College Expectations Promote College Attendance: Evidence From a Quasiexperimental Sibling Study

Psychological Science
2019, Vol. 30(8) 1186–1194
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DOI: 10.1177/0956797619855385
www.psychologicalscience.org/PS

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Abstract

When adolescents are asked how likely they think it is that they will go to college, does their answer influence what they will actually do? Typically, it is difficult to determine whether college expectations promote academic achievement or just reflect a reasonable forecast of what is likely to happen to them. We used a sample of siblings from The National Longitudinal Study of Adolescent to Adult Health ($N = 1,766$) to test whether associations between college expectations and educational attainment remained after accounting for unobserved family factors that may shape both educational expectations and attainment. Compared with their siblings, adolescents with higher college expectations were also 43% more likely to attend college, even when analyses controlled for grades and IQ. The effect of college expectations on college attendance was strongest among youths living in higher-socioeconomic-status families.

Keywords

future expectations, college, socioeconomic status, sibling study, quasiexperiment

Received 4/23/18; Revision accepted 4/28/19

The ability to imagine possible futures is a fundamental human process (Seligman, Railton, Baumeister, & Sripada, 2013). Forming expectations for the future is a particularly significant developmental task of adolescence that promotes identity development, preparation for transition to adulthood, and behavior that aligns with desired futures (Massey, Gebhardt, & Garnefski, 2008; Nurmi, 1991). Attending college is a salient future expectation of many adolescents (Massey et al., 2008) for which goal attainment is readily measurable. Greater educational attainment is increasingly necessary for upward mobility in today's labor market (Autor, 2010) and has significant impacts on health and well-being (Gakidou, Cowling, Lozano, & Murray, 2010; Marmot, Friel, Bell, Houweling, & Taylor, 2008). For these reasons, the federal government's Healthy People 2020 agenda highlights education as one of five key social determinants of health and calls for research on factors that shape educational attainment (HealthyPeople.gov, 2019).

Youths who think it is relatively more likely that they will go to college tend to have higher grades (Khattab, 2015; Rothon, Arephin, Klineberg, Cattell, & Stansfeld,

2011) and higher educational attainment as adults (Beal & Crockett, 2010; Marjoribanks, 2003), even when analyses control for important individual differences, including cognitive ability (Lemos, Abad, Almeida, & Colom, 2014) and prior academic achievement (Rothon et al., 2011). Expectations to attend college may directly promote academic outcomes by motivating adolescents to engage in goal-directed behaviors that help them attain their desired futures. Youths who think it is more likely that they will attend college show more effort in their high school coursework (e.g., by completing assignments, spending time on homework, coming to class prepared, and paying attention; Domina, Conley, & Farkas, 2011) and participate in more extracurricular activities, which helps explain their relatively greater educational attainment in adulthood (Beal & Crockett, 2010).

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However, such correlational studies make it difficult to determine whether expectations about attending college truly motivate adolescents to achieve their goals or if they just reflect a reasonable forecast of what is likely to happen to them given their circumstances (Kao & Thompson, 2003). In contrast, experimental and quasiexperimental studies allow for stronger causal inference about the role of adolescents' expectations in shaping their educational outcomes. For example, one intervention study found that helping eighth graders develop expectations and strategies for their academic futures improved their academic performance compared with youths randomly assigned to a control group (Oyserman, Bybee, & Terry, 2006). Such intervention studies demonstrate what can be accomplished by changing adolescents' expectations for the future.

Whether or not one can effect change in adolescents' college expectations and, as a result, increase the chances that they will attend college is a different question from whether naturally occurring individual differences in those expectations are related to educational outcomes. Quasiexperimental designs such as sibling comparisons can be helpful for the latter question (Jaffee, Strait, & Odgers, 2012). When comparing full biological siblings, one can control for unobserved, shared factors within the family (e.g., genes, family cohesion) as well as differences between families (e.g., racial-minority status, income, neighborhood) that can impact college expectations and educational attainment (Lahey & D'Onofrio, 2010). Monozygotic twins, who share genotype and family environment, provide the most stringent test of whether differences in siblings' expectations promote differences in their educational outcomes. Although quasiexperimental designs do not automatically control for unobserved, nonshared factors within the family (e.g., if one sibling has a higher IQ than the other), these factors can be included as measured covariates (Lahey & D'Onofrio, 2010). The sibling-comparison design has been underutilized in psychology (Jaffee et al., 2012; Lahey & D'Onofrio, 2010) and represents an ideal opportunity to better understand the nature of the association between college expectations and educational attainment.

Studying the degree to which college expectations may predict college attendance is complicated by an income-achievement gap that persists throughout children's school years, resulting in the underrepresentation of low-income students in colleges and universities (Reardon, 2013). Because future expectations are shaped by opportunities and constraints in an individual's environment (Massey et al., 2008), it is not surprising that youths from lower-income households tend to rate their academic aspirations as less attainable than their wealthier peers (Mello, 2008; Rothson et al., 2011; Stewart,

Stewart, & Simons, 2007). However, many adolescents from low socioeconomic backgrounds do aspire to attend college (Pettit, Davis-Kean, & Magnuson, 2009), and educational expectations have risen over time, with more adolescents from all social backgrounds expecting to go to college now than ever before (Goyette, 2008).

It may be that the degree to which future expectations impact college attendance varies by socioeconomic status (SES). One possibility consistent with an *overwhelming-risk* hypothesis (Li, Nussbaum, & Richards, 2007) is that higher college expectations are associated with greater likelihood of attending college for youths living in middle- to high-income households but not in poverty (Mahatmya & Smith, 2017). This posits that youths who lack financial resources and social capital may not get to college no matter how much they want or expect to do so. This pattern would also suggest that youths in higher-SES families have advantages over youths in lower-SES families that enable them to achieve their aspirations for going to college. A second possibility, consistent with *resource-substitution* theory (Ross & Mirowsky, 2006), is that higher college expectations are associated with greater likelihood of college attendance for youths in poverty but not youths living in higher-income households. In this case, a strong desire to attend college may help adolescents from low-income backgrounds compensate for the lack of social or financial capital that might otherwise prevent them from attending. In addition, it may be that expectations are irrelevant for adolescents from higher-SES backgrounds because of either a ceiling effect (i.e., virtually all expect to go to college) or the possibility that family and other social pressures promoting higher education overwhelm any individual-level expectations for alternative futures.

In the current study, we used a sibling-comparison design to test whether associations between college expectations and actual college attendance remain after accounting for unobserved family factors that may shape both college expectations and college attendance. We compared same-sex, full biological siblings because sex is correlated with both college expectations and college attendance (Gakidou et al., 2010; Mello, 2008). We also controlled for intelligence and grades, which can differ among siblings and predict academic expectations (Lemos et al., 2014) and educational outcomes (Duckworth, Quinn, & Tsukayama, 2012; Lleras, 2008). First, we expected that adolescents who rated it more likely that they would go to college, compared with siblings who rated it less likely that they would go to college, would be more likely to actually attend college. Second, we hypothesized that family SES would moderate effects of college expectations on college attendance, although we did not make specific predictions about the direction of the effect

given theoretical and empirical grounds for different moderator patterns (Li et al., 2007; Mahatmya & Smith, 2017; Ross & Mirowsky, 2006).

Method

The current study is a secondary data analysis of The National Longitudinal Study of Adolescent to Adult Health (Add Health; Harris et al., 2009). Add Health study procedures were approved by the University of North Carolina at Chapel Hill Human Subjects Review Committee. Wave I data were collected in 1994 to 1995 from 90,118 seventh- to twelfth-grade students between the ages of 11 and 17 years sampled from 145 middle and high schools using a stratified, random-school selection procedure. Of the students who completed questionnaires in schools, 20,745 students and 17,670 of their parents also completed in-home interviews in 1995. One year later, 14,738 adolescents completed a follow-up in-home interview (Wave II). In 2001 to 2002, 15,197 participants completed a third in-home interview (Wave III), at which time their ages ranged from 18 to 26 years. Finally, 15,701 participants between the ages of 24 and 32 years completed a fourth in-home interview (Wave IV) in 2007 to 2008.

The current study included siblings who had data available on the outcome variable (actual college attendance measured at Wave IV). A total of 6,278 siblings participated in Add Health; 3,908 cases were excluded because siblings were the opposite sex, half-siblings, or unrelated siblings raised in the same household. An additional 604 cases were excluded because data on college attendance were not available for one or both siblings (391 individuals were missing data on educational attainment; an additional 213 cases were excluded because although they had data on college attendance, their sibling did not). Thus, the current analytic sample consisted of 1,766 same-sex full siblings (914 nontwin full siblings, 428 dizygotic twins, and 424 monozygotic twins) from 883 families in which both siblings had nonmissing data on educational attainment at Wave IV. Same-sex twin pairs with unknown zygosity were coded as dizygotic. Per the Add Health study design, many siblings did not have sample weights, so we did not restrict the sample to individuals with valid sample weights, as has been the convention in other sibling-comparison studies in Add Health (Bauldry, Shanahan, Russo, Roberts, & Damian, 2016; Jaffee, Lombardi, & Coley, 2013). Simulations of multilevel logistic models in Mplus (Version 8; Muthén & Muthén, 2017) were used to estimate power to detect within- and between-family associations of predictors with a binary outcome, assuming a base rate matching the one for our outcome (68% attended at least some college). At the within-family level ($N = 1,766$ individuals), we had 80% power

to detect an odds ratio of 1.4. At the between-family level ($n = 883$ family units), we had 80% power to detect an odds ratio of 1.8.

Measures

Demographics. Age was calculated as the discrepancy between date of birth and the date of the participant's Wave I interview. Participants reported their sex, race, and ethnicity at Wave I.

Verbal IQ. At Wave I, participants completed the Adolescent Health Picture Vocabulary Test, which was adapted from the revised version of the Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1981). Raw scores were standardized on the basis of age norms and converted to percentiles.

Grades. As part of the Wave 1 in-home survey, participants self-reported their letter grades during the most recent grading period in English, math, history, and science (1 = *D or lower*, 2 = *C*, 3 = *B*, 4 = *A*). We calculated the average of their grades.

SES. Caregivers reported annual household income, which was log transformed for analyses. Parents also reported their highest level of educational attainment and that of their current partner or spouse (1 = *less than a high school degree*; 2 = *high school degree, GED, or vocational training instead of high school*; 3 = *vocational training after high school, or some college*; 4 = *college graduate*; 5 = *professional training beyond college*). Income and parent education are important components of SES and were reasonably highly correlated ($r = .50$, $p < .001$). Thus, we standardized and averaged the log of family income and highest parental education to construct a composite SES variable that was used in analyses.

College expectations. At Wave I, participants used a 5-point scale of 1 (*low*) to 5 (*high*) to rate their college expectations ("How likely is it that you will go to college?").

College attendance. Participants reported their educational attainment at Wave IV, and this was coded into a binary variable representing college attendance (0 = *no college*, 1 = *at least some college*).

Data-analysis plan

Analyses were conducted in Stata (Version 14.0; StataCorp, 2015). Following methods of Begg and Parides (2003) and Rabe-Hesketh and Skrondal (2012), we computed random-effects logistic regression models to estimate whether within- and between-family differences in college expectations were associated with within- and between-family

differences in college attendance. Models included both the individual-level predictors (e.g., IQ) and the family average of each predictor (i.e., IQ averaged across siblings) to isolate the fixed (within-family) effects. In contrast to traditional regression models, random-effects models are more appropriate when analyses involve nested data, such as siblings nested within families. Data for sibling pairs violates the independence assumption inherent in the traditional model. Thus, random-effects models are used to produce more accurate estimates with adjusted degrees of freedom. Moreover, the random-effects model allowed us to test whether the within-families effect of college expectations was moderated by family-level SES.

The analytic sample included participants with non-missing data on the outcome variable, college attendance ($N = 1,766$). Less than 5% of participants had missing data on the covariates, except for the measures of family SES, which had a greater percentage of missing data (i.e., 22% of participants were missing data on family income, and 13% were missing data on parent education). To address missing data, we used multiple imputation via chained equations (Allison, 2002) with model predictors as well as additional predictors of SES: race, parent marital status, and household size. We constructed 10 data sets to help ensure stable parameter estimates and standard errors (Allison, 2002; Graham, Olchowski, & Gilreath, 2007). We confirmed that the imputed values did not significantly alter the distribution of the SES measure. Furthermore, random-effects models were estimated via maximum likelihood (Stata “mle” command), which produces estimates that are consistent, efficient, and asymptotically normal (Allison, 2002).

First, to estimate the random-effects models, we calculated family-average scores for all covariates by computing the mean of siblings' scores. Next, we used the “xtreg” command to examine the intraclass correlation (ρ), using a random-effects-only model that estimates the amount of within-family variance compared with between-family variance. Intraclass correlation coefficients closer to 1 indicate more similar scores within families (and bigger differences between families), and values closer to 0 indicate more variability within families (and smaller differences between families; Rabe-Hesketh & Skrondal, 2012).

Next, random-effects models were estimated by using the “xtlogit” command to regress college attendance (Wave IV) on individual college expectations (Wave I), family-average college expectations (Wave I), individual age (Wave I), family-average age (Wave I), individual verbal IQ (Wave I), family-average verbal IQ (Wave I), family SES (Wave I), and the interaction of individual college expectations and family SES. Interaction terms were probed using the “mimrgns” command

Table 1. Sample Characteristics ($N = 1,766$)

Variable	Value
Sibling type	
Full nontwin	52%
Dizygotic twin	24%
Monozygotic twin	24%
Age at Wave I (years)	$M = 16.08$
Sex (female)	53%
Race and ethnicity	
White	58%
Black/African American	18%
Asian	5%
Hispanic/Latinx	13%
Other or multiracial	6%
Verbal IQ percentile at Wave I	$M = 50.61$
Grades at Wave I	$M = 2.87$
College expectations at Wave I	$M = 4.16$
Family SES at Wave I (z score)	$M = -0.01$
Family income (log transformed) at Wave I	$M = 3.58$
Highest parent education at Wave I	$M = 5.47$
College attendance by Wave 4	
No college	32%
Attended at least some college	68%

Note: Means are averages over the 10 multiply imputed data sets, accounting for between-imputations variation. See the Measures section of the text for ranges of the measures from which means were derived.

to examine the effect of college expectations at different levels of SES.

Results

Table 1 shows descriptive statistics for all study variables. Intraclass correlations of analytic variables fell between .41 and .62, indicating that there was a moderate amount of between- and within-family variability in study variables to justify the examination of both within- and between-family effects. Although college expectations were highly negatively skewed (i.e., 50% of adolescents had expectations at or above 4.5 on a scale of 1 to 5), the intraclass correlation ($\rho = .41$) suggests that siblings were far from perfectly correlated in their expectations. In 51% of the pairs in the sample, both siblings rated their college expectations the same; 30% of pairs had a 1-point discrepancy, and the remaining 19% of pairs had discrepancies of more than 1 point. Three percent of pairs in the sample ($n = 23$ pairs) had extreme discrepancies (one sibling rated the likelihood of going to college as 1, and the other rated it as 5). Regarding sibling differences in college attendance ($\rho = .58$), 55% of sibling pairs both attended at least some college, 26% of pairs had discrepancies on college attendance (i.e., one sibling attended college,

Table 2. Results of Random-Effects Logistic Regressions Predicting College Attendance at Wave IV

Predictor (Wave I)	Model 1			Model 2		
	OR	SE	p	OR	SE	p
Within-family effects						
Age	1.02 [0.86, 1.20]	0.09	.83	1.00 [0.85, 1.19]	0.09	.96
IQ	1.02 [1.00, 1.03]	0.01	.01	1.02 [1.00, 1.03]	0.01	.02
Grades	1.57 [1.09, 2.26]	0.29	.02	1.55 [1.08, 2.23]	0.29	.02
College expectations	1.43 [1.15, 1.77]	0.16	.001	1.55 [1.24, 1.94]	0.18	< .001
Between-family effects						
Family-average age	1.08 [0.88, 1.34]	0.12	.46	1.10 [0.89, 1.35]	0.12	.39
Family-average IQ	1.01 [0.99, 1.02]	0.01	.36	1.01 [0.99, 1.02]	0.01	.35
Family-average grades	1.87 [1.16, 3.00]	0.45	.01	1.84 [1.14, 2.95]	0.44	.01
Family-average college expectations	1.42 [1.06, 1.90]	0.21	.02	1.41 [1.01, 1.88]	0.21	.02
Family socioeconomic status	1.61 [1.28, 2.03]	0.19	< .001	0.61 [0.30, 1.23]	0.22	.17
Interaction						
Family Socioeconomic Status × College Expectations				1.27 [1.08, 1.50]	0.11	.005

Note: Values in brackets are 95% confidence intervals. OR = odds ratio.

and the other did not), and, for 19% of pairs, neither sibling attended college.

Within- and between-family effects of college expectations on college attendance

We estimated a random-effects logistic regression predicting college attendance at Wave IV from age, family-averaged age, verbal IQ, family-averaged verbal IQ, grades, family-averaged grades, college expectations, family-average college expectations, and family SES (Model 1). Model 2 included the interaction term of college expectations and family SES at Wave I (see Table 2). Accounting for potentially confounding unobserved variables that differ between families, we found that individuals who rated their likelihood of going to college as higher at Wave I had a 43% greater likelihood of attending college at Wave IV compared with their sibling with lower college expectations. Adolescents with higher IQ scores and higher grades were also more likely to attend college than their sibling with lower IQ scores and lower grades. Adolescents were more likely to attend college if they were from families in which expectations to attend college, grades, and SES were higher, on average, in comparison with other families.

The effect of college expectations on educational attainment

Model 2 included an interaction term to test whether the effect of college expectations depended on family SES. The interaction of college expectations and family SES

was significant. Post hoc analyses of the interaction revealed that the association between college expectations and likelihood of attending college was stronger as SES increased (see Fig. 1). The association between college expectations and college attendance was not significant for youths living in households greater than 1 standard deviation below the mean.

Discussion

Many adolescents expect that they will go to college, but far fewer attain postsecondary education (Goyette, 2008). It is unclear whether college expectations promote academic achievement or simply reflect realistic forecasting or social norms. Because these possibilities are difficult to tease apart in correlational studies, we used a sibling-comparison quasiexperimental design (Jaffee et al., 2012; Lahey & D'Onofrio, 2010). Our findings were most consistent with the possibility that expectations play a causal role in shaping academic futures, particularly for adolescents from higher-SES backgrounds.

Adolescents who expected that it was more likely they would attend college were, in fact, more likely to attend college compared with their sibling who had lower college expectations. This is consistent with findings of prior correlational studies (Beal & Crockett, 2010; Marjoribanks, 2003). Because these siblings grew up in the same household, many potentially confounding factors were eliminated, such as financial resources, geographical proximity to universities, and how much parents knew about how to navigate the college application process. We also controlled for IQ and grades,

Fig. 1. Average marginal effect of college expectations on college attendance at each level of family socioeconomic status in the analytic sample of same-sex, full-biological-sibling pairs. Error bars represent 95% confidence intervals.

which can vary among siblings. Thus, our findings are consistent with the possibility that college expectations motivated adolescents to pursue a college education.

The impact of adolescents' college expectations on their later college attendance depended on the family's SES. The benefits of higher expectations for attending college were greater for adolescents living in higher-SES families. However, the association between college expectations and college attendance was not significant for youths living in families greater than 1 standard deviation below the sample mean of SES. Even if youths growing up in low-SES families had the same college expectations as their more socioeconomically advantaged peers, those expectations were not related to whether they attended college. Although college expectations appear helpful when youths have the resources to achieve their academic goals, these data suggest that living in a low-SES household prevents adolescents from fully capitalizing on their aspirations. This pattern of findings is consistent with a prior study on parental college expectations (Mahatmya & Smith, 2017) and supports the overwhelming-risk hypothesis (Li et al., 2007) that the benefits of college expectations are overwhelmed under conditions of poverty. Conversely, this pattern could also suggest that growing up in a higher-SES household facilitates adolescents' goals around college attendance.

A few limitations should be considered when interpreting the current findings. First, causality cannot be definitively established without a randomized experimental design. Sibling comparisons are quasiexperimental designs that can provide evidence consistent with a causal explanation (Jaffee et al., 2012). The design does not control for unobserved, nonshared

factors within the family, such as if the mother used controlled substances during her pregnancy with one child and not the other (Lahey & D'Onofrio, 2010). For this reason, we included some key measured covariates (i.e., grades, IQ) that can vary between siblings and impact both college expectations and college attendance. However, the current findings do not rule out the possibility that differences in siblings' college expectations and college attendance were explained by nonshared factors, such as if only one sibling had an academic mentor or role model (Eby, Allen, Evans, Ng, & DuBois, 2008). We note, however, that many potentially relevant nonshared factors that were not measured in the current study—such as having an academic mentor, participating in an academic enrichment program, or showing individual differences on a measure of conscientiousness—are likely to result from or to produce some of the variables we did measure. For example, adolescents who score high on measures of conscientiousness tend to get good grades, and adolescents who score high on measures of IQ often participate in academic enrichment programs. Thus, it is likely that we have at least partly controlled for some of these other nonshared factors by proxy.

Second, our measurement was restricted to what was available in the Add Health data set. Grades and educational attainment were measured by self-report. One concern with self-report may be that some adolescents have a reporting bias resulting in rating overly high college expectations and grades. This problem with the validity of these measures could compromise their association with actual college attendance. However, it is unlikely that students reported good grades only if they had an overreporting bias because self-reported grades

are highly correlated with grade point average among students with good grades but are less accurate among students with poor grades (Kuncel, Credé, & Thomas, 2005). Another limitation is that the measure of IQ available in Add Health is based on the revised version of the PPVT—an intelligence screener that relies on receptive language to assess vocabulary knowledge. The PPVT is moderately to highly correlated with measures of verbal intelligence but shows small to moderate correlations with other domains of intelligence, such as fluid reasoning and processing speed (Bell, Lassiter, Matthews, & Hutchinson, 2001). Fortunately, verbal intelligence is the domain of IQ that is most highly correlated with academic functioning (Glutting, Watkins, Konold, & McDermott, 2006), which was the construct of interest.

The findings have important implications for interventions and policy to increase educational attainment. An encouraging finding is that youths who expected that it was more likely that they would go to college tended to also be more likely to attend college. However, the degree to which college expectations predicted college attendance depended on the family's SES. This suggests that college expectations alone are insufficient for youths living in low-SES households. Thus, interventions targeting youths living in low-SES families should emphasize systemic change, such as grant-based financial aid, to help socioeconomically disadvantaged youths get to and graduate from college.

Action Editor

Brent W. Roberts served as action editor for this article.

Author Contributions

L. D. Brumley and S. R. Jaffee conceived and designed the study. L. D. Brumley and M. A. Russell analyzed the data. All the authors interpreted the data. L. D. Brumley drafted the manuscript, and S. R. Jaffee provided critical revisions. All authors approved the final version of the manuscript for submission.

Acknowledgments

This research used data from The National Longitudinal Study of Adolescent to Adult Health (Add Health), a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill. Special acknowledgment is given to Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design of the Add Health study.

Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

Funding

The National Longitudinal Study of Adolescent to Adult Health was funded by Grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. No direct support was received from Grant P01-HD31921 for the analysis reported in this article.

Open Practices

The National Longitudinal Study of Adolescent to Adult Health data files used for the present study are available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). The design and analysis plans for the present study were not preregistered.

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