some educational researchers, the effects of attending academically selective schools on ASC are negative—not positive; the big-fish-little-pond-effect (BFLPE; Marsh, 1984; Marsh & Parker, 1984; Marsh & Seaton, 2015). Following

the theoretical work by William James (1890/1963), Festinger (1954), Davis (1966), and many others, the social comparison process is central to the BFLPE (Marsh & Seaton, 2015). Students form their ASCs by comparing their academic accomplishments with those of their classmates and use this relativistic impression as a basis for their ASC formation. Individual ability correlates positively with ASC (the brighter I am, the higher my ASC), but that school-average ability adversely affects ASC (the brighter my classmates, the lower my ASC). Hence, it is the difference between school-average ability and individual student ability that influences ASC. Achievement and SES are substantially correlated, and their effects are difficult to disentangle at both the individual-student and school-average levels. However, consistent with BFLPE theory, early BFLPE studies (Marsh, 1987; see review by Marsh & Seaton, 2015) found that the BFLPE was driven primarily by individual and school-average achievement rather than corresponding measures of SES.

The BFLPE was initially seen as paradoxical, but the underlying theory and subsequent empirical support are so strong that it is now seen as one of psychology's most robust and universal findings (Fang et al., 2018; Marsh & Seaton, 2015; Marsh et al., 2008a, b; Marsh, Parker, et al., 2018a; Marsh et al., 2020; Marsh, 2023). Particularly robust support for the BFLPE comes from four PISA data collections. Across these four studies based on responses from more than a million students, the effect of school-average achievement on ASC was negative in all but one of the 191 country samples, significantly so in 181 (Marsh, Pekrun, et al., 2018a, b). More broadly, support for the BFLPE generalizes over experimental, quasi-experimental, longitudinal, case study, and cross-cultural studies—including social psychology laboratory studies with random assignment (Alicke et al., 2010; Zell & Alicke, 2010). Furthermore, the BFLPE is also found for outcomes that ASC influences, such as students' motivation and emotions (e.g., Pekrun et al., 2019). Thus, Marsh and Seaton (2015) argued that the BFLPE is one of psychology's most universal findings, suggesting that it is a pan-human phenomenon. These claims are consistent with theoretical models positing social comparison as a universal human drive (Festinger, 1954) and evolutionary approaches that posit social comparison as a largely immutable aspect of human behavior (Frank, 2012). Based on this BFLPE research, there is robust evidence that school-average achievement negatively affects ASC. Here, we extend the research to determine whether school-average achievement also negatively affects the educational expectations of students, teachers, and parents, and parents' educational aspirations.

## The Present Investigation

Our study uses large-scale longitudinal data from the US Educational Longitudinal Survey 2002 (ELS:2002; 16,197 high school Year 10 students from 751 schools followed up through age 26). Figure 1 presents the variables and the longitudinal structural equation model (SEM) design we used. Key variables were student background covariates (age, gender, ethnicity, parent education, academic track, and the ELS2002 composite risk factor, individual student achievement, and SES), school contextual variables (school-average SES and achievement), educational expectations (parent, but also teacher, and student), parent aspirations, ASC, final

grade-point-average (GPA), and age-26 outcomes (attainment, educational and occupational expectations). Our overarching aim was to disentangle the short- and long-term effects of parents' educational expectations and aspirations for their high school (Year 10) children and the aspiration-expectation gap (difference between aspirations and expectations). We also considered the corresponding educational expectations of teachers and students (Fig. 1). In pursuit of this overarching aim, we also address limitations in existing research.

In the theoretical framework underpinning of study (Fig. 1), our primary focus is on the antecedents and outcomes of educational expectations (parents, teachers, and students) and parents' aspirations. The critical antecedent variables in our study are school contextual variables (school-average SES and achievement, and their effects on expectations and aspirations). We included individual student measures of SES and achievement to disentangle the impact of these individual-student and school-average effects. We also included additional covariates (gender, age, ethnicity, academic track, and a composite risk factor) to control for pre-existing differences. We posit ASC is formed partly as a consequence of expectations and aspirations, integrating our focus on educational expectations with a growing body of ASC research showing the adverse effects of school-average achievement (the BFLPE). However, our critical long-term outcomes are GPA at the end of high school, and educational attainment and long-term expectations measured at age 26.

The critical difference between Fig. 1A and B is that Fig. 1A is for parent expectations and aspirations. In Fig. 1B, we use a sum-and-difference orthogonal transformation of these variables (i.e.,  $\text{sum} = \text{expectations} + \text{aspirations}$ ;  $\text{difference} = \text{aspirations} - \text{expectations}$ ). As described below, this transformation has critical statistical advantages concerning multicollinearity. Importantly, the effects of the difference between aspirations and expectations provide a more direct test of our key research hypothesis.

Our primary focus is on our SEM (Fig. 1) and the following hypotheses and research questions based on this SEM and our review of existing theoretical and empirical research.

1. We hypothesize that parent expectations for Year 10 students (as well as those of teachers and students) have positive direct and indirect links (see Fig. 1) with subsequent outcomes (ASC, Year 12 student expectations, GPA, and age-26 outcomes—educational attainment, and educational and occupational expectations). We leave as a research question the size and directions of links relating parent aspirations to these outcomes, but expect them to be smaller than those for parent expectations.
2. Following earlier discussion (e.g., Murayama et al., 2016; Schoon & Burger, 2021), we hypothesize that the parental aspiration-expectation difference negatively predicts subsequent outcomes (Fig. 1B).
3. Following social comparison theory and BFLPE studies, we hypothesize that school-average achievement negatively predicts expectations (student, teacher, and parents) and parent aspirations—as well as ASC. These negative effects of school-average achievement is in contrast to the positive effects of individual student achievement on these same outcomes. Furthermore, based on limited research (e.g., Marsh, Pekrun, et al., 2023; but also see Göllner et al. 2018), we

hypothesize that individual-student and school-average SES positively predicts ASC, educational expectations, and aspirations (see Fig. 1).

4. As a research question, we test whether the Goldilocks Effect (not too little, not too much, but just right) holds for the effects of expectations and aspirations. This effect suggests that expectations and aspirations should be curvilinearly (an inverted U shape) related to subsequent outcomes. However, we leave this as a research question as the Goldilocks Effect has not previously been applied to expectations and aspirations.

## Method

### Data Availability and Ethical Approval

We used the public US ELS:2002 database (16,197 high school Year-10 students from 751 schools followed up through age 26; see Ingels et al., 2004, 2005, 2007; 2014). The data is freely available from the ELS website. Because these secondary data are in the public domain, ethical approval was waived.

### Sample

The public US ELS:2002 database (see Ingels et al., 2004, 2005, 2007; 2014) used a two-stage complex sample design, selecting schools and students within each school. Hence, students within each school constitute a representative sample. This is important in using individual student responses to create school-average aggregates of achievement and SES. We used sampling weights provided by ELS:2002 so that the baseline sample constituted a nationally representative probability sample of public, Catholic, and other private schools in the spring term of the 2001–2002 school year. Most of the 17,600 eligible Year 10 (sophomore) students completed a base-year questionnaire (87% response rate; mostly 15-year-olds, the median date of birth was February 1986; 49.4% female). After the initial data collection, ELS:2002 collected follow-up data 2, 4, and 10 years later.

In the autumn of 2004 (1 year after most students had graduated from high school), ELS:2002 requested high school transcripts for all students (including drop-outs, transfer students, home-schooled students, and early graduates; Inglis, 2014). Remarkably, ELS:2002 obtained transcripts for more than 90% of the students with baseline data.

In 2012, the ELS2002 data collection focused on actual educational attainment and future educational and occupational expectations of participants at age 30 (based on responses when they were mostly 26). The target population in 2012 was the same as the baseline sample in 2002. Inglis et al. (2014) describe the data collection activities and procedures, including locating and tracing activities, sample maintenance, responsive design methodology, survey modes, and avoiding and converting refusals. Through these efforts, at age-26 ELS:2002 achieved a response rate of 78.2% of the baseline students. However, ELS:2002 obtained additional information

about cohort members from extant data sources such as the American Council on Education, the U.S. Department of Education Central Processing System, and SAT/ACT (postsecondary entrance exam scores).

## Measures

### Educational Expectations and Aspirations

ELS:2002 collected data on the educational expectations of parents, teachers, and students at Year 10, and parent educational aspirations of parents at Year 10. In addition, ELS:2002 collected students' educational expectations at Year 12 and age 26. All these educational expectation and aspiration variables were scaled to vary along a standard 7-category response scale: less than high school graduation; high school diploma or General Educational Development equivalent; undergraduate certificate or diploma; associates degree; bachelor's degree; master's degree; doctoral degree. The actual wording of the expectation and aspiration variables is as follows:

- Parent aspirations (*How far in school the parent wants the tenth grader to go*).
- Parent expectations (*In Question 79, you reported how far in school you want your tenth grader to go. For this question, please indicate how far in school you expect your tenth grader will go*)
- Teacher expectations (*How far in school do you expect this student to get?*)
- Student expectations (*As things stand now, how far in school do you think you will get?*)

### Individual and Compositional Antecedents: Achievement and SES

We used ELS:2002's standardized test (IRT scored) measures to represent math and reading achievement. ELS:2002's reading and math achievement measures were selected from previous national assessments and field-tested before being used. Final forms were assembled based on psychometric characteristics and coverage of framework categories: content areas and cognitive processes (Ingels et al., 2004). Mathematics tests covered arithmetic, algebra, geometry/measurement, data/probability, and advanced topics (analytic geometry and precalculus but not calculus). The tests also reflected cognitive process categories of skill/knowledge, understanding/comprehension, and problem-solving. Most of the math items were multiple-choice, but 10% were open-ended. The ELS:2002 also used a two-level framework for their reading test: four content areas (biographical; literary, including poetry and prose; scientific, including graphical displays as well as prose; and social studies) and three cognitive processes (reproduction of detail; comprehension of thought and translating verbal statements into concepts; and inference/evaluative judgment and drawing conclusions based on the material presented). In statistical models, we constrained reading and math to be equally weighted in constructing individual-student achievement (Ach-I) and aggregated this individual student achievement to form school-average achievement (Ach-SA).

Achievement and SES (at the individual student level, SES-I and Ach-I; and school-average level, SES-SA and Ach-SA) are the critical compositional variables in our study (see Fig. 1). ELS:2002's measure of SES is a composite based on five standardized scores: father's/guardian's education, mother's/guardian's education, family income, father's/guardian's occupation, and mother's/guardian's occupation. In calculating SES, education level was determined based on a 7-point scale, ranging from 1 (less than high school graduation) to 7 (completed a Ph.D., M.D., or another advanced professional degree). Yearly total family income was asked based on a 13-point scale, ranging from 1 (none) to 13 (\$200,0001 or more) for the past year. Occupational prestige scores were calculated based on Duncan's Socio-economic Indicator (Inglis et al., 2004). ELS:2002 used parent data when available or student data if parent data were missing, and in some cases, imputed data from other material. We aggregated ELS:2002's measure of individual-student SES to the school level to form school-average SES (school-average SES).

### Short- and Long-term Outcomes

We assessed global ASC with a set of 5 ELS:2002 items: When I sit myself down to learn something really hard, I can learn it; If I decide not to get any bad grades, I can really do it; If I want to learn something well, I can; When I study, I make sure that I remember the most important things; When studying, I try to do my best to acquire the knowledge and skills taught. Participants responded on a 4-point scale ranging from 1 (almost never) to 4 (almost always). Higher scores reflect more favorable ASCs.

The final GPA at the end of high school was based on official school transcripts. ELS:2002 requested schools to provide academic transcripts for all participating students. ELS:2002 collected transcripts from sample members in late 2004 and early 2005, 6 months to a year after most students had graduated from high school, allowing for more complete high school records. In addition, ELS:2002 collected transcripts from the students' base-year and last school of attendance. This included participants who were dropouts, freshened sample members, transfer students, homeschooled students, early graduates, and students who had not previously participated because of a physical disability, a mental disability, or a language barrier (for further information, see Bozick et al., 2006, NCES 2006).

The long-term age-26 outcomes were final educational attainment (at age 26), long-term educational aspirations, and long-term occupational expectations (Fig. 1). These were assessed with the ELS:2002 2012 follow-up questionnaire, a self-administered web-based survey, or a computer-assisted interview. Although the survey was the primary source of information, ELS:2002 used other sources of information when the survey data was unavailable and to check the consistency of survey responses (Inglis et al., 2014). Final educational attainment was coded according to the following 9-category response scale: 1=no high school credential or post-secondary attendance; 2=high school credential, no post-secondary attendance; 3=some post-secondary attendance but no post-secondary credential; 4=undergraduate certificate or diploma; 5=associates degree; 6=bachelor's degree; 7=post-baccalaureate certificate; 8=master's degree/post-master's certificate;

9=doctoral degree). Respondents reported, “What is the highest level of education you ever expect to complete” and “What job for pay or occupation do you plan to have when you are age 30?” (recall, age at the time of the interview was about 26). ELS2002 coded occupational expectations according to occupational prestige.

## Control and Antecedent Variables

VanderWeele et al. (2019) systematically reviewed best-practice concerning the inclusion of covariates. He emphasized that demographic variables like those considered here should be included. This is particularly important in observation studies where there is no random assignment to control pre-existing differences—so long as it is clear that the demographic variables pre-date the subsequent variables concerning directional ordering. This use of covariates is consistent with recommendations by Lüdtke and Robitzsch’s (2021) methodological analysis of longitudinal panel studies more generally. Although substantive interest exists in how the covariates considered here relate to our study variables, our primary focus is to use these covariates to control for pre-existing differences and evaluate how their inclusion affects estimated compositional effects.

For present purposes, individual-student control covariates consisted of individual-student achievement, SES, gender, date of birth, track in Year 10 (1=academic track; 0=non-academic track), two dichotomous variables representing ethnicity (Black, 1=yes, 0=no; Hispanic, 1=yes, 0=no), and a composite risk factor compiled by ELS:2002. The composite risk factor includes six indicators: (1) comes from a single-parent household; (2) has two parents without a high school diploma; (3) has a sibling who has dropped out of school; (4) has changed schools two or more times (excluding changes due to school promotions); (5) has repeated at least one grade; and (6) comes from a household with an income below the federal threshold for poverty. In some cases, the variables making up the risk factor were based on data imputed by ELS:2002 using data not otherwise available in the public ELS:2002 database.

School contextual variables (school-average achievement and SES) are critical antecedent variables in our study (Fig. 1), but we also included individual-student achievement and SES. As noted earlier, individual-student achievement and SES serve as control variables but are also critical in disentangling the school contextual effects and the effects of these individual-student variables. Similarly, in our longitudinal model (Fig. 1), school contextual variables are critical antecedent variables. However, they also serve as control variables (i.e., the effects of antecedent variables, as well as control variables, are controlled in evaluating the effects of expectations and aspirations).

## Statistical Analyses

### Structural Equation Modeling (SEM)

We performed all analyses with Mplus (Muthén & Muthén, 1998–2019, Version 8). We used the robust maximum likelihood estimator (MLR). This estimator

is robust against any violations of normality assumptions and uses weights to adjust for unequal probabilities of student selection. To facilitate the interpretation of the regression coefficients, we standardized all continuous student-level variables across the student sample ( $M=0$ ,  $SD=1$ ), and latent factors were scaled so that the total variance was approximately 1.0. This way, parameter estimates were scaled relative to a common metric and represented standardized effects. We standardized school-average achievement and SES in relation to individual student measures of achievement and SES. We then tested four different models. First, we tested a CFA measurement model (Model 1) to evaluate the factor structure and latent correlations among the variables. Then, we tested two SEMs (Fig. 1A, Model 2; Fig. 1B, Model 3) to disentangle the impact of parental expectations and aspirations. Finally, we tested a supplemental model to evaluate the non-linear effects of educational expectations and aspirations (Model 4).

Consistent with the complex design of the ELS2002 data collection, we used Mplus's complex design option (Muthén & Muthén, 1998–2019) to control the nesting of students within schools and appropriately adjust standard errors. The complex design uses a sandwich estimator (Muthén. & Satorra, 1995) based on maximum likelihood estimation with robust standard errors (MLR). The chi-square parameters adjust for the non-independence of observations and the number of observations within each cluster (Muthén & Muthén, 1998–2019). Also, to avoid undue clutter, we refer to differences between effects without including formal tests of statistical significance. However, because of the very large sample size, all such differences are statistically significant, and we present standard errors in associated tables.

We began with a preliminary evaluation of correlations among variables based on our CFA model. ASC (based on five items) and achievement (based on math and verbal tests) were latent, but other variables were single-item factors. The good fit and parameter estimates support the a priori factor structure, including the construct validity of the multi-item ASC construct.

We then tested our two SEM (Fig. 1A and B). The effects of variables collected in the early stages of the longitudinal design will likely be mediated by intervening variables (see Fig. 1). Thus, in addition to the direct effects of variables that are the parameter estimates from traditional SEMs, we also used Mplus's indirect model and "via" commands (Muthén & Muthén, 1998–2019) to estimate direct, mediated, and total effects.

Finally, in supplemental analyses, we evaluated the quadratic effects of expectations and aspirations (Fig. 1B) and the aspirations-expectations gap (Fig. 1B) to test Goldilocks Effects. The quadratic terms were the squared terms for aspirations and expectations after zero-mean centering these variables.

### Sum-and-Difference Transformation

Figure 1 shows two alternative approaches to test Hypothesis 2: the aspiration-expectation difference negatively predicts subsequent outcomes. Figure 1A is based on a traditional regression model, but does test the aspiration-expectation difference. Figure 1B is based on a sum-and-difference transformation of the aspiration

and expectation variables (sum = expectations + aspirations; difference = expectations – aspirations). Hence, the model in Fig. 1B directly tests our hypothesis. Here, we briefly outline the statistical rationale for this sum-and-difference transformation.

In regression analyses, evaluating the relative size, importance, and usefulness of different predictor variables in predicting outcome variables is common. If the predictor variables are uncorrelated, this is easy, and the solution is unique. However, when the predictor variables are correlated, there is no unambiguous solution to determining the relative importance of the predictors (e.g., Johnson, 2000; Darlington, 1968; Pedhazur & Smelkin, 2013). One solution to this issue is to apply an orthogonal rotation or transformation of the original variables such that the new transformed variables are uncorrelated. A critical feature of orthogonal transformations is that the rotation renders unchanged the variance explained by the entire set of variables (as well the df and statistical significance). Furthermore, it does not affect the regression weights of variables not involved in the transformation (Garthwaite et al., 2012; Garthwaite and Koch, 2016; Johnson, 2000; Shabuz & Garthwaite, 2019). There is the widespread use of orthogonal transformations in psychological research comparing differences between groups and in the comparison of polynomial contrasts to investigate non-linear relations (e.g., Pedhazur & Smelkin, 2013). However, orthogonal transformations of variables with substantial multicollinearity can facilitate interpreting the results (see Darlington & Hayes, 2016; Johnson, 2000; Laird & Weems, 2011). Garthwaite and Koch (2016) emphasize that the goal is to transform the multicollinear variables through rotation to achieve new variables that are orthogonal to each other, do not affect the contribution of other variables in the regression equation, and have a meaningful interpretation.

Applying this sum-and-difference transformation, we tested the parent aspiration-expectation gap with two essentially equivalent models (Fig. 1A and B). In the first model (Fig. 1A), we used the original (untransformed) parent aspirations and expectations. In the second model (Fig. 1B), we evaluated the sum (aspirations + expectations) and difference (aspirations – expectations) based on the transformed variables. As noted above, the inclusion of the sum is necessary to make the “sum-and-difference” (transformed) model equivalent to the model based on the untransformed model using the original variables. Thus, the two degrees-of-freedom associated with the original two variables were transformed to represent two orthogonal contrasts, the sum, and the difference. We note that this transformation has no effect on the degrees-of-freedom, the goodness-of-fit indices, or parameter estimates associated with other variables (Laird & Weems, 2011; also see Garthwaite & Koch, 2016). However, the sum-and-difference transformation of two highly correlated variables into two orthogonal variables provides a viable alternative interpretation of the difference between the two variables. The difference between the expectations and aspirations of an individual parent (i.e., the “difference” in our sum-and-difference transformation) provides a direct test of our Hypothesis 2 (that the aspiration-expectation difference negatively predicts subsequent outcomes, as shown in Fig. 1B).

Based on the untransformed model (Fig. 1A), we used Mplus’s model constraint to test the sum and difference of the effects of parent aspirations and expectations. Our primary focus was the difference contrast, representing the difference between the parameter estimates associated with aspirations and expectations. The advantage of this approach is that it provides a more straight-forward way to model the

aspiration-expectation gap, and an appropriate standard error for testing the statistical significance of this difference. In the second approach, we used the sum-and-difference transformation of the observed parent aspiration and expectation variables to form new variables. Again, we note that this transformed model was equivalent to the untransformed model (i.e., same degrees-of-freedom, goodness-of-fit indices, parameter estimates, and SEs associated with other variables). Indeed, the *t*-values representing the significance of these transformed variables were the same as those representing the effect of model contrasts in the first approach without transforming the variables. However, the sum-and-difference approach facilitates estimating the direct, mediated, and total effects of the difference between aspirations and expectations.

The sum-and-difference transformation in our study (Fig. 1B) provided a within-person perspective (i.e., the difference between aspirations and expectations of a given parent). This avoids the potential confounding of with- and between-person effects in the original analysis of untransformed values (Fig. 1B). This is potentially important because of the high correlation between parent expectations and aspirations. Thus, for example, it would be possible for both expectation and aspiration (between-person) effects to be positive, but for the aspiration-expectation difference (within-person) effect to be negative.

## Missing Data

Large longitudinal field studies like ours typically have substantial missing data. In our study, coverage rates varied from 66 to 100% across all variables (see Supplemental Table 1 for missing data for all variables used in the analysis). Particularly in longitudinal studies, there is increasing awareness of the limitations of traditional approaches to missing data, such as listwise and pairwise deletion (Graham, 2009). Therefore, we used the initial sampling weights for each student provided by ELS:2002 coupled with multiple imputation (De Silva et al., 2021) to account for subsequent missing data. We accomplished this with Mplus's two-level imputation procedure supplemented by auxiliary variables to create 20 imputed datasets (Asparouhov & Muthen, 2022; also see Enders, 2010; Graham, 2009). Following recommendations by Asparouhov and Muthen, we constructed the imputed data files using a restricted measurement model in which we posited ASC as a latent variable, and all other parameters were unrestricted. Multiple imputation results in appropriate, unbiased estimates for missing values even when there is a lot of missing data (Enders, 2010). Thus, it is an appropriate method to manage missing data in large longitudinal studies (Jeličić et al., 2009). More specifically, as emphasized in classic discussions of missing data (e.g., Newman, 2014), under the missing-at-random (MAR) assumption that is the basis of multiple imputations, missingness is allowed to be conditional on all variables included in the analyses. However, it does not depend on missing variables' values. Thus, missing values can be conditional on the same variable's values collected in a different wave in a longitudinal panel design. This data feature makes it unlikely that MAR assumptions are seriously violated, as the critical situation of not-MAR is when missingness is related to the

variable itself. An essential advantage of the multiple imputation approach to missing data is that the control for the missingness is consistent across models based on different variables.

### Goodness-of-Fit

Applied SEM studies typically focus on fit indices that are relatively sample-size independent (Hu & Bentler, 1999; Marsh et al., 2004), such as the root mean square error of approximation (RMSEA), the Tucker-Lewis index (TLI), and the comparative fit index (CFI). TLI and CFI population values vary along a 0-to-1 continuum, in which values greater than 0.90 and 0.95 typically reflect good and excellent fits to the data, respectively. Values smaller than 0.08 and 0.06 for the RMSEA support acceptable and good model fits, respectively. Nevertheless, these cut-off values for these indices constitute only rough descriptive guidelines rather than “golden rules” (Marsh et al., 2004). However, goodness-of-fit is not particularly important for present purposes because ASC (based on five indicators) and achievement (based on two indicators) are the only latent variables. Hence, the goodness-of-fit for our basic SEM based on original untransformed (Fig. 1A) and sum-and-difference transformed (Fig. 1B) result in the same goodness-of-fit that is very good according to traditional guidelines (chi-square = 1848; df = 273; CFI = 0.987; TLI = 0.969; RMSEA = 0.029, CI = 0.027–0.031).

## Results

### Preliminary Analysis: Correlations Between Expectations, Aspirations, and Other Study Variables (Table 1)

We present correlations among the six measures of expectations (parents and teachers at Year 10, students at Year 10, Year 12, and age-26) and parent aspirations with other study variables (Table 1; also see Fig. 1 and the full correlation matrix in Supplemental Materials). All the expectation and aspiration variables (i.e., educational expectations of parents, teachers, and students, and parent aspirations) were positively correlated (0.31–0.68, Table 1). The highest correlation was between parent expectations and aspirations (0.68). Year 10 student expectations correlated more highly with teacher expectations (0.52) than parent expectations (0.47) and parent aspirations (0.42), but the differences were small. Year 10 student expectations correlated moderately with student expectations at Year 12 (0.55) and age-26 (0.44). Over time, student expectations become increasingly more correlated with teacher expectations but less correlated with parent expectations and aspirations. The lowest correlation was between teacher expectations and parent aspirations (0.33), although teacher expectations correlated more highly with parent expectations (0.47) than aspirations.

Teacher expectations correlated most substantially with achievement (0.67 with test scores, 0.68 with GPA). Furthermore, relative to other Year 10 expectation and aspiration variables, teacher expectations correlated more highly with all four

**Table 1** Educational expectations and aspirations (teachers, parents, students): Correlations and mean differences over time

Variables	Ed Exp Teacher	Ed Asp Parent	Ed Exp Parent	Year 10 Ed Exp Student	Year 12 Ed Exp Student	Age 26 Ed Exp Student
Expectations and aspirations	Correlations					
Year 10 educational expectation teacher	1.00					
Year 10 educational aspiration parent	.33	1.00				
Year 10 educational expectation parent	.49	.68	1.00			
Year 10 Ed expectation student	.47	.42	.52	1.00		
Year 12 Ed expectation student	.52	.38	.48	.55	1.00	
Age-26 Ed expectation student	.52	.31	.41	.44	.54	1.00
Correlates						
Academic self-concept	.42	.26	.34	.39	.38	.32
Grade point average	.68	.23	.39	.39	.45	.44
Occupation expectation	.33	.21	.27	.27	.33	.45
Attainment	.56	.26	.38	.38	.48	.64
Achievement (student)	.67	.31	.41	.44	.47	.48
Achievement (school)	.36	.12	.18	.23	.27	.28
SES (student)	.43	.23	.28	.30	.35	.35
SES (school)	.36	.17	.21	.25	.30	.29
Gender (female)	.11	.07	.11	.15	.13	.10
Date of birth	.23	.14	.19	.18	.17	.18
Ethnicity black	-.15	.07	.02	-.02	-.01	-.03
Ethnicity Hispanic	-.14	.01	.03	-.08	-.09	-.09
Academic track	.33	.20	.26	.29	.28	.25
Parents education	.37	.23	.28	.27	.32	.32
Risk factor	-.36	-.11	-.17	-.22	-.24	-.23
Expectations and aspirations	Pair-wise mean differences					
Ed expectation teacher	0.00					
Ed Asp parent	-1.36	0.00				
Ed expectation parent	-0.88	0.48	0.00			
Yr10 Ed expectation student	-1.12	0.24	-0.24	0.00		
Yr12Ed expectation student	-0.90	0.45	-0.03	0.21	0.00	
Age26 Ed expectation student	-0.86	0.50	0.02	0.26	0.04	0.00
Mn	3.96	5.32	4.84	5.08	4.87	4.82
SD	1.41	1.29	1.45	1.48	1.49	1.62
SE of mean	0.03	0.02	0.02	0.02	0.02	0.02

*Ed Exp*, educational expectancies; *Ed Asp*, educational aspirations. All pairwise mean differences > |.03| and all correlations > |.02| are statically significant ( $p < .01$ )

subsequent outcomes (final high school GPA, 0.68; age-26 educational expectations, 0.52; occupational expectations, 0.33; and attainment, 0.56). Indeed, given that these are single-item manifest indicators, the correlations between teacher expectations when students were in Year 10, and students' final GPAs at the end of Year 12, were remarkably high. These relations' nature and size suggest that teachers focused primarily on student achievement in forming educational expectations ratings.

Parent expectations consistently correlated more highly with student expectations and all other outcomes than parent aspirations. For example, even though parent expectations and aspirations were substantially correlated (0.68), student expectations correlated 0.52 with parent expectations but only 0.42 with parent aspirations. Similarly, parent expectations correlated more highly with test scores (0.41), GPA (0.39), and age-26 attainment (0.38) than parent aspirations (0.31, achievement; 0.23, GPA; 0.26, attainment). The results suggest that parent expectations are more "realistic" than parent aspirations.

We also tested all pairwise differences in mean expectation and aspiration ratings (bottom of Table 1). Teacher expectations were the lowest (3.84). Parent aspirations were the highest (5.32), and significantly higher than their expectations (4.84). Year 10 student expectations were also high (5.08) but declined over time (4.87, Year 12; 4.82, age-26).

A primary purpose of considering background/demographic variables was to control for pre-existing differences, but their links with other variables are also substantively interesting. Across all expectations and aspirations (Table 1), the correlations were consistently highest for achievement and SES at the individual student level (Ach-I, SES-I) and parent education. Girls had modestly higher values for all educational expectations and aspirations. Teacher expectations correlated more highly with age, ethnicity, academic track, SES, parent education, and the ELS2002 composite risk factor compared to other expectations and aspirations. The risk composite correlated negatively with all educational expectations and aspirations—particularly teacher expectations.

## Effects of Expectations and Aspirations on Subsequent Academic Outcomes

In this section, we evaluated (Tables 2 and 3) the direct, mediated, and total effects of teacher and parent expectations and aspirations, controlling background variables, achievement, and SES (see Fig. 1).

Our initial focus was on the direct effects of teacher and parent expectations and parent aspirations (Table 2). However, their total long-term effects were inevitably mediated at least partly by intervening variables, as hypothesized in our theoretical model (Fig. 1). Hence, we also evaluated the total and mediated effects in addition to the direct effects (Table 3).

Parental expectations and aspirations were highly correlated, resulting in substantial multicollinearity. We eliminated this multicollinearity by applying the orthogonal "sum-and-difference" transformation to these two variables (Tables 2 and 3). This transformation provided a more direct test of Hypothesis 2. Furthermore, as noted earlier, this transformation provided a within-person test (i.e., the difference between aspirations and expectations of a given parent) that avoids the potential confounding of

**Table 2** Path coefficients relating expectations and aspirations to subsequent outcomes

Outcome	Linear effects (untransformed)					Sum and difference contrasts					Non-linear (Quad) effects				
	Predictor	Est	SE	T-Val		Predictor	Est	SE	T-Val		Predictor	Est	SE	T-Val	
Yr10 student expectations	TchExp	.16	.01	12.01							TchExpQ	-.04	.01	-5.17	
	PmAsp	.11	.01	8.35	Diff	-.16	.03	-5.78			PmAspQ	-.01	.01	-1.01	
	PmExp	.27	.02	17.07	Sum	.38	.01	31.67			PmExpQ	-.02	.01	-3.09	
Academic self-concept	TchExp	.21	.02	12.76							TchExpQ	.02	.01	1.91	
	PmAsp	.03	.02	2.02	Diff	-.08	.03	-2.65			PmAspQ	.01	.01	0.74	
	PmExp	.11	.02	6.41	Sum	.14	.01	9.95			PmExpQ	.01	.01	0.84	
Yr12 student expectations	ASC	.07	.01	6.84											
	Yr10StdExp	.27	.01	26.47							Yr10StdExpQ	.02	.01	3.44	
	TchExp	.18	.01	15.36							TchExpQ	-.02	.01	-2.81	
Grade point average	PmAsp	.05	.01	3.82	Diff	-.07	.03	-2.53			PmAspQ	.00	.01	0.11	
	PmExp	.12	.01	8.06	Sum	.17	.01	14.36			PmExpQ	-.01	.01	-0.76	
	ASC	.05	.01	5.93											
Occupational expectations	TchExp	.44	.01	37.06							TchExpQ	.00	.01	0.05	
	Yr10 StdExp	.00	.01	-0.09							Yr10StdExpQ	.00	.01	0.61	
	PmAsp	-.09	.01	-7.50	Diff	-.16	.02	-8.72			PmAspQ	.01	.01	0.73	
Occupational expectations	PmExp	.08	.01	7.96	Sum	.01	.01	0.74			PmExpQ	.00	.01	-0.30	
	Yr12StdExp	.07	.01	7.60							Yr12StdExpQ	.00	.01	0.60	
	ASC	.01	.01	0.51											
Occupational expectations	TchExp	.12	.02	6.74							TchExpQ	.01	.01	0.66	
	Y10 StdExp	.03	.01	2.12							Yr10StdExpQ	.00	.01	0.00	
	PmAsp	.01	.02	0.85	Diff	-.04	.03	-1.17			PmAspQ	.00	.01	-0.30	
Occupational expectations	PmExp	.05	.02	2.58	Sum	.07	.02	3.77			PmExpQ	-.01	.01	-0.69	
	Yr12StdExp	.15	.02	9.66							Yr12StdExpQ	-.01	.01	-1.67	

Table 2 (continued)

Outcome	Linear effects (untransformed)				Sum and difference contrasts				Non-linear (Quad) effects			
	Predictor	Est	SE	T-Val	Predictor	Est	SE	T-Val	Predictor	Est	SE	T-Val
Age 26 student expectations	ASC	.02	.01	2.15					PmExpQ	.00	.01	0.27
	TchExp	.18	.01	13.52					Yr10StdExpQ	.00	.01	-0.36
	Yr10StdEx	.07	.01	6.80					Yr12StdExpQ	-.01	.01	-1.92
	PmAsp	.00	.01	0.14	Diff	-.07	.02	-2.66	TchExpQ	.00	.01	-0.28
	PmExp	.07	.01	4.76	Sum	.07	.01	5.70	PmAspQ	.01	.01	1.23
	Yr12StdExp	.26	.01	23.8								
Attainment	ASC	.03	.01	2.67					TchExpQ	.04	.01	5.00
	TchExp	.26	.01	22.6					Yr10StdExpQ	-.01	.01	-0.80
	Yr10StdExp	.01	.01	1.51	Diff	-.10	.02	-4.65	PmAspQ	.00	.01	-0.11
	PmAsp	-.03	.01	-2.44	Sum	.04	.01	4.06	PmExpQ	.00	.01	0.10
	PmExp	.07	.01	5.57					Yr12StdExpQ	-.01	.01	-1.12
	Yr12StdExp	.18	.01	17.73								

Socioeconomic status (SES) and achievement (Ach) are at the individual student (I) and school-average (SA) levels; *Tch*, teacher; *Pm*, parent; *Std*, student; *Exp*, expectation; *Asp*, aspiration; *Est*, estimate; *SE*, standard error; *T-Val*, *t*-values greater than 1.96 are statistically significant ( $p < .05$ ); *Diff*, difference between effects of parent aspirations and expectations; *Sum*, sum of effects of parent aspirations and expectations; Predictors ending in Q (under non-linear effects) are quadratic terms for the corresponding linear terms. The estimates for linear effects and the sum and differences were based on the same analysis using untransformed parent aspirations and expectations and model constraints for the sum and the difference of effects associated with parent aspirations and expectations. The final analysis of non-linear effects was a separate analysis in which quadratic effects were added as additional predictor variables

**Table 3** Mediation analysis: effects of parent expectations and aspirations (original scores) and the sum and difference of on outcomes (parent expectations and aspirations)

Outcome	Original parent expectations and aspiration scores						Sum and differences of parent expectations and aspiration scores										
	Total effects			Indirect effects			Direct effects			Total effects			Indirect effects			Direct effects	
	Predictor	Est	se	t-val	Est	se	t-val	Est	se	t-val	Predictor	Est	se	t-val	Est	se	t-val
Yr12 student expect	TchExp	.24	.01	20.08	.06	.00	14.25	.18	.01	15.33	TchExp	.24	.01	19.58	.06	.00	13.03
	PrnExp	.20	.02	13.13	.08	.01	16.20	.12	.01	8.36	Sum	.28	.01	24.92	.11	.01	21.44
	PrnAsp	.09	.01	6.07	.03	.00	8.25	.05	.01	3.71	Diff	-.11	.03	-4.15	-.05	.01	-6.08
Grade point average	TchExp	.47	.01	38.92	.03	.00	9.33	.44	.01	36.58	TchExp	.47	.01	4.05	.03	.00	9.36
	PrnExp	.10	.01	10.40	.02	.00	6.67	.08	.01	7.64	Sum	.03	.01	3.68	.03	.00	7.19
	PrnAsp	-.07	.01	-6.90	.01	.00	4.00	-.08	.01	-7.70	Diff	-.17	.02	-9.38	-.01	.00	-3.79
Occupation expect	TchExp	.16	.02	9.56	.04	.01	8.67	.12	.02	6.74	TchExp	.16	.02	9.56	.04	.01	8.67
	PrnExp	.09	.02	4.63	.04	.01	7.40	.05	.02	2.60	Sum	.12	.02	7.07	.05	.01	8.90
	PrnAsp	.03	.02	1.76	.02	.00	5.33	.01	.02	.88	Diff	-.06	.03	-1.99	-.02	.00	-4.23
Age26 student expect	TchExp	.26	.01	19.62	.08	.01	15.60	.18	.01	13.54	TchExp	.26	.01	19.14	.08	.01	17.21
	PrnExp	.14	.01	10.69	.07	.01	14.60	.07	.01	4.79	Sum	.17	.01	15.07	.10	.01	19.11
	PrnAsp	.03	.02	1.94	.03	.00	1.33	.00	.02	.13	Diff	-.11	.02	-4.36	-.04	.01	-5.13
Attainment	TchExp	.31	.01	26.08	.05	.00	12.50	.26	.01	21.83	TchExp	.31	.01	26.26	.05	.00	14.30
	PrnExp	.11	.01	9.25	.04	.00	10.25	.07	.01	5.38	Sum	.10	.01	9.92	.06	.00	13.11
	PrnAsp	-.01	.01	-.67	.02	.00	4.25	-.03	.01	-2.00	Diff	-.12	.02	-5.86	-.02	.01	-4.62

*Tch*, teacher; *Prn*, parent; *Std*, student; *Exp*, expectation; *Asp*, aspiration. *Est*, estimate; *SE*, standard error; *T-Val*, *t*-values greater than 1.96 are statistically significant ( $p < .05$ ); *Diff*, difference between effects of parent aspirations and expectations; *Sum*, sum of effects of parent aspirations and expectations. In separate analyses, we estimated the direct, indirect (mediated), and total effects of parent and teacher expectancy beliefs. The first was based on untransformed parent aspirations and expectations and the second on the (sum and difference) transformation of these variables

with- and between-person effects in the original analysis of untransformed values (see earlier discussion of the “[Sum-and-Difference Transformation](#)” section).

### Direct Linear Effects of Parent, Teacher, and Student Expectations on Outcomes (Hypothesis 1)

**Effects on Year 10 Student Expectations and Academic Self-concept** Parent and teacher expectations significantly predicted Year 10 student expectations and ASC, even after controlling achievement, SES, and background variables (Table 2). Parent expectations had their largest predictive effects on student expectations (0.27) but also on ASC (0.11). Teacher expectations had their greatest predictive effect on ASC (0.21) but also on student expectations (0.16). The effects of parent aspirations were smaller for Year 10 student expectations (0.11) and non-significant for ASC.

**Effects on Long-term Outcomes** Next, we evaluated (see Fig. 1) the direct effects of all five Year 10 predictors (Table 2; expectations—parents, teachers, students; parent aspirations; student ASCs). We tested these effects on subsequent outcomes (Year 12 student educational expectations, GPA at the end of high school, and age-26 outcomes).

For Year 12 student educational expectations (Table 2), the direct effects of all five predictors were statistically positive. The largest effects were for Year 10 student expectations (0.27) and teacher expectations (0.18). Parent aspirations had the smallest effects (0.05) but were still significantly positive.

For GPA, the direct effects of six predictors (including Year 12 Student expectations; Table 2) were quite varied. Teacher expectations had a substantial positive effect (0.44) on GPA. However, the effects of Year 12 student expectations, ASC, and parent expectations on GPA were also significantly positive. Notable was the significantly negative effect ( $-0.09$ ) of parental aspirations.

For the three age-26 outcomes (educational and occupational expectations, and educational attainment), the direct effects of the predictors were again varied (Table 2). For all three age-26 outcomes, the largest direct effects were for teacher expectations (0.12–0.26) and Year 12 student expectations (0.15–0.26). Effects of parent expectations were smaller, but still statistically significant (0.05–0.07). However, the effects of parental aspirations were small and non-significant (but significantly negative for attainment). The direct effects of ASC (0.01–0.03) and Year 10 student expectations (0.01–0.07) were also small and not always statistically significant.

**Mediated Effects** As noted earlier, the educational expectation and aspiration effects on subsequent outcomes were likely to be mediated by intervening variables (Fig. 1). We presented the direct effects that were the focus of most SEMs. However, we also tested the indirect (mediated) and total (direct + mediated) effects (Table 3) when there were intervening variables between the predictors and outcomes (Fig. 1).

The total effects of teacher expectations were positive on all five outcomes (0.16–0.47). The largest total effects were for GPA (0.47). However, the total effects were also significant for attainment (0.31), Year 12 student expectations (0.24), age-26 student expectations (0.31), and occupational expectations (0.16).

The total effects of parent expectations were also positive on all five outcomes (0.09–0.20). The largest total effects were for Year 12 student expectations (0.20). However, the total effects of parent expectations were also significant for age-26 student expectations (0.14), attainment (0.11), GPA (0.10), and occupational expectations (0.09). Parent aspirations had small, mixed total effects. They were significantly positive for Year 12 student expectations (0.09), significantly negative for GPA (−0.07), and non-significant for the three age-26 outcomes.

## The Gap Between Parent Expectations and Aspirations (Hypothesis 2)

As part of parent expectations and aspirations analyses, we tested sum-and-difference contrasts. The two SEMs (Model 2, Fig. 1A, based on original variables, and Model 3, Fig. 1B, based on the sum-and-difference transformed scores) had the same degrees-of-freedom and goodness-of-fit indices. In this sense, the two models were equivalent (Laird & Weems, 2011). Also, effects not involving the parent expectation and aspirations variables were the same as already discussed. Hence, here we focus on the effects of the difference contrast representing the aspiration-expectation gap (Fig. 1B).

Consistent with Hypothesis 2, the direct effects of the difference-contrast were statistically significant and negative for 6 of the 7 outcomes (all but occupational expectations, Table 2). The direct effects were largest for Year 10 student expectations (−0.16), GPA (−0.16), and attainment (−0.10). However, the effects were also significantly negative for Year 12 student expectations, and age-26 educational expectations.

Again, we evaluated mediated and total effects on subsequent outcomes (Table 3). The total effects of the difference were significantly negative for all five outcomes (−0.06 to −0.17; Table 3). The largest total effects of the difference (aspirations − expectations) contrast were for GPA (−0.17). However, the total effects were also significantly negative for attainment (−0.12), Year 12 student expectations (−0.11), age-26 student expectations (−0.11), and occupational expectations (−0.06).

## Effects of SES and Achievement on Expectations, Aspirations, and Outcomes (Hypothesis 3)

SES and achievement were important antecedent predictors of expectations and aspirations (Fig. 1). Furthermore, we hypothesized teachers' and parents' educational expectations and parents' aspirations to mediate the effects of achievement and SES on subsequent outcomes (Fig. 1). Previous research had focused primarily on the effects of achievement and SES at the individual student level. However, an

essential contribution of our study was to juxtapose these individual-student effects (Ach-I and SES-I) with school-average effects (Ach-SA and SES-SA).

Hypothesis 3 predicted the Ach-SA would negatively affect educational expectations and aspirations but that SES-SA effects would be positive. Hence, we examined the effects of achievement and SES (at the levels of the individual student and school-average), controlling background variables (Table 4; see Fig. 1). In evaluating these effects, it was critical to distinguish between effects at the levels of the individual student (Ach-I and SES-I) and the school-average (Ach-SA and SES-SA).

### Effects on Parent and Teacher Expectancy Beliefs

For SES and achievement predictions of the parent and teacher expectations and parent aspirations, there were only direct effects (i.e., there were no intervening variables; see Fig. 1; also noting that these effects are the same for Models 2, Fig. 1A, and Model 3, Fig. 1B). The results (Table 4) were reasonably consistent across these all three outcomes. There were substantial positive effects from Ach-I, smaller positive effects of SES-SA, little or no effect of SES-I, and adverse effects of Ach-SA. Particularly relevant to Hypothesis 3 (predictions based on social comparison theory and the BFLPE; Fang et al., 2018; Marsh & Seaton, 2015), school-average achievement (Ach-SA) negatively predicted teacher expectations ( $-0.25$ ), parent aspirations ( $-0.21$ ), and parent expectations ( $-0.22$ ). In contrast, school-average SES (SES-SA) positively predicted teacher expectations ( $0.21$ ), parent aspirations ( $0.16$ ), and parent expectations ( $0.17$ ).

### Effects on Student Expectations and Academic Self-concept

Achievement and SES had direct effects on Year 10 student expectations and ASC. However, achievement and SES also had indirect effects, mediated via parent and teacher expectations and parent aspirations (see Fig. 1; Table 4). Consistent with Hypothesis 3, the direct effects of achievement (positive for Ach-I and negative for Ach-SA) were significant. In contrast, SES-I's direct effects were mostly small and non-significant. However, achievement also had significant indirect effects (again positive for Ach-I and negative for Ach-SA). There were also positive indirect effects of SES-SA on both these outcomes (but no significant effects of SES-I). Thus, the total effects (direct + mediated) were systematically larger and in the same direction as the direct effects.

For the Year 12 student expectations, most of the effects of achievement and SES were mediated through intervening variables rather than direct effects. Nevertheless, the pattern of total effects was similar to Year 10 student expectations—significantly positive for Ach-I ( $0.38$ ), SES-SA ( $0.21$ ), small for SES-I ( $0.05$ ), but negative for Ach-SA ( $-0.17$ ). The effects of achievement and SES on ASC and Year 12 student expectations (Fig. 1) were mediated through parent and teacher expectations and, to a lesser extent, parent aspirations (Table 5). The direction of mediated effects was consistent across the three teacher and parent ratings—positive for Ach-I and SES-SA, non-significant for SES-I, and negative for Ach-SA. Mediation through teacher

**Table 4** Effects of SES and achievement (individual and school-average) outcomes

Outcome	Predictor	Direct effects			Indirect effects			Total effects		
		Est	SE	T-v	Est	SE	T-v	Est	SE	T-v
Teacher expectations	SES-I	.01	.01	1.18						
	Ach-I	.54	.01	56.08						
	Ach-SA	-.25	.03	-8.81						
	SES-SA	.21	.03	8.02						
Parent aspirations	SES-I	.02	.01	1.19						
	Ach-I	.27	.01	26.99						
	Ach-SA	-.21	.03	-7.82						
	SES-SA	.16	.03	5.99						
Parent expectations	SES-I	.00	.02	-0.13						
	Ach-I	.39	.01	34.92						
	Ach-SA	-.22	.03	-7.48						
	SES-SA	.17	.03	5.64						
Yr10 student expectations	SES-I	.03	.01	1.83	.00	.01	0.58	.03	.02	1.90
	Ach-I	.16	.01	11.42	.22	.01	25.23	.38	.01	31.6
	Ach-SA	-.07	.02	-3.13	-.12	.01	-9.18	-.20	.03	-6.92
	SES-SA	.06	.02	2.83	.10	.01	7.42	.16	.03	5.9
Academic self-concept	SES-I	.03	.02	1.39	.00	.00	0.89	.03	.02	1.55
	Ach-I	.23	.02	13.46	.16	.01	16.96	.40	.01	28.28
	SES-SA	.00	.04	-0.06	.07	.01	7.70	.07	.04	1.85
	Ach-SA	-.08	.04	-2.29	-.08	.01	-8.90	-.17	.04	-4.55
Yr12 student expectations	SES-I	.03	.01	2.41	.01	.01	1.86	.05	.02	2.99
	Ach-I	.09	.01	6.81	.29	.01	32.22	.38	.01	33.24
	SES-SA	.09	.02	4.27	.12	.02	7.90	.21	.03	7.43
	Ach-SA	-.02	.02	-1.01	-.15	.02	-9.60	-.17	.03	-5.93
Grade point average	SES-I	-.02	.01	-1.88	.01	.01	1.48	-.01	.01	-0.89
	Ach-I	.23	.01	18.5	.30	.01	36.66	.52	.01	46.54
	SES-SA	-.13	.03	-3.92	.11	.01	8.17	-.02	.04	-0.55
	Ach-SA	.00	.03	0.12	-.13	.04	-3.66	-.13	.02	-8.92
Occupation expectations	SES-I	.01	.02	0.57	.01	.00	2.41	.02	.02	1.12
	Ach-I	.08	.02	5.22	.16	.01	17.29	.24	.01	17.94
	SES-SA	.04	.03	1.40	.07	.01	8.34	.11	.03	3.76
	Ach-SA	-.01	.03	-0.22	-.08	.03	-2.74	-.08	.01	-8.42
Age26 student expectations	SES-I	.02	.01	1.70	.02	.01	2.69	.04	.02	2.57
	Ach-I	.13	.01	10.05	.26	.01	29.62	.39	.01	34.67
	SES-SA	.04	.02	1.59	.12	.01	8.74	.15	.03	5.49
	Ach-SA	.01	.03	0.32	-.12	.01	-8.74	-.11	.03	-3.82
Attainment	SES-I	.05	.01	3.87	.01	.01	2.23	.06	.01	4.47
	Ach-I	.11	.01	8.56	.24	.01	29.51	.36	.01	33.58
	SES-SA	.01	.02	0.38	.10	.01	8.76	.11	.03	4.16
	Ach-SA	.07	.02	2.86	-.11	.01	-8.93	-.04	.03	-1.62

Predictors are socioeconomic status (SES) and achievement (Ach) at the individual student (I) and school-average (SA) levels; *Est*, estimate; *SE*, standard error; *T-Val*, *t*-values greater than 1.96 are statistically significant ( $p < .05$ ). Presented are the direct, indirect, and total effects relating SES and achievement to each of the subsequent outcomes

expectations tended to be stronger for achievement than mediation through parent expectations and particularly parent aspirations.

### Effects on Long-term Outcomes

There were substantial total effects for the four long-term outcomes, particularly the effects of achievement (positive for Ach-I and negative for Ach-SA; Table 4). However, the patterns of the direct and indirect effects varied for the different outcomes.

For GPA, there were positive direct and indirect effects of Ach-I, so the total effects were substantial (0.52). Ach-SA had no significant direct impact on GPA. However, the total effects were significantly adverse ( $-0.13$ ). SES-SA had counterbalancing negative direct and positive indirect effects for GPA, so the total effects were non-significant. The indirect effects mediated through teacher expectations were systematically stronger than those mediated through parent expectations and aspirations (Table 5).

For age-26 outcomes (occupational expectations, educational expectations, and attainment), Ach-I had consistently positive direct, indirect, and total effects. Ach-SA had consistently small or non-significant direct effects (but significant positive effects on attainment), but consistently negative indirect effects; thus, the total effects were negative (but non-significant for attainment). SES-I's direct, indirect, and total effects on age-26 outcomes were consistently small but tended to be positive. The direct and indirect effects of SES-SA were mostly positive, so the total effects were significantly positive for all three age-26 outcomes. The mediated effects through teacher expectations were systematically stronger than those mediated through parent expectations and aspirations (Table 5).

The direct effects of Ach-SA on age-26 outcomes were mostly small because intervening variables mediated these effects. In contrast, the total effects of Ach-SA were consistently negative across all the short-, medium-, and long-term outcomes. Hence, researchers need to evaluate total and mediated effects when considering the long-term effects of school contextual variables.

### Goldilocks Effects: Non-linear Effects of Expectations (Research Question 4)

We evaluated the non-linear effects of expectancy beliefs (teacher expectations, parent expectations and aspirations, and student self-expectations in Years 10 and 12) on subsequent outcomes. These analyses test the Goldilocks Effect, suggesting that relations between educational expectations and subsequent outcomes would be curvilinear (an inverted U-shaped). However, when we added quadratic components to the model (Fig. 1A), the non-linear effects were all very small and largely non-significant. Across the seven outcomes and all educational expectations and aspirations, we tested a total of 30 quadratic effects (Table 2). Despite the large sample size, only 5 of 30 quadratic effects were statistically significant ( $p < 0.05$ ). None of the quadratic effects was larger than  $|.04|$  and not even the direction of the significant effects was consistent (i.e., inverted U-shaped consistent with the Goldilocks Effect rather than U-shaped).

**Table 5** Mediation results: effects leading from achievement and SES to subsequent outcomes mediated via teacher and parent expectancy beliefs (see Fig. 1)

		Outcome variables																				
		To Yr10 student expectations			To academic self-concept			To Yr12 student expectations			To grade point average			To occupation expectations			To age26 student expectations			To attainment		
Leading from pre-dictors	Mediated via	Est	SE	T-Val	Est	SE	T-Val	Est	SE	T-Val	Est	SE	T-Val	Est	SE	T-Val	Est	SE	T-Val	Est	SE	T-Val
Ach_I	TchExp	.08	.01	11.87	.11	.01	12.64	.13	.01	18.94	.25	.01	34.66	.09	.01	9.55	.14	.01	18.62	.17	.01	24.33
	PmExp	.10	.01	15.60	.04	.01	6.38	.08	.01	12.27	.04	.00	9.87	.03	.01	4.52	.05	.01	10.07	.04	.01	9.03
	PmAsp	.03	.00	7.98	.01	.00	2.02	.02	.00	5.86	-.02	.00	-6.44	.01	.01	1.79	.01	.00	2.44	.00	.00	-0.79
SES-I	TchExp	.00	.00	1.16	.00	.00	1.17	.00	.00	1.17	.01	.01	1.18	.00	.00	1.16	.00	.00	1.17	.01	.00	1.17
	PmExp	.00	.00	-0.12	.00	.00	-0.11	.00	.00	-0.12	.00	.00	-0.12	.00	.00	-0.12	.00	.00	-0.12	.00	.00	-0.12
	PmAsp	.00	.00	1.17	.00	.00	0.98	.00	.00	1.15	.00	.00	-1.18	.00	.00	0.96	.00	.00	1.03	.00	.00	-0.62
Ach_SA	TchExp	-.04	.01	-7.10	-.05	.01	-7.46	-.06	.01	-8.01	-.12	.01	-8.60	-.04	.01	-6.44	-.06	.01	-7.97	-.08	.01	-8.35
	PmExp	-.06	.01	-6.96	-.02	.01	-4.83	-.04	.01	-6.37	-.02	.00	-5.84	-.02	.01	-4.05	-.03	.01	-6.05	-.03	.00	-5.87
	PmAsp	-.02	.00	-5.75	-.01	.00	-1.95	-.02	.00	-4.73	.02	.00	5.10	-.01	.00	-1.75	-.01	.00	-2.34	.00	.00	0.79
SES-SA	TchExp	.03	.01	6.63	.04	.01	6.86	.05	.01	7.46	.10	.01	7.88	.04	.01	6.02	.05	.01	7.45	.07	.01	7.65
	PmExp	.05	.01	5.46	.02	.00	4.25	.03	.01	5.14	.02	.00	4.71	.02	.00	3.63	.02	.01	4.88	.02	.00	4.73
	PmAsp	.02	.00	4.88	.01	.00	1.91	.01	.00	4.24	-.01	.00	-4.45	.01	.00	1.71	.01	.00	2.27	.00	.00	-0.78

Predictors are socioeconomic status (SES) and achievement (Ach) at the individual student (I) and school-average (SA) levels; Tch, teacher; Pm, parent; Exp, expectation; Asp, aspiration; Est, estimate; SE, standard error; T-Val, t-values greater than 1.96 are statistically significant ( $p < .05$ ). Presented are total indirect effects of leading from SES and achievement (individual and school-average) to subsequent outcomes that are mediated via parent and teacher expectancy beliefs (also see Table 4)

The two largest non-linear effects were the quadratic effects of teacher expectations on Year 10 student expectations ( $-0.04$ ) and attainment ( $0.04$ ). No other quadratic effect was larger than  $1.021$  (Table 2). In plots of these two largest non-linear functions (Fig. 2), the effects of teacher expectations were primarily linear, increasing monotonically over the range ( $\pm 2$  SD) of teacher expectations. On this basis, we concluded that the effects of expectations and aspirations were primarily linear, and did not support the Goldilocks Effect.

## Discussion

Our substantive-methodological synergy offers critical qualifications to the conventional wisdom that parents' positive expectations and aspirations benefit their children's short- and long-term educational outcomes. Novel features of our study of expectations and aspirations include the following: using SES-SA and Ach-SA, juxtaposing expectations of parents, teachers, and students; evaluating the aspiration-expectancy gap in parent ratings based on the sum-and-difference transformation; testing non-linear (Goldilocks) effects of expectancy beliefs; and evaluating direct, mediated, and total effects of educational expectations and aspirations. Before discussing results in relation to research hypotheses and questions, we briefly review the major take-home messages—substantively important implications with practical significance.

### Substantively Important Implications with Concrete, Practical Significance

Substantively, our study has implications for practice. We offer empirically robust findings consistent with strong theoretical models that may seem paradoxical, but will be of practical interest to parents, teachers, and educational policymakers. We



Fig. 2 Linear and quadratic effects relating teacher educational expectations to student educational expectations at Year 10 and educational attainment at age 26

begin by briefly summarizing these before linking these to an extensive research literature, our research hypotheses and questions, and our empirical results.

- The gap between parental aspirations and expectations had largely adverse effects on a range of educational outcomes. Aspirations that are too high relative to realistic expectations have adverse consequences. Thus, parents need to reduce aspirations-expectations gaps by lowering overly high aspirations to match realistic expectations
- There were consistently large negative effects of school-average achievement on parents educational aspirations for their children and on expectations by teachers, parents, and students. For equally able students, attending a school with a higher school-average achievement negatively affects the expectations of parents, teachers, and students compared to attending an average-achievement school. School-average achievement also negatively affects subsequent short- and long-term outcomes, mediated partly by lower expectations. Thus, parents need to be cautious about sending their children to high-achieving schools, which will result in lowered expectations and self-beliefs.
- Juxtaposing the effects of school-average achievement and SES, we replicate and extend Göllner et al., (2018) controversial conclusion that the optimal balance for a good school is one with a high school SES but a moderate or low school-average achievement.
- Consistent with a growing body of research, the results support the need to reinforce students' positive self-beliefs to promote short- and long-term academic outcomes.
- We found no support for Goldilocks Effects (that expectations and aspirations should be not too high, not too low, but just right). Non-linear effects of all educational expectations and aspirations were mostly non-significant and were few and tiny.

Next, we summarize and explore the support for research hypotheses that link our results to prior research and the introduction of methodological innovations useful for future research.

### **Correlations Among SES, Achievement, Expectations, and Aspirations**

We began our results with a preliminary description of our study variables, focusing on means and correlations for the six educational expectation and aspiration variables (parent expectations and aspirations, teacher expectations, and student expectations at Year 10, Year 12, and age 26, Table 1). These six variables were substantially correlated (also see Danişman, 2017). Still, the highest correlation was between parent expectations and aspirations for their children (0.68). The mean of teachers' expectations was substantially lower than those of parents and students, whereas mean parent aspiration was the highest. Student expectations in Year 10 were also high, but were lower in Year 12 and at age 26. All six educational expectations and aspirations correlated substantially with student achievement (test scores and GPA). However, teacher expectations were so highly correlated with

achievement (test scores, 0.67; GPA, 0.68) as to suggest that teacher ratings were primarily an accurate assessment of student achievement rather than, or in addition to, educational expectations. Thus, teacher expectations are strongly related to subsequent outcomes because their ratings accurately reflect student achievement. Consistent with suggestions by Jussim (2017), teacher expectations might be good predictors of subsequent educational outcomes because they accurately reflect current social reality rather than cause future social reality.

### **Effects of Expectations and Aspirations on Short- and Long-term Outcomes (Hypotheses 1 and 2)**

Our substantive-methodological synergy's overarching purpose is to evaluate the effects of educational expectations and aspirations on short- and long-term academic outcomes (Fig. 1). We considered educational expectations by significant others (teachers and parents) and students themselves (see earlier discussion in the "Parents' Expectations and Aspirations" section). However, our primary focus was juxtaposing parent expectations and aspirations (see earlier discussion in the "Parents' Expectations and Aspirations" section). Across all the short- and long-term outcomes, there were reasonably consistent positive effects of parent expectations; small, mixed effects of parent aspirations; and largely negative effects of the gap between parental aspirations and expectations. The effects of parent expectations were in addition to the effects of educational expectations by teachers and students themselves.

An important feature of our study is the distinction between parents' educational expectations and aspirations. In much research, the terms "expectations" and "aspirations" are used more or less interchangeably. ELS:2002 measured these constructs separately and highlighted their distinctiveness. Thus, parents were told, *In Question 79, you reported how far in school you want your tenth grader to go. For this question, please indicate how far in school you expect your tenth grader will go.* We suspect this clarification was a critical feature, even when both constructs are measured in the same study. We recommend that future research carefully distinguish between these two constructs and evaluate the aspiration-expectation gap as well as the separate effects of expectations and aspirations.

### **The Sum-and-Difference Transformation**

In our study, parent aspirations and expectations are substantially correlated ( $r=0.68$ ). Methodologically, this substantial collinearity complicates disentangling the separate effects of these two variables. However, this issue is critical as the aspiration-expectation gap is our primary substantive focus. We addressed this issue using a sum-and-difference transformation to eliminate this collinearity (i.e., the sum and difference are orthogonal; Shabuz & Garthwaite, 2019). In doing so, we used two essentially equivalent approaches (Fig. 1A and 1B). Although offering apparently different perspectives, regressions based on the original (Fig. 1B) and orthogonal transformed (Fig. 1B) variables are equivalent for goodness-of-fit and parameter estimates not involving the parent belief variables. Indeed, the estimates

based on the model constraint forming the sum and difference of effects of the untransformed variables (Fig. 1A) were the same as those based on the orthogonal transformation of these variables (Fig. 1B).

The juxtaposition of the effects of the untransformed parent aspirations and expectations and the sum-and-difference transformation is critical. The interpretation of the model of (transformed) difference scores offers an alternative statistical and psychological perspective to the original (untransformed) ratings. Thus, for example, the total effects of parental aspirations on the seven outcomes (Tables 4 and 5) were mostly small and mixed in direction (positive for student expectations and ASC, negative for GPA, and non-significant for the three age-26 outcomes). In contrast, the total effects of the aspiration-expectation difference were negative for all seven outcomes. Psychologically, the models offer alternative interpretations—considered separately from expectations, parents' high aspirations have little effect. The effects of parent aspirations are mostly small and non-significant. However, aspirations that are high relative to expectations adversely affect subsequent outcomes. Hence, consistent with Hypothesis 4, the gap between aspirations and expectations has negative effects, rather than simply high aspirations themselves.

We also note that our sum-and-difference transformation partially eliminated the potential confounding of within-parent and between-parent differences in our models (see related discussion by Hamaker et al., 2015; Marsh et al., 2022; Marayama et al., 2016). Thus, the difference contrast targets within-parent differences in aspirations and expectations, our substantive and methodological focus. This allows us to distinguish the between-parent effects of aspirations that tend to be positively correlated with outcomes and the within-parent differences between aspirations and expectations that are negatively related to outcomes. Hence, parents' high aspirations are not necessarily bad but become detrimental when parents' aspirations are too high relative to their realistic expectations.

### **School Contextual Effects: Juxtaposing Individual-Student and School-Average Effect (Hypothesis 3)**

Consistent with Hypothesis 3 (also see earlier discussion of the “[Antecedents: School-Average SES and Achievement](#)” section), we found that individual-student achievement and SES, and school-average SES, all positively predicted expectations and aspirations, even after controlling for a range of control variables. However, the effects of school-average SES and achievement were dramatically different. Consistent with theoretical (social comparison theory and the BFLPE) and school effectiveness research, we found that the effects of school-average achievement negatively predicted all expectations and aspirations. The direct effects of Ach-SA on age-26 outcomes were mostly small because intervening variables mediated these effects. In contrast, the total effects of Ach-SA were consistently negative across all the short-, medium-, and long-term outcomes. Hence, it is important for researchers to evaluate total and mediated effects when considering the long-term effects of school contextual variables.

Hence, for students attending high-achieving schools, the educational expectations of their teachers, their parents, and the student themselves are likely to be significantly lower than if the same students attended mixed- or low-achieving schools. Nevertheless, the educational expectations of parents, teachers, and students in high-achieving schools tend to be higher than those in low-achieving schools (see correlations in Table 1). However, these correlations do not take into account that students in high-achieving schools tend to have much higher levels of achievement as well as many other advantages. Thus, the more relevant comparison is between two equally advantaged students (particularly in academic achievement) attending high- and low-achieving schools. Based on this comparison, the effects of school-average achievement are substantially negative. This conclusion is controversial. Thus, future research needs to evaluate this conclusion concerning limitations that always exist in any one study and replicate it for different settings and analytic strategies. However, these results logically follow from the highly robust and closely related BFLPE (the negative effect of school-average achievement on ASC—see Marsh & Seaton, 2015; Marsh et al., 2021).

It is also interesting to note that the effects of SES-SA were significantly positive for all the educational expectations, although smaller in absolute value than the adverse effects of Ach-SA. The purpose of our study was not specifically to juxtapose the effects of school-average achievement and SES. Nevertheless, our results are consistent with theoretical models of normative processes resulting in assimilation effects for school-average SES, and comparative processes resulting in contrast effects for school-average achievement (e.g., Kelly, 1952). Furthermore, our results support and extend Göllner et al. and's (2018; also see Marsh, Pekrun, et al. 2023; Marsh & O'Mara, 2008) controversial conclusion that the optimal balance for a good school is a high SES-SA but a moderate or low Ach-SA.

We found surprisingly little effect of SES-I, but this finding warrants qualification. Our main focus is on expectancy beliefs. Hence, we included many overlapping control variables related to SES-I—including ethnicity, ELS:2002's composite risk factor, and parent education. Thus SES-I is substantially correlated with expectancy beliefs (0.12–0.36; Table 1), but these relations are primarily explained by other control variables that overlap with SES.

The negative effect of school-average achievement on ASC (the BFLPE; Fang et al., 2018; Marsh & Seaton, 2015) is widely acknowledged as one of education and psychology's most robust effects and a basis of predictions in our study. However, the total negative effects of school-average achievement on student expectations were as large or larger than those for ASC. Furthermore, these effects of school-average achievement for student expectations and ASC were somewhat smaller than the corresponding expectations by teachers and parents. Interestingly, the negative effects of school-average achievement were as large or larger for educational expectations by significant others (teachers and parents) than for the students themselves. This suggests that the social comparison processes leading to the negative effect of school-average achievement on student expectations (and ASC) are as strong or even stronger for expectations by significant others. Nevertheless, in support of Hypothesis 3, the adverse effects of school-average achievement were highly consistent across all the parent, teacher,

and student expectations, and parent aspirations. Parents choosing to send their children to high-achieving schools not only adversely affect their childrens' educational expectations (and ASC), but effects on teachers' and parents' educational expectations are even more negative.

The effects of achievement and SES on subsequent outcomes are mediated in part by the parent and teacher expectations and parent aspirations. The directions of the mediated effects are highly consistent across expectations by parents and teachers (positive for Ach-I and SES-SA, negative for school-average achievement, small and largely non-significant for SES-I). Effects mediated by parent aspirations are smaller, but also in the same direction as expectations. For student expectations at Year 10, effects mediated via parents and teachers are similar in size (slightly larger for parents).

### The Goldilocks Effect

We proposed the Goldilocks Effect (not too low, not too high, but just right) for educational expectations and aspirations (see Kidd et al., 2012; Przybylski & Weinstein, 2017). Despite the intuitive appeal of the proposal and the extraordinary power of our tests (due to the large sample size), there was no support for Goldilocks Effects. When we tested the quadratic components of educational expectation and aspirations terms, the non-linear effects were consistently very small, largely non-significant, and not even consistent in direction.

Nevertheless, it might be premature to abandon it. Indeed, our interpretation of the effects of the aspiration-expectation difference seems logically related to the Goldilocks Effect. High aspirations and expectations are not bad, but aspirations that are too high relative to realistic expectations have adverse effects. Hence the "just right" levels in the Goldilocks Effect might require an appropriate balance between expectations and aspirations. Indeed, it is overly simplistic to assume that the optimal ("just right") level of expectations and aspirations is the same for every student. A plausible alternative is that the aspiration-expectation differences are curvilinearly related to subsequent outcomes, so there is a "just right" balance between aspirations and expectations. This alternative interpretation disentangles within-parent and between-parent perspectives of parents' expectations and aspirations (see the related discussion of the "[Sum-and-Difference Transformation](#)" section). However, when we tested the quadratic effects of the difference contrast (see Fig. 1B), the effects were tiny, largely non-significant, and not even consistently in the right direction. Although we did not find support for our proposed Goldilocks Effect, a within-person focus on what constitutes "just right" should be an important contribution to Goldilocks Effect studies more generally.

### Strengths, Weaknesses, and Directions for Further Research

Particular strengths of our study are the large, nationally representative ESL:2002 database, the final high school GPA based on official school transcripts collected following graduation, and the age-26 outcomes collected following the typical

post-school transition into early adulthood. Methodologically, we constructed 20 multiple imputation datasets based on extensive auxiliary variables to control missing data, and included robust covariates to control pre-existing differences. The introduction of the sum-and-difference transformation and the Goldilocks Effect constitute important methodological and theoretical contributions. Although school-effectiveness and BFLPE studies routinely include school-average measures of SES and achievement, their inclusion is rare in studies of parents' and teachers' educational expectations and parents' aspirations. Furthermore, many education expectation studies are cross-sectional, and few include long-term outcomes and multiple waves of high school outcomes. Our novel application of a sum-and-difference transformation of parents' expectations and aspirations allowed us to focus more specifically on the aspiration-expectancy gap and distinguish between-parent and within-parent effects. Thus, our study is an innovative substantive-methodological synergy.

There are also potentially important limitations to our study. As with all correlational studies—even when based on large samples and longitudinal data, support for a priori hypotheses that imply causality must be interpreted cautiously. However, the most critical threat to these interpretations is the control for potential covariates that are confounded with effects. Here, we had a robust set of covariates (gender, age, SES, achievement, track, and ELS:2002's composite risk variable). Furthermore, our results for expectations closely parallel those for ASC, where the support for causal interpretations is much stronger (Marsh & Seaton, 2015). However, most BFLPE and related studies are based on subjective outcomes using self-report Likert response scales, prompting Zell and Alicke (2010) to call for more objective outcome measures. Hence, it is relevant to note that compared to typical Likert scales, the response categories for our educational expectation and aspiration ratings are highly tangible and well anchored, ranging from 1 (less than high school graduation) to 7 (complete a Ph.D., M.D., or another advanced professional degree). Furthermore, there are responses by teachers and parents as well as student self-report responses. Indeed, the negative effects for school-average achievement on these well-anchored response scales are larger than for ASC and larger for parent and teacher responses than student self-report responses.

We also note that the ELS:2002 items used to define global ASC represent a more broadly defined construct than is typical in current research. However, historically, the ASC construct has been more broadly defined. For example, in the classic Self Description Questionnaire (e.g., Marsh & O'Neill, 1984), a model of many subsequent ASC instruments and studies, ASC was defined as a blend of competence, motivation, and affect. Similarly, Honicke and Broadben's (2016, p. 4) systematic review defined academic self-concept as follows: "*Academic self-concept is a multidimensional construct that encompasses a student's beliefs and feelings about their academic abilities, including their perceived level of competence, affective experiences, and liking for academic activities.*" Also, historically there has been a blurring of the constructs of ASC and academic self-efficacy (see Marsh et al., 2019, on the "murky distinction" between academic self-concept and self-efficacy). Current perspectives on ASC tend to focus more narrowly on the self-perceived competence component of ASC (e.g., Basarkod & Marsh, 2023). However, our preliminary analyses clearly showed that the set of five items that we used reflected one dominant factor. Furthermore, more complex SEMs treating the five items as a single factor fit the data very well. Nevertheless, researchers must be

cautious about comparing results from studies that use very different conceptualizations of ASC (see Marsh et al., 2019, for further discussion).

Finally, although well-suited to test our main hypotheses, we note that the first wave of ELS:2002 data is more than 20 years old, and even the age-26 variables were collected a decade ago. Furthermore, students', parents', and teachers' educational expectations, and parents' aspirations, were based on US students in Year 10. We anticipate that the basic psychological processes posited to drive the effects 10 and 20 years ago will remain valid. Still, there is need to evaluate the historical generalizability of our results and those of other studies we reviewed. More broadly, further research needs to replicate and extend the results to younger students, different school systems, different countries (but see Murayama et al.'s 2016 study of Year 5 German students), and more recent data.

## Conclusions and Implications

In this study, we evaluate parents, teachers, and students' educational expectations and parental aspirations. Parents' educational expectations and aspirations for their children correlate positively with children's academic outcomes and long-term attainment. However, if parents' aspirations exceed parents' realistic expectations, then the results are negative. Having aspirations that are too high compared to realistic expectations has adverse effects. Furthermore, parents', teachers', and students' educational expectations are all negatively related to school-average achievement (a big-fish-little-pond result). Going to school with high-achieving students is negatively associated with educational expectations. All these findings are robust when we control for background variables (e.g., gender, ethnicity, SES).

There is a tendency for governments and policymakers to individualize responsibility and blame the victims of economic and social disadvantage rather than societal factors that create disadvantages (e.g., Wright, 1993). Thus, we note that some of the discussion around economic privilege can potentially promote a deficit perspective that blames underprivileged adolescents and families for failures in school due to low aspirations and expectations (see earlier discussion by Spohrer et al., 2018; St. Clair et al., 2013). However, as emphasized by St. Clair et al., disadvantaged and marginalized adolescents typically have high aspirations—higher than those that can be supported by the societies in which they live. Thus, researchers studying individual differences in psychological constructs must contextualize those constructs within the environmental factors also at play. More broadly, our study calls into question recommendations by successive UK governments and the OECD (2004; 2019) for the need to raise the aspirations of all students and their support of policies to accomplish this goal. As Schoon and Burger (2021; also see Spohrer et al., 2018) emphasized, government policies and initiatives aimed at raising aspirations to increase educational attainment are overly simplistic and potentially counterproductive.

Our substantive-methodological synergy brings together strong data, methodological models, and theory to address substantive issues with important consequences for policy and practice—a substantive-methodological synergy. The

issues at the heart of our research have critical implications for parents who aspire for their children to achieve high levels of educational attainment. High parental expectations have largely positive direct, mediated, and total effects on short- and long-term educational outcomes. High aspirations are not necessarily bad, but aspirations that greatly exceed realistic educational expectations have uniformly negative effects. Our study adds to a growing number of studies showing that discrepancies between aspirations and realistic expectations negatively affect self-beliefs, school performance, and subsequent educational attainment and long-term outcomes.

Our research also adds to the growing literature suggesting school-average achievement's adverse effects. Consistent with social comparison theory and implications from BFLPE studies, school-average achievement negatively affects the educational expectations of parents, teachers, and students, and parents' aspirations. The juxtaposition of these negative effects of school-average achievement and positive effects of school-average SES also extends Göllner et al. and's (2018; also see Marsh, Pekrun, et al. 2023; Marsh & O'Mara, 2008) controversial conclusion that the optimal balance for a good school is a high level of school-average SES but a moderate or low level of school-average achievement.

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