



Contents lists available at ScienceDirect

## Journal of Experimental Social Psychology

journal homepage: [www.elsevier.com/locate/jesp](http://www.elsevier.com/locate/jesp)

Case Report



## Perceptions of socioeconomic mobility influence academic persistence among low socioeconomic status students<sup>☆</sup>

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## ARTICLE INFO

## Keywords:

Socioeconomic mobility  
Socioeconomic status  
Academic persistence

## ABSTRACT

Despite facing daunting odds of academic success compared with their more socioeconomically advantaged peers, many students from low socioeconomic status (SES) backgrounds maintain high levels of academic motivation and persist in the face of difficulty. We propose that for these students, academic persistence may hinge on their perceptions of socioeconomic mobility, or their general beliefs regarding whether or not socioeconomic mobility—a powerful academic motivator—can occur in their society. Specifically, low-SES students' desire to persist on a primary path to mobility (i.e., school) should remain strong if they believe that socioeconomic mobility can occur in their society. By contrast, those who believe that socioeconomic mobility generally does not occur should be less motivated to persist academically. One correlational and two experimental studies provide support for this hypothesis among low (but not high) SES high school and university students. Implications for future intervention efforts are discussed.

Across all levels of education, students from family backgrounds with fewer financial resources face daunting odds of academic success compared with their more socioeconomically advantaged peers (Johnson, Richeson, & Finkel, 2011; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Phinney & Haas, 2003; Sirin, 2004). Despite these challenges, many students from low socioeconomic status (SES) backgrounds maintain high levels of academic motivation and persist in the face of academic difficulty—tendencies that can ultimately contribute positively to students' academic outcomes (see Oyserman, 2013). In exploring the numerous factors that can be conducive to low-SES students' academic resilience, prior research has found that one key psychological contributor is the perception that school is connected to reaching a desirable future, characterized by stable employment and a respectable income. In survey research of over 141,000 incoming university students, for example, those from low-SES backgrounds

emphasized the ability to improve their earning power as a critical motive underlying their decision to pursue higher education (CIRP, 2015). Furthermore, in a field experiment, low-SES middle school students were more motivated to complete current school tasks if they were made aware of the strong positive correlation between education and income than if they were made aware of routes to high income that are not directly related to education (Destin & Oyserman, 2010). Ultimately, then, this motivational pathway may rest on an important but unexplored broader assumption about society at-large: the perception of socioeconomic mobility, or the general belief that socioeconomic mobility can occur.

In the current research, we examine whether low-SES students' perceptions of socioeconomic mobility predict how they respond to experiences of academic difficulty. We build on established social-psychological theories of identity and motivation that explain how

<sup>☆</sup> Portions of this research were submitted by Alexander S. Browman to Northwestern University in partial fulfillment of the degree of Doctor of Philosophy, and were presented at the 2016 Annual Meeting of the Society for Personality and Social Psychology (SPSP) in San Diego, California; at the 2016 Annual Meeting of the Midwestern Psychological Association in Chicago, Illinois; and at the 2017 Biennial Meeting of the Society for Research in Child Development in Austin, Texas. This research was supported by grants awarded to Alexander S. Browman by the Society for the Psychological Study of Social Issues and The Graduate School at Northwestern University. Alexander S. Browman was supported by fellowships from the Fonds de recherche du Québec – société et culture and the Social Sciences and Humanities Research Council of Canada, Kathleen L. Carswell was supported by a fellowship from the Social Sciences and Humanities Research Council of Canada, and Ryan C. Svoboda was supported by a fellowship from the Institute of Education Sciences. The authors thank Wendi Gardner, Eli Finkel, Daniel Molden, and Galen Bodenhausen for their helpful comments.

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students' thoughts about the future influence academic persistence (Markus & Nurius, 1986; Oyserman, Bybee, & Terry, 2006; Smith & Oyserman, 2015). Specifically, students are motivated to persist during difficult academic experiences when school feels connected or congruent with their future identities, or the futures they envision for themselves (Oyserman, 2007; Oyserman & Destin, 2010). However, the extent to which school feels congruent with a student's future identity—and their corresponding tendency to persist academically—is dynamic, meaning that it shifts from moment to moment depending upon cues available in the salient context. In one experiment, for example, university students whose successful future identities were salient were more likely to perceive experiences of academic difficulty as a signal that their schoolwork warranted persistence if the university felt congruent with success rather than if the university felt like a place where failure was likely (Oyserman, Destin, & Novin, 2015). Building on this framework, we propose that low-SES students' perceptions of socioeconomic mobility reflect an overarching and powerful but as-yet unexplored contextual cue that influences their psychological inclination to persist when faced with academic difficulty. Specifically, because educational attainment is frequently touted as the primary pathway to future socioeconomic success (Bowen, Kurzweil, & Tobin, 2006; Rosenbaum, 2001), low-SES students who believe that socioeconomic mobility generally does not occur in their society should be less motivated to persist academically. By contrast, if low-SES students believe that socioeconomic mobility can occur, their desire to persist on the primary path to mobility (i.e., school) should remain strong.

Contextual cues regarding socioeconomic mobility are ever-present in society and mixed in their messages. On one hand, the idea that people can experience socioeconomic mobility is strongly inscribed into the very ethos of American life in the form of the American dream (McNamee & Miller, 2009)—a belief that has long been heavily propagated in mass media and politics (Foster, 2005; Ghosh, 2013) and is recognized by many low-SES individuals (Carter-Black, 2001; López, 2001).<sup>1</sup> By contrast, record high levels of national and global economic turmoil have had negative effects on youth and young adults' perceptions of their potential economic futures (Chambers, Swan, & Heesacker, 2015; Silvia, Quinlan, & Seydl, 2011). In 1998, for example, 65% of young working American adults were very or extremely confident that they could find another job if they lost or left their current job. In 2009, however, this figure plummeted to just 25% (Pew Research Center, 2012). In addition, youth who grow up in low-SES contexts are commonly exposed to role models who have been unsuccessful at improving their socioeconomic standing over the course of their lives, which can make socioeconomic mobility seem unlikely (Oyserman et al., 2006; Roderick, 2003; Thomas, Townsend, & Belgrave, 2003). Because youth and young adults are therefore likely to be familiar with cues that both support and erode the belief that socioeconomic mobility can occur, we examine the implications of their perceptions of socioeconomic mobility for academic persistence as both a chronic individual difference variable and as an experimentally cued situational variable.

In three studies, we examine the consequences of perceptions of socioeconomic mobility for low-SES students' persistence during experiences of academic difficulty. Study 1 provided an initial correlational examination of this relationship in a ubiquitously low-SES student population. Studies 2 and 3 then aimed to provide causal evidence for this relationship by manipulating students' perceptions of socioeconomic mobility and examining the direct consequences for low-SES students' self-reported and behavioral tendencies to persist on

difficult academic tasks. In addition, the designs of Studies 1 and 3 also provided opportunities to collect exploratory data regarding academic performance (i.e., official GPAs); however, we note that the aim of these studies was to provide simple proofs of concept and thus they were not intended to have long-term effects on performance.

Because people's thoughts about mobility tend to center on the prospect of moving up (versus moving down) the socioeconomic ladder (Davidai & Gilovich, 2015; Kraus & Tan, 2015), the prospect of socioeconomic mobility should be more consequential for those at the lower end of the socioeconomic ladder than for those at the upper end. As such, we hypothesized that academic persistence among lower-SES students would be more contingent on their beliefs about whether or not socioeconomic mobility can occur than among their higher-SES counterparts. In other words, we predicted that when more socioeconomically diverse populations were examined (Studies 2 and 3), the links between students' perceptions of socioeconomic mobility and their academic persistence would be moderated by SES (perceptions of socioeconomic mobility  $\times$  SES interaction), with simple effects of mobility beliefs emerging among lower (but not higher) SES students. In addition, because our hypotheses center on students' reactions to academic difficulty, we examine two educational levels at which experiences of academic difficulty and socioeconomic achievement gaps are especially prominent: high school (e.g., Reyes, Gillock, Kobus, & Sanchez, 2000) and university (e.g., National Center for Education Statistics, 2010). We report all measures, manipulations, and exclusions associated with these studies, which represent all of the data we have collected to date on the associations of perceptions of socioeconomic mobility with academic persistence. All materials, data, and analytic syntax relevant to present studies can be found either in the supplementary materials or at <https://github.com/abrowman/psm-jesp2017>. Analyses were not conducted prior to collection of the full samples in each study.

## 1. Study 1

Study 1 provides an initial examination of the relationship between low-SES students' perceptions of socioeconomic mobility and their inclinations to persist when faced with academic difficulty. In addition, the sample examined in this study has several important characteristics for the present framework. Specifically, the school district examined was one with predominantly low achievement rates, and the student body of the school we focused on came from almost ubiquitously minority (99.1% Black, 0.9% Hispanic) and low-SES backgrounds (98.4% of students were either eligible for free or reduced-price lunches, lived in substitute care, or came from families that receive public aid). This is therefore a critical population in which to test our hypotheses. Finally, as a supplementary analysis, Study 1 also employed a longitudinal design to examine the potential links between low-SES students' perceptions of mobility and inclinations to persist at the beginning of an academic quarter and their official grades at the end of the quarter.

### 1.1. Method

Participants were 9th–11th grade, low-SES students from a small public high school in a major American metropolitan area. Students completed the study as part of a larger online study during science class about 2 weeks into the academic quarter. The larger study centered on students' interest in science, technology, engineering, and mathematics and included four conditions that did not influence our variables of interest (see supplementary materials). Because high school schedules are very restrictive, sample size was determined by the number of consented and assenting students who completed the study on a single day pre-arranged with school staff. Our final sample consisted of 200 students (112 male, 85 female, 3 undisclosed), and no data were excluded.

<sup>1</sup> While the goal of reaching a future characterized by stable employment and a respectable income may be seen as an extrinsic and self-focused aspiration (Deci & Ryan, 1987; Kasser & Ryan, 1993), in the case of many low-SES students, such goals are in fact adopted for intrinsic and communal reasons—for example, helping out their families and giving back to their communities (Harackiewicz et al., 2014; Somers & Cofer, 1997; Stephens et al., 2012; Ziskin, Fischer, Torres, Pellicciotti, & Player-Sanders, 2014).

### 1.1.1. Assessing perceptions of socioeconomic mobility

Students' perceptions of whether socioeconomic mobility generally can or cannot occur were assessed using a six-item scale that we developed. Scale items consisted of three strong mobility belief items (e.g., “No matter who you are, you can significantly change your status a lot”) and three reverse-scored weak mobility belief items (e.g., “You can do things differently, but you can't really change your status in society”), and participants responded using a 1–7 scale ranging from “strongly disagree” to “strongly agree” ( $M = 4.92$ ,  $SD = 0.98$ ,  $\alpha = 0.69$ ). See the supplementary materials for scale construction studies.

### 1.1.2. Assessing students' psychological inclination to persist academically

To capture students' psychological inclinations to persist when faced with academic difficulty, participants completed a four-item measure, culled from prior research, examining the degree to which students perceive the normative experience of encountering difficulty in school as a signal that their schoolwork is not worth persisting on (Oyserman et al., 2015). Items included “When I feel stuck on a school task, it's a sign that my effort is better spent elsewhere,” and participants responded using a 1–7 scale ranging from “strongly disagree” to “strongly agree.” Responses were then reverse-scored, such that students with lower scores were less inclined to persist when faced with academic difficulty ( $M = 3.98$ ,  $SD = 1.47$ ,  $\alpha = 0.87$ ).

### 1.1.3. Assessing academic performance

At the end of the academic quarter—about 7 weeks after the in-class sessions—students' official cumulative GPAs were collected from the school administration ( $M = 2.19$ ,  $SD = 0.95$ ).

### 1.1.4. Control variable

To examine the contributions of perceptions of socioeconomic mobility above and beyond those of established social-psychological predictors of academic persistence and performance, we also measured students' lay theories of intelligence (Yeager & Dweck, 2012), which had a small but significant relationship with perceptions of socioeconomic mobility in our scale construction study (see supplementary materials). The six-item measure included, “You can always greatly change how intelligent you are” (see Dweck, 1999), and responses were given using a 1–7 scale, ranging from “strongly disagree” to “strongly agree” ( $M = 4.50$ ,  $SD = 0.96$ ,  $\alpha = 0.68$ ).<sup>2</sup>

## 1.2. Results

The results are displayed in Table 1. Supporting our main hypothesis, a significant positive correlation emerged between students' perceptions of mobility and their inclinations to persist academically. In other words, low-SES students with stronger beliefs in socioeconomic mobility reported greater psychological inclinations to persist when faced with academic difficulty than those with weaker beliefs in mobility. These results held when controlling for lay theories of intelligence.

In addition, secondary analyses revealed that both perceptions of mobility and inclinations to persist academically were significantly positively correlated with students' GPAs. In other words, low-SES students with stronger beliefs in socioeconomic mobility and those with stronger inclinations to persist when faced with academic difficulty at the beginning of the academic quarter earned higher GPAs at the end of the academic quarter than those with weaker beliefs in socioeconomic mobility or inclinations to persist.<sup>3</sup> However, no potentially causal

<sup>2</sup> A complete list of all the variables assessed in the larger datasets used in Studies 1 and 3 (which were not relevant to the present hypotheses) can be found in the supplementary material.

<sup>3</sup> An additional study (see supplementary materials) replicates this correlation relationship between perceptions of socioeconomic mobility and academic performance among low-SES students.

**Table 1**

Bivariate correlations (below the diagonal) and partial correlations controlling for lay theories of intelligence (above the diagonal) in Study 1.

	(1)	(2)	(3)
(1). Perceptions of socioeconomic mobility	–	0.17* [0.03, 0.31]	0.17* [0.03, 0.31]
(2). Academic persistence	0.33*** [0.19, 0.45]	–	0.14† [0.00, 0.28]
(3). Academic performance	0.18* [0.04, 0.31]	0.14* [0.002, 0.28]	–
(4). Lay theories of intelligence	0.43*** [0.30, 0.54]	0.43*** [0.30, 0.54]	0.06 [–0.08, 0.20]

Square brackets denote 95% confidence intervals.

\*\*\*  $p < 0.001$ .

\*  $p < 0.05$ .

†  $p = 0.052$ .

pathways emerged between these variables, as inclinations to persist did not mediate the relationship between perceptions of socioeconomic mobility and quarter-end-GPAs,  $b = 0.03$  [–0.02, 0.09],  $p = 0.252$  (test of mediation with 5000 bootstrapped samples; Preacher & Hayes, 2008).<sup>4</sup>

## 2. Study 2

Study 1 thus provided evidence of a relationship between low-SES students' perceptions of socioeconomic mobility and their inclinations to persist when faced with academic difficulty. Of course, Study 1 was correlational in nature and therefore could neither establish the direction of causation between our variables of interest nor determine whether students' perceptions of socioeconomic mobility and corresponding tendency to persist in school could be situationally shifted, as our dynamic identity framework predicts (Oyserman, 2013; Oyserman & Destin, 2010). In Study 2, we therefore manipulated students' momentary perceptions of socioeconomic mobility and subsequently administered a persistence-based academic task in order to determine whether these beliefs can be situationally altered and to examine the immediate causal implications of these beliefs for academic persistence among low-SES students. In addition, extending Study 1's focus on objectively low-SES students, both Studies 2 and 3 examined these effects among students who were relatively low and high in SES in more socioeconomically diverse samples.

### 2.1. Method

Participants in Study 2 were 102 undergraduate students (58 male, 44 female) enrolled at a diverse range of colleges and universities in the United States who completed the study on Amazon's Mechanical Turk ([www.mturk.com](http://www.mturk.com)). Forty-nine additional responses were excluded from our analyses: 34 from participants who did not identify as undergraduate students; 13 from participants who failed at least one attention check (see supplementary materials for details); and 2 from participants who began the study twice. Following an a priori guideline of 50 participants per condition (Simmons, Nelson, & Simonsohn, 2013), recruitment was terminated soon after 100 usable data points had been collected.

#### 2.1.1. Manipulating perceptions of socioeconomic mobility

Students' momentary perceptions of socioeconomic mobility were manipulated using a forced-agreement paradigm (Petrocelli, Martin, & Li, 2010). Specifically, participants were randomly assigned

<sup>4</sup> For all studies where applicable, the supplementary materials provide exploratory analyses testing the potential moderating effects of race and gender.

to respond to four scale items, one at a time, that supported either a weak ( $N = 49$ ) or strong belief in socioeconomic mobility in general ( $N = 53$ ) using a 6-point forced-agreement scale, ranging from “slightly agree” to “strongly agree.” All items were based on our perceptions of socioeconomic mobility scale discussed in Study 1. A manipulation check using additional items from our scale confirmed that participants in the strong mobility condition had significantly higher mobility belief scores ( $M = 5.17$ ,  $SD = 1.09$ ) following manipulation than those in the weak mobility condition ( $M = 4.56$ ,  $SD = 1.35$ ),  $t(99) = 2.51$ ,  $p = 0.014$ ,  $d = 0.50$ .

### 2.1.2. Assessing academic persistence

We examined the immediate effects of the manipulation on students' academic persistence by having them complete a common persistence-based academic task: anagrams (Nussbaum & Steele, 2007; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012). Specifically, participants were told that they would be completing an academic task that has been used with university students in the past. They were then told to unscramble seven letters to form as many words as possible (L C R A E K G; Clarkson, Hirt, Jia, & Alexander, 2010; Egan, Clarkson, & Hirt, 2015). All participants were forced to work on this task for a fixed amount of time (3 min). Scores on this task were therefore contingent on sustained meaningful persistence, as all participants had an equal amount of time in which they could either persist and work to provide high quality responses (i.e., struggle through multiple failed attempts to recombine letters until successful; Apfelbaum, Stephens, & Reagans, 2016; Baumeister, Bratslavsky, Muraven, & Tice, 1998) or disengage and provide low quality responses. To capture meaningful persistence on this task, we divided each participant's total number of correct responses by their total number of attempts (Clarkson et al., 2010; Vohs et al., 2008) and administered a logarithmic transformation to correct for skew before conducting analyses (Ratcliff, 1993).

### 2.1.3. Assessing SES

As in prior research on SES and academic outcomes (Browman & Destin, 2016; Johnson et al., 2011; Rheinschmidt & Mendoza-Denton, 2014), SES was operationalized as family income. Specifically, participants indicated their family's household income from a list of nine categories used in prior research: (1) \$25,000 or less, (2) \$25,001–\$40,000, (3) \$40,001–\$70,000, (4) \$70,001–\$90,000, (5) \$90,001–\$120,000, (6) \$120,001–\$150,000, (7) \$150,001–\$200,000, (8) \$200,001–\$300,000, and (9) \$300,001 or more ( $M = 3.30$ ,  $SD = 1.98$ ; Browman & Destin, 2016). There were no between-condition differences in SES (weak mobility belief condition:  $M = 3.37$ ,  $SD = 2.19$ ; strong mobility belief condition:  $M = 3.25$ ,  $SD = 1.79$ ),  $t(100) = 0.31$ ,  $p = 0.757$ .<sup>5</sup>

### 2.1.4. Control variable

Lay theories of intelligence were assessed with three items from the scale used in Study 1. Responses were given using a 1–7 scale, ranging from “strongly disagree” to “strongly agree” ( $M = 4.38$ ,  $SD = 1.44$ ,  $\alpha = 0.88$ ). The manipulation procedures did not significantly influence students' lay theories of intelligence (weak mobility condition:  $M = 4.16$ ,  $SD = 1.49$ ; strong mobility condition:  $M = 4.58$ ,

<sup>5</sup> While SES is a multidimensional construct, we focused on income because it provides a direct assessment of an individual's ability to access to valued material resources (e.g., healthy food, safe neighborhoods; see Diemer et al., 2013; Kraus & Stephens, 2012) and therefore represents a valuable index of how motivating the prospect of socioeconomic mobility should be for them. In addition, income has emerged as an important SES index in prior psychological research on academic outcomes (e.g., Johnson et al., 2011; Rheinschmidt & Mendoza-Denton, 2014) and large representative studies find that income is often highly correlated with other objective dimensions of SES, including education and occupational prestige (e.g., Singh-Manoux, Adler, & Marmot, 2003; see also Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012). Finally, following best-practice recommendations (Kraus & Stephens, 2012), students' subjective SES was also assessed. See the supplementary materials for details and analyses.

$SD = 1.38$ ),  $t(100) = -1.49$ ,  $p = 0.140$ .

## 2.2. Results

To test how manipulating perceptions of socioeconomic mobility influenced the academic persistence of lower- and higher-SES students, anagram scores were regressed on condition (with the weak and strong mobility beliefs conditions coded  $-1$  and  $+1$ , respectively), SES (continuous and mean-centered), and their interaction. A significant  $SES \times$  condition interaction predicting anagram scores emerged, and this effect was driven by significant positive effects of condition among lower-SES students (i.e., simple effect of condition assessed at  $-1$   $SD$  of SES; see Table 2 and Fig. 1). In other words, lower-SES students who were led to hold stronger perceptions of socioeconomic mobility displayed significantly greater persistence than those led to hold weaker such perceptions. There was no significant effect of condition among higher-SES students (i.e., simple effect of condition assessed at  $+1$   $SD$  of SES), and all results held when lay theories of intelligence were included as a control variable (see Table 2). Study 2 therefore confirmed that perceptions of socioeconomic mobility have immediate causal implications for the academic persistence of relatively low (but not high) SES students.

## 3. Study 3

The primary goal of Study 3 was to conceptually replicate Study 2. As such, we again manipulated lower- and higher-SES students' perceptions of socioeconomic mobility and examined the influence on their subsequent inclinations to persist when faced with academic difficulty. In addition, we also extended Study 2 in three ways. First, Study 3 tested this causal pathway in a real-world academic setting: a socioeconomically and racially diverse high school. Second, to isolate whether strengthening or weakening perceptions of socioeconomic mobility has a greater influence on academic persistence, Study 3 also included a control condition. Finally, to complement our exploratory analyses in Study 1, official grades were collected at the end of the school year.

### 3.1. Method

Participants were 9th-grade students from a large, diverse high school just outside of a major American metropolitan area. Forty-four percent of students at the school were eligible for free or reduced lunch. Students completed the study as part of a larger online study during a study hall period about 1 month into the school year. Again, sample size was determined by the number of consented and assenting students who completed the study on a single day pre-arranged with school staff. Our final sample consisted of 170 students (93 male, 76 female, 1 non-binary). An additional 32 responses were excluded because we could not obtain administrative data (i.e., SES and official grades) for those students.

#### 3.1.1. Manipulating perceptions of socioeconomic mobility

Near the beginning of the school year, participants were randomly assigned to one of three conditions. Participants in the weak ( $N = 57$ ) and strong mobility beliefs conditions ( $N = 55$ ) were presented with a figure adapted from a report on socioeconomic mobility in the United States (The Pew Charitable Trusts, 2012) that depicted either a very low level of socioeconomic mobility or a much greater level. To ensure that participants understood the manipulation materials, in both conditions, participants were required to answer two comprehension questions correctly before proceeding to the next page of the study. Participants in the control condition ( $N = 58$ ) did not view a figure.

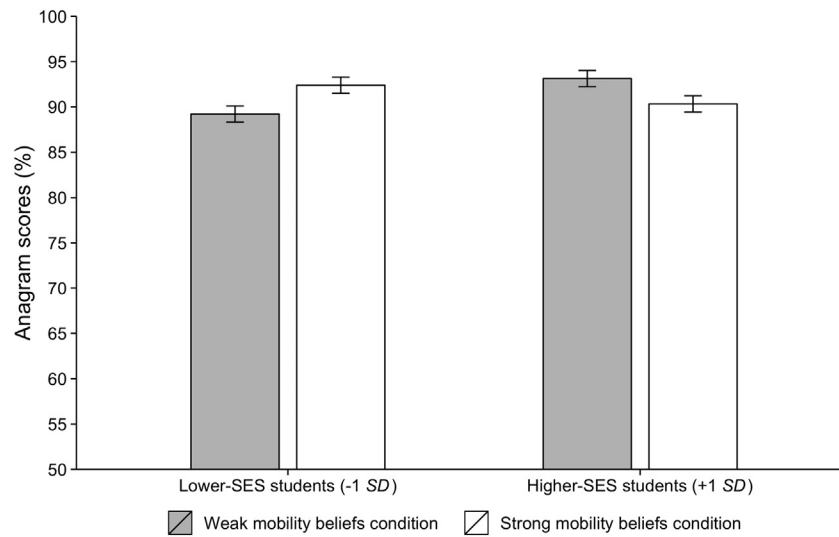
#### 3.1.2. Assessing inclination to persist academically

To assess students' post-manipulation inclinations to persist when

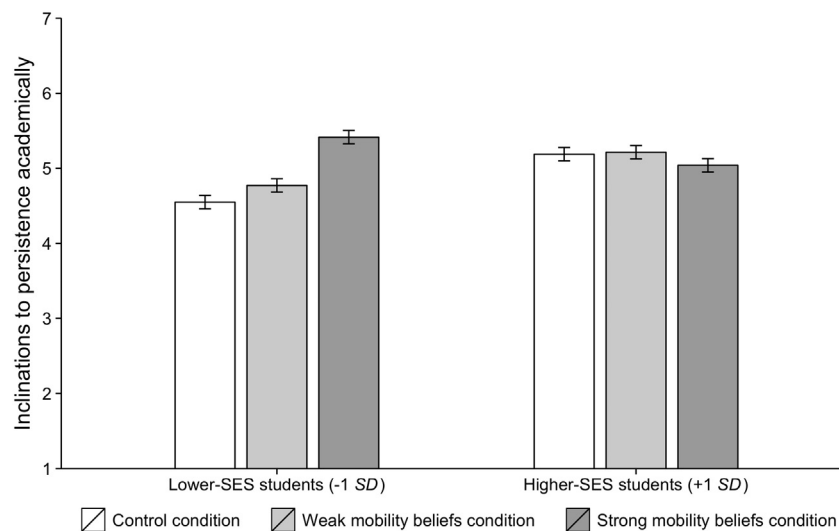
**Table 2**

Overall and simple effects of regressing academic persistence on condition (primed weak (–1) or strong (+1) perceptions of socioeconomic mobility), SES, and their interaction, and complementary analyses including lay theories of intelligence as a control variable (all mean-centered; Study 2).

	Without control variable				With control variable			
	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>
Condition	0.05 [–0.05, 0.14]	0.96	98	0.342	0.04 [–0.06, 0.13]	0.75	96	0.453
SES	0.02 [–0.03, 0.07]	0.71	98	0.478	0.02 [–0.03, 0.07]	0.98	96	0.330
Condition × SES	–0.06 [–0.11, –0.02]	–2.626	98	0.010	–0.06 [–0.11, –0.02]	–2.633	96	0.0099
Lay theories of intelligence	$\beta_{\text{interaction}} = -0.26$				$\beta_{\text{interaction}} = -0.26$			
Lay theories of intelligence × SES					0.06 [–0.01, 0.13]	1.66	96	0.099
Simple effect of condition among lower-SES students (–1 SD)	0.17 [0.04, 0.31]	2.55	98	0.012	–0.01 [–0.04, 0.02]	–0.58	96	0.560
Simple effect of condition among higher-SES students (+1 SD)	–0.08 [–0.22, 0.05]	–1.20	98	0.233	0.16 [0.03, 0.30]	2.42	96	0.017
					–0.09 [–0.23, 0.05]	–1.33	96	0.187



**Fig. 1.** The relationship between condition and academic persistence (untransformed) among lower- and higher-SES students in Study 2. Points are plotted at ± 1 SD for SES, and error bars represent ± 1 SE of the mean of academic persistence (untransformed).



**Fig. 2.** The relationship between condition and academic persistence among lower and higher-SES students in Study 3. Points are plotted at ± 1 SD for SES, and error bars represent ± 1 SE of the mean of academic persistence.

faced with academic difficulty, participants completed a six-item version of the measure used in Study 2 (Oyserman et al., 2015). Participants responded using a 1–7 scale ranging from “strongly disagree” to “strongly agree,” and responses were again reverse-scored, such that students with lower scores were less inclined to persist when

faced with academic difficulty ( $M = 5.04, SD = 1.16, \alpha = 0.88$ ).

3.1.3. Assessing academic performance

At the end of the school year—7 months after they were exposed to the manipulation materials—participants’ official cumulative GPAs

**Table 3**

Interaction and simple effects of regressing inclinations to persist academically on condition (primed perceptions of socioeconomic mobility), SES (mean-centered), and their interaction (Study 3).

	Weak (0) vs. strong mobility (1)				Control (0) vs. strong mobility (1)				Control (0) vs. weak mobility (1)			
	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>
Condition × SES	−0.41 [−0.84, 0.03]	−1.85	164	0.066	−0.51 [−0.92, −0.09]	−2.43	164	0.016	−0.10 [−0.53, 0.34]	−0.45	164	0.657
Simple effect of condition on lower-SES students (−1 <i>SD</i> )	0.64 [0.03, 1.26]	2.07	164	0.040	0.86 [0.29, 1.44]	2.98	164	0.003	0.22 [−0.40, 0.85]	0.70	164	0.483
Simple effect of condition on higher-SES students (+1 <i>SD</i> )	−0.17 [−0.78, 0.43]	−0.57	164	0.573	−0.15 [−0.75, 0.46]	−0.48	164	0.632	0.03 [−0.56, 0.61]	0.09	164	0.930

were collected from the school administration ( $M = 3.62$ ,  $SD = 0.72$ ).

### 3.1.4. Assessing SES

Because students of this age cannot reliably report family household income (Diemer, Mistry, Wadsworth, López, & Reimers, 2013), we obtained participants' home addresses from the school administration and used the U.S. Census American FactFinder tool to determine their census block group's median income ( $M = \$87,179.35$ ,  $SD = \$40,855.37$ ). These summed incomes were then sorted into one of nine family household income categories used in Study 2 ( $M = 4.36$ ,  $SD = 1.73$ ). There were no between-condition differences in SES,  $F(2, 167) = 0.74$ ,  $p = 0.478$ .

## 3.2. Results

To test how strengthening, weakening, and not manipulating perceptions of socioeconomic mobility influenced academic persistence among lower- and higher-SES students, inclinations to persist when they experienced academic difficulty were regressed on condition, SES (continuous and mean-centered), and their interaction. The omnibus condition × SES interaction was significant,  $F(2, 164) = 3.27$ ,  $p = 0.041$  (see Fig. 2). As shown in Table 3, examining the various contrasts revealed significant and marginal condition × SES interactions between the control and strong mobility beliefs conditions and between the weak and strong mobility beliefs conditions, respectively, but not between control and weak mobility beliefs conditions. Breaking down these interactions revealed that lower-SES students (−1 *SD* in SES) in the strong mobility beliefs condition were significantly more inclined to persist when faced with academic difficulty than those in both the weak mobility beliefs and control conditions (see Table 3). Thus, compared to baseline (i.e., the control condition), only strengthening lower-SES students' perceptions of socioeconomic mobility had a notable effect on lower-SES students' inclinations to persist academically. By contrast, no between-condition differences in psychological inclinations to persist emerged among higher-SES students (+1 *SD* in SES; see Table 3), and no significant main effects of condition,  $F(2, 164) = 1.43$ ,  $p = 0.243$ , or SES,  $F(1, 165) = 1.77$ ,  $p = 0.185$ , emerged in predicting students' inclinations to persist. These results therefore replicate and extend Study 2 by demonstrating that compared to both weakening and not manipulating perceptions of socioeconomic mobility, strengthening these beliefs among low (but not high) SES students can enhance their psychological inclinations to persist when they encounter academic difficulty.

In addition, complementary secondary analyses were conducted to examine students' GPAs. However, neither condition,  $F(2, 164) = 0.27$ ,  $p = 0.762$ , SES,  $F(1, 165) = 2.17$ ,  $p = 0.143$ , nor their interaction,  $F(2, 164) = 1.04$ ,  $p = 0.355$ , significantly predict students' year-end GPAs. In other words, Study 3 did not replicate the direct relationship between perceptions of socioeconomic mobility and long-term academic performance found in Study 1. However, replicating a different result from Study 1, across conditions, the correlation between post-

manipulation inclinations to persist academically and year-end GPAs was significant and positive,  $r(168) = 0.34$ ,  $p < 0.001$ .

## 4. General discussion

Educational attainment is widely touted and recognized as the most effective means by which socioeconomic mobility can be achieved, and many financially disadvantaged students thereby draw academic perseverance from the belief that school will enable them to attain a desirable socioeconomic future (e.g., CIRP, 2015; Rosenbaum, 2001). The present studies extend our understanding of this motivational pathway by targeting perceptions of socioeconomic mobility—beliefs about whether socioeconomic mobility generally can or cannot occur—as important but unexplored assumptions with potential implications for the academic persistence of low-SES students. Specifically, these studies collectively demonstrate that perceptions of socioeconomic mobility have causal implications for these students' inclinations to persist during normative experiences of academic difficulty. Our findings therefore illuminate a novel pathway through which perceptions of the broader societal context can influence the academic tendencies of disadvantaged students.

Our results highlight the importance of believing that one can have a financially successful future for sustaining academic resilience. As discussed, the ability to reach financial stability is often a critical motive underlying low-SES students' decision to pursue higher education (e.g., CIRP, 2015; Destin & Oyserman, 2010). While theorists have proposed the importance of people's personal socioeconomic backgrounds in determining whether school feels congruent with desired future identities such as these (see Jury et al., 2017; Oyserman, 2013; Stephens, Brannon, Markus, & Nelson, 2015), our studies are the first to fully connect students' perceptions of the broad socioeconomic contexts they inhabit to their inclination to persist when faced with academic difficulty. In other words, consistent with an identity-based perspective on academic motivation (Oyserman, 2007; Oyserman & Destin, 2010), our results suggest that low-SES students' perceptions of socioeconomic mobility may be important to their academic resilience because this construal of the surrounding context dynamically influences the extent to which school feels congruent with their desired socioeconomic futures.

It is also important to note that our results emerged both among students who were objectively low-SES in society at large (Study 1) and those who were relatively low-SES in more socioeconomically diverse samples (Studies 2 and 3). As such, our findings among objectively low-SES students contribute to the growing recognition that subtle psychological factors can influence the academic outcomes of students from the most objectively disadvantaged backgrounds (Croizet & Claire, 1998; Harackiewicz et al., 2014; Rheinschmidt & Mendoza-Denton, 2014; Smeding, Darnon, Souchal, Toczek-Capelle, & Butera, 2013; Stephens, Hamedani, & Destin, 2014; Stephens et al., 2012). In addition, our results from the more socioeconomically diverse samples complement recent research demonstrating that even being from back-

grounds that might not be labeled as objectively low-SES in society at large but are relatively low in a given academic context can have negative consequences for students' academic outcomes (Browman & Destin, 2016; Johnson et al., 2011; Rheinschmidt & Mendoza-Denton, 2014).

The present research also highlights opportunities and suggestions for future intervention efforts and research. Foremost, while Study 3's manipulation effectively influenced academic persistence in a field setting, we caution against using this approach as a general intervention method. Like the rest of the studies we present, the results of Study 3 represent a proof of concept, supporting the general hypothesis that perceptions of socioeconomic mobility are a psychologically meaningful construct with regard to low-SES students' academic persistence. As such, while the results of Study 3 (and Study 2) suggest that encouraging low-SES students to hold strong mobility beliefs can enhance academic persistence, these specific manipulations were only designed to test this concept in a few specific student samples, not to instill long-lasting change across all student populations. We therefore echo Yeager and Walton's (2011) recommendation that practitioners should not simply use experimental materials such as these without considering whether they would convey the intended meaning—that attaining socioeconomic mobility is possible for them—to their targeted population of interest, which our specific manipulations may not provide for all students. Indeed, given that our simple belief strengthening manipulation did not influence long-term academic performance (Study 3), future research should aim to identify and test approaches that can help tie thoughts about mobility to students' own life opportunities in more impactful and enduring ways.

Finally, while no effects emerged among higher-SES students, future research should consider the potential influences of these students' beliefs regarding different types of mobility. While thoughts about mobility tend to center on the prospect of moving up the socioeconomic ladder (Davidai & Gilovich, 2015; Kraus & Tan, 2015), high-SES individuals could potentially be focused either on upward mobility (i.e., attaining an even higher place on the socioeconomic ladder) or on downward mobility (i.e., losing ground compared to where they currently stand socioeconomically). Being more concerned about moving down the socioeconomic ladder could make educational attainment seem more important for high-SES individuals, thereby enhancing academic persistence compared to those who are less concerned with downward mobility.

In summary, the present findings highlight perceptions of socioeconomic mobility as a powerful but as-yet overlooked psychological contributor to low-SES students' academic persistence, and demonstrate a novel, identity-based motivational pathway through which academic resilience may emerge.

## Open Practices

The studies in this article earned Open Materials and Open Data badges for transparent practices. Materials and data for these studies are available at <https://github.com/abrowman/psm-jesp2017>.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jesp.2017.03.006>.

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## Supplementary Materials

### Scale Construction Studies

To create a scale for assessing adult's perceptions of socioeconomic mobility, we adapted an 8-item scale that has been widely used in prior research on academically-relevant beliefs (Dweck, 1999) to focus on people's beliefs about whether or not socioeconomic mobility can occur:

1. People can do things differently, but their status in society can't really be changed. (reverse-scored)
2. Everyone, no matter who they are, can significantly change their status in society.
3. The status a person has in society is something basic about them, and it can't be changed very much. (reverse-scored)
4. People can substantially change their status in society.
5. No matter what status a person has in society at one point in their life, they can always change it a lot.
6. People can change even their most basic status markers.
7. Everyone is of a certain status in society, and there is not much that they can do to really change that. (reverse-scored)
8. As much as I hate to admit it, people can't really change where they stand in society at large. (reverse-scored)

To confirm that these items captured individuals' beliefs about *socioeconomic* mobility, 101 online workers<sup>1</sup> recruited from Amazon's Mechanical Turk ([www.mturk.com](http://www.mturk.com)) were asked to read all 8 scale items before indicating, in open-ended fashion, what the terms "status in society," "the status a person has in society," "where people stand in society at large," and "status markers" meant to them as they appear in the scale items. Participants overwhelmingly (83.2%) responded with at least one socioeconomic descriptor (e.g., income, wealth, job status, educational attainment, etc.) and were significantly more likely to describe these statements in socioeconomic terms than in non-socioeconomic terms,  $t(100) = 2.99, p = .004$ .

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<sup>1</sup> The total number of responses collected was 163. However, 38 of participants recruited did not complete the task, and the responses of 24 participants who did complete the task were excluded because they did not follow the task instructions.

The complete scale was also completed by an independent sample of 120 online workers (53 male, 67 female)<sup>2</sup> recruited from Amazon's Mechanical Turk. Participants responded using a 1-7 scale ranging from "strongly disagree" to "strongly agree," with higher scores indicating stronger socioeconomic mobility beliefs ( $M = 5.19$ ,  $SD = 1.11$ ,  $\alpha = .94$ ). To ensure that our scale assessed a different construct than has been examined in prior work on the effects of students' beliefs on academic outcomes (Yeager & Dweck, 2012), participants also completed two additional 8-item lay theories measures: a validated measure of lay theories of intelligence (e.g., "A person can change even their basic intelligence level considerably" and "People can learn new things, but they can't really change their basic intelligence" [reverse-scored];  $M = 3.93$ ,  $SD = 1.63$ ,  $\alpha = .98$ ; see Dweck, 1999), and a validated measure of lay theories of personality (e.g., "People can change even their most basic qualities" and "People can do things differently, but the important parts of who they are can't really be changed" [reverse-scored];  $M = 4.28$ ,  $SD = 1.40$ ,  $\alpha = .97$ ; see Dweck, 1999).

Participants' responses to the items from all three scales were subjected to a principal-components factor analysis with a promax rotation. Examination of the scree plot revealed three factors with eigenvalues of 10.89, 5.44, and 3.00, respectively. Factor 1 was populated by all eight socioeconomic mobility belief items, all of which loaded at .62 or higher. All eight lay theories of intelligence items, loading at .80 or higher, populated Factor 2, while Factor 3 consisted of all eight personality lay theory items, all loading at .82 or higher. In addition, only small-to-moderate correlations emerged between socioeconomic mobility beliefs and both lay theories of intelligence,  $r(117) = .25$ ,  $p = .006$ , and lay theories of personality,  $r(118) = .10$ ,  $p =$

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<sup>2</sup> The total number of participants recruited was 126. However, the data of 6 participants were removed for failing attention checks—specifically, for those who gave a response to at least 1 of 4 items marked "This item is here to screen out random responding; do not give a response to this item" that were interspersed among the 3 scales and had the same 7-point response scale (Oppenheimer et al., 2009).

.254. These results suggest that the socioeconomic mobility belief items formed a coherent scale and that the construct assessed by our scale is distinct from the lay theories of intelligence and lay theories of personality constructs explored in prior academic work.

### **Study 1: Additional Details**

#### **Participants**

The student body of the school investigated in Study 1 was 99.1% Black and .9% Hispanic, and participants in this study had a mean age of 15.9 years ( $SD = .98$ ).

#### **Conditions**

Students completed Study 1 as part of a larger online study designed to explore potential methods for enhancing interest in science, technology, engineering, and mathematics (STEM) in disadvantaged student populations. The study therefore included four conditions; however, discussions with participants, teachers, and research assistants present during completion of the study revealed that the students had difficulty understanding the graphical formats we used, and the materials were therefore ineffective. The aim of the central condition was to enhance students' interest in STEM courses by linking STEM education to desired socioeconomic futures. As such, participants in this condition were presented with a figure (Destin & Oyserman, 2010) depicting a step-wise increase in median earnings with the following levels of educational attainment: no high school degree, high school graduate, 4-year college degree, and 4-year math or science college degree. The remaining three conditions were included for comparison. To compare the effects of linking STEM educational attainment to socioeconomic success with the effects of linking educational attainment in general to socioeconomic success, participants in one comparison condition were presented with a figure depicting a step-wise increase in median earnings by general level of education, without distinguishing between STEM- and non-STEM

degrees (Destin & Oyserman, 2010). To compare the effects of linking STEM educational attainment to socioeconomic success with the effects of strengthening students' beliefs about socioeconomic mobility more generally, participants in a second comparison condition were presented with a figure adapted from a recent report on socioeconomic mobility in the United States (The Pew Charitable Trusts, 2012) that depicted a high level of socioeconomic mobility for low-income people. In the final (control) condition, no figures were presented. As discussed in the main text, no between-differences emerged with regard to our three variables of interest: perceptions of socioeconomic mobility,  $F(3, 195) = .17, p = .917$ , inclinations to persist academically,  $F(3, 189) = 1.03, p = .380$ , or official grades,  $F(3, 193) = .32, p = .814$ . Our main analyses (presented in the main text) were therefore conducted by collapsing across conditions.

### **Assessing Adolescents' Perceptions of Socioeconomic Mobility**

For this adolescent sample, perceptions of socioeconomic mobility were assessed using a version of our scale (see scale construction studies) that was modified in three ways. First, to clarify the wording of the items for these younger students, we included a prompt explaining that "status in society" referred to "how much money you and your family have, the kind of jobs you can have, and how you describe your place in society (lower class, middle class, or upper class)." Second, we shortened the questionnaire to six items. Third, the items were reworded to be self-focused. These modifications were made because we had previously found that our original scale posed comprehension issues for students of this age. The items used were as follows:

1. You have a certain status in society, and you really can't do much to change it. (reverse-scored)
2. Your status in society is something about you that you can't change very much. (reverse-scored)
3. You can do things differently, but you can't really change your status in society. (reverse-scored)
4. No matter who you are, you can significantly change your status a lot.
5. You can always greatly change your status in society.

6. No matter what your status is at one point in your life, you can always change it quite a bit.

### **Assessing Students' Psychological Inclinations to Persist Academically**

The following items were used to assess students' psychological inclinations to persist when faced with academic difficulty in Studies 1 (marked "S1") and 3 (marked "S3"). The items were culled from work by Oyserman, Destin, and Novin (Oyserman, Destin, & Novin, 2015; Smith & Oyserman, 2015):

1. When I feel stuck on a school task, it's a sign that my effort is better spent elsewhere.<sup>S1,S3</sup>
2. If working on a school task feels very difficult, that type of task may not be possible for me.<sup>S1,S3</sup>
3. Sometimes people work at things that just aren't meant for them. If a school task feels too difficult, I should move on to something else.<sup>S1,S3</sup>
4. I know that when working on a school task feels hard, that feeling means it's not for me.<sup>S3</sup>
5. Finding a school task really difficult tells me that I can't complete it successfully.<sup>S3</sup>
6. If a school task feels really difficult, it may not be possible for me.<sup>S1,S3</sup>

### **Assessing Lay Theories of Intelligence (Control Variable)**

The following items (culled from Dweck, 1999) were used to assess students' lay theories of intelligence in Studies 1 (marked "S1"), 2 (marked "S2"), and the supplementary study (marked "sup."):

1. Your intelligence is something about you that you can't change very much. (reverse-scored)<sup>S1</sup>
2. No matter how much intelligence you have, you can always change it quite a bit.<sup>S1</sup>
3. You can always greatly change how intelligent you are.<sup>S1</sup>
4. No matter who you are, you can significantly change your intelligence level.<sup>S1,S2,supp.</sup>
5. You can learn new things, but you can't really change your basic intelligence. (reverse-scored)<sup>S1,S2,supp.</sup>
6. You have a certain amount of intelligence, and you can't really do much to change it. (reverse-scored)<sup>S1,S2,supp.</sup>

### **Analyses with Gender**

We conducted exploratory analyses for gender (female coded as -1, male coded as +1). Low-SES female students ( $M = 2.35$ ,  $SD = .97$ ) earned higher GPAs than their male counterparts

( $M = 2.07$ ,  $SD = .92$ ),  $t(192) = 1.98$ ,  $p = .049$ , and as shown in Table S1, gender significantly moderated the effect of perceptions of socioeconomic mobility on GPA, such that the effect emerged among female students, but not among male students. Again, this exploratory finding was not replicated in our other studies and should be interpreted with caution. Gender did not significantly moderate either the effects of perceptions of socioeconomic mobility on academic persistence, or of academic persistence on GPA. In other words, these latter two effects were equally significant for both genders.

**Table S1.** Study 1 analyses controlling for gender.

<b>(a) Perceptions of socioeconomic mobility predicting academic persistence, controlling for gender</b>				
	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>
Socioeconomic mobility beliefs	.53 [.33, .73]	5.21	188	< .0001
Gender	.02 [-.17, .22]	.25	188	.802
Socioeconomic mobility beliefs × gender	.10 [-.11, .30]	.94	188	.349
	$\beta = .06$			
<b>(b) Perceptions of socioeconomic mobility predicting GPA, controlling for gender</b>				
Socioeconomic mobility beliefs	.18 [.04, .31]	2.58	190	.011
Gender	-.14 [-.27, -.01]	-2.06	190	.041
Socioeconomic mobility beliefs × gender	-.14 [-.28, .00]	-2.02	190	.045
	$\beta = -.14$			
Simple effect of socioeconomic mobility beliefs among female students	.31 [.12, .51]	3.21	190	.002
Simple effect of socioeconomic mobility beliefs among male students	.04 [-.15, .23]	.40	190	.693
<b>(c) Academic persistence predicting GPA, controlling for gender</b>				
Academic persistence	.10 [.01, .20]	2.20	185	.029
Gender	-.13 [-.27, .01]	-1.89	185	.060
Academic persistence × gender	-.06 [-.16, .03]	-1.32	185	.188
	$\beta = -.09$			

### Additional Variables

A complete list of all the variables assessed as part of the larger Study 1 protocol can be found in Appendix A. None of the variables besides those discussed in here and in the main text were relevant to or analyzed to test the present hypotheses.

### **Supplementary Study**

Complementing the exploratory findings in Study 1, an additional study that we conducted provided further correlational evidence of a relationship between chronic perceptions of socioeconomic mobility and academic performance (i.e., GPAs).

#### **Method**

Participants were 117 undergraduate students from an elite private American university (57 male, 60 female) involved in a larger longitudinal study. Participants were 55.6% White, 23.9% Asian, 8.5% multi-racial, 5.1% Latino, 4.3% Black, 1.7% Indian, and 0.9% undisclosed; 24.8% freshmen, 51.3% sophomores, 16.2% juniors, and 7.7% seniors; and with a mean age of 19.8 years ( $SD = .94$ ). Participants were paid up to \$30 for their participation in the larger longitudinally study in which our measures of interest were included. Data from 5 non-undergraduates were also collected but excluded from the present analyses. The sample size was determined by the number of participants who had enrolled in the study during a six-day period pre-specified as part of the larger longitudinal design. Our measures of interest were completed in two online surveys administered about nine weeks apart, and analyses were not conducted prior to collection of the full sample.

**Assessing perceptions of socioeconomic mobility.** Students' perceptions of socioeconomic mobility were measured using the eight-item scale described in the scale construction studies. Participants responded using a 1-7 scale ranging from "strongly disagree" to "strongly agree" ( $M = 4.60$ ,  $SD = .78$ ,  $\alpha = .79$ ).

**Assessing academic performance.** Participants' uploaded their university transcripts, which provided their cumulative GPAs as of the end of their most recently completed academic quarter ( $M = 3.37$ ,  $SD = .52$ ).

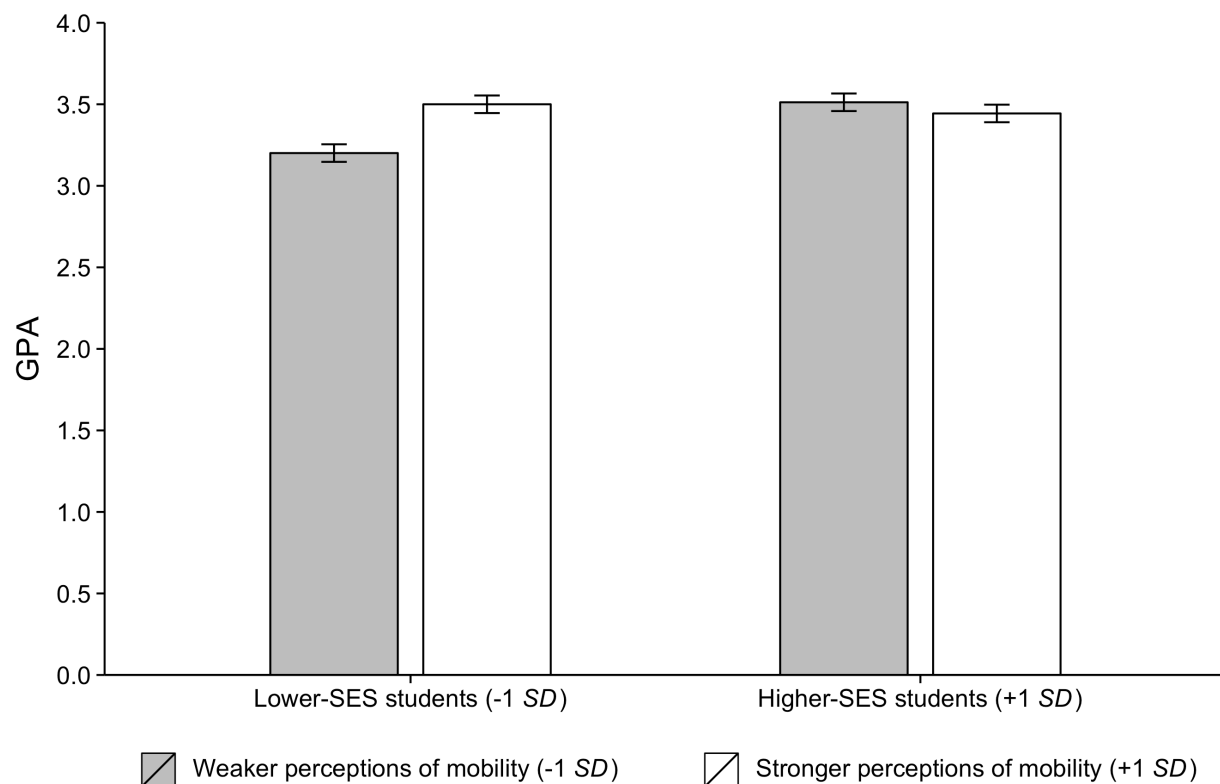
**Assessing SES.** Participants reported each of their parents' annual incomes, which were added together to determine the participants' family's total annual income. Because the range of incomes was extremely large and skewed (\$0 - \$1,000,000;  $M = \$190,626.21$ ,  $SD = \$183,878.61$ ) and in order to enhance consistency across studies, these summed incomes were sorted into one of the nine family household income categories used in Studies 2 and 3 ( $M = 5.83$ ,  $SD = 2.47$ ).

**Control variables.** To examine the contributions of perceptions of socioeconomic mobility above and beyond those of potentially related constructs and established social-psychological predictors of academic performance, we also measured two additional factors. The first was students' meritocratic beliefs—specifically, their Protestant work ethic beliefs (Furnham, 1984)—which might have captured some of the variance attributed to perceptions of socioeconomic mobility. Protestant work ethic was measured using a four-item scale that assessed participants' beliefs about the link between effort and success. Items included, “If I work hard enough, I can be whatever I want to be in life” (Eliezer, Townsend, Sawyer, Major, & Mendes, 2011; Levin, Sidanius, Rabinowitz, & Federico, 1998), and responses were given using a 1-7 scale ranging from “strongly disagree” to “strongly agree” ( $M = 3.37$ ,  $SD = 1.00$ ,  $\alpha = .74$ ). Second, we assessed students' lay theories of intelligence (Yeager & Dweck, 2012), which prior research has shown can be a strong predictor of academic performance (for review, see Yeager & Walton, 2012), and which had a small but significant relationship with perceptions of socioeconomic mobility in our scale construction study. Lay theories of intelligence were



assessed with three items used in Study 1. Responses were given using a 1-6 scale ranging from “strongly disagree” to “strongly agree” ( $M = 3.63$ ,  $SD = 1.14$ ,  $\alpha = .80$ ). Students’ protestant work ethic beliefs were significantly correlated with their perceptions of socioeconomic mobility,  $r(92) = .25$ ,  $p = .014$ , but lay theories of intelligence were not significantly correlated with either perceptions of socioeconomic mobility,  $r(92) = .04$ ,  $p = .700$ , or Protestant work ethic beliefs,  $r(95) = -.13$ ,  $p = .221$ .

## Results



**Fig. S1.**

The relationship between chronic perceptions of socioeconomic mobility and GPA among lower and higher-income students in Study 1. Points are plotted at  $-/+1 SD$  for perceptions of socioeconomic mobility and SES, and error bars represent  $-/+ 1 SE$  of the mean of GPA.

Students’ GPAs were regressed on their perceptions of mobility, SES, and their interaction (all continuous and mean-centered variables). The perceptions of socioeconomic mobility  $\times$  SES interaction term was marginally significant (see Table S2a and Fig. S1). Most

critically, this interaction was driven by a marginally significant positive relationship between perceptions of socioeconomic mobility and GPA among lower-SES students (i.e., simple slope of perceptions of mobility assessed at -1 *SD* of SES). Lower-SES students with a stronger belief in socioeconomic mobility thus had higher GPAs than those with weaker beliefs in socioeconomic mobility. There was no relationship between perceptions of socioeconomic mobility and the academic performance of higher-SES students (i.e., simple slope of perceptions of mobility assessed at +1 *SD* of SES). The patterns and significance of these results held or were strengthened when the control variables were included, and no significant interactions with the control variables emerged (see Table S2a). Analyses including subjective SES (measured as in Studies 2 and 3;  $M = 7.11$  out of 10,  $SD = 2.01$ ) were also similar but stronger in magnitude (see Table S2b). Subjective SES was highly positively correlated with both the raw objective SES values,  $r(87) = .56, p < .001$ , and the categorized values,  $r(87) = .66, p < .001$ . In summary, this supplementary study supported exploratory findings from Study 1, revealing a significant correlation between low (but not high) SES students' perceptions of socioeconomic mobility and their GPAs.

**Table S2.**

Overall and simple effects of regressing GPA on chronic perceptions of socioeconomic mobility, (a) income and (b) subjective SES, and their interactions, and complementary analyses including control variables (Study 1).

	Without control variables				With control variables			
	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>
<b>(a) Analyses with income</b>								
Socioeconomic mobility beliefs	.08 [-.07, .23]	1.11	74	.269	.12 [-.03, .28]	1.56	70	.123
SES	.02 [-.02, .07]	1.02	74	.312	.01 [-.03, .06]	.54	70	.594
Socioeconomic mobility beliefs × SES	-.05 [-.10, .01]	-1.67	74	.099	-.05 [-.10, .01]	-1.70	70	.094
	$\beta = -.19$				$\beta = -.20$			
Protestant work ethic beliefs					-.10 [-.23, .02]	-1.68	70	.097
Protestant work ethic beliefs × SES					.00 [-.05, .05]	.02	70	.987
Lay theories of intelligence					-.03 [-.14, .08]	-.56	70	.581
Lay theories of intelligence × SES					.03 [-.01, .07]	1.35	70	.181
Simple effect of socioeconomic mobility beliefs among lower-SES students (-1 <i>SD</i> )	.19 [-.01, .39]	1.93	74	.058	.24 [.02, .45]	2.22	70	.029
Simple effect of socioeconomic mobility	-.04 [-.26, .17]	-.42	74	.678	-.01 [-.22, .20]	-.11	70	.916

	Without control variables				With control variables			
	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>
beliefs among higher-SES students (+1 <i>SD</i> )								
<b>(b) Analyses with subjective SES</b>								
Socioeconomic mobility beliefs	.08 [-.06, .21]	1.15	84	.254	.10 [-.04, .24]	1.40	80	.166
SES	.06 [.00, .11]	2.06	84	.042	.05 [-.01, .11]	1.57	80	.121
Socioeconomic mobility beliefs × SES	-.11 [-.18, -.03]	-2.95	84	.004	-.10 [-.18, -.03]	-2.73	80	.008
	$\beta = -.30$				$\beta = -.28$			
Protestant work ethic beliefs					-.05 [-.17, .06]	-.93	80	.357
Protestant work ethic beliefs × SES					-.01 [-.06, .04]	-.40	80	.692
Lay theories of intelligence					-.04 [-.14, .05]	-.92	80	.362
Lay theories of intelligence × SES					.02 [-.04, .07]	.62	80	.536
Simple effect of socioeconomic mobility beliefs among lower-SES students (-1 <i>SD</i> )	.27 [.08, .46]	2.83	84	.006	.29 [.08, .49]	2.82	80	.006
Simple effect of socioeconomic mobility beliefs among higher-SES students (+1 <i>SD</i> )	-.15 [-.34, .05]	-1.47	84	.145	-.11 [-.32, .09]	-1.09	80	.277

## Study 2: Additional Details

### Participants

Participants in Study 2 were 9.8% freshmen, 29.4% sophomores, 28.4% juniors, and 32.4% seniors, and were paid \$0.60 on Amazon's Mechanical Turk for their participation. Due to a programming error, participants' age and race were not collected. Students retained in this study attended the following public ( $N = 62$ ) and private 4-year colleges and universities ( $N = 27$ ) and 2- and 3-year post-secondary institutions ( $N = 13$ ) in the United States:

Albright College ( $n = 1$ ), Ashland University ( $n = 1$ ), Ashworth College ( $n = 2$ ), Bakersfield College ( $n = 1$ ), Ball State University ( $n = 1$ ), Barton College ( $n = 1$ ), Baruch College ( $n = 1$ ), Berkshire Community College ( $n = 1$ ), Binghamton University ( $n = 1$ ), Boston University ( $n = 1$ ), Brandeis University ( $n = 1$ ), California State University—Bakersfield ( $n = 1$ ), California Baptist University ( $n = 1$ ), California Polytechnic University—Pomona ( $n = 1$ ), California State University—Northridge ( $n = 1$ ), California State University—San Bernardino ( $n = 1$ ), Central Michigan University ( $n = 1$ ), Chamberlain College of Nursing ( $n = 1$ ), Chicago State University ( $n = 1$ ), City University of New York ( $n = 1$ ), Clemson University ( $n = 1$ ), Columbia College Chicago ( $n = 1$ ), East Carolina University ( $n = 1$ ), Emory University ( $n = 2$ ), Everest College ( $n = 1$ ), Florida Community College ( $n = 1$ ), Florida International University ( $n = 2$ ), Folsom Lake College ( $n = 1$ ), Fordham University ( $n = 1$ ), Georgia Institute of Technology ( $n = 1$ ), Hamline University ( $n = 1$ ), Hunter College ( $n = 2$ ), Indiana University-Purdue University Indianapolis ( $n = 1$ ), Johnson & Wales University ( $n = 1$ ), Lee University ( $n = 1$ ), Linn Benton Community College ( $n = 1$ ), Mansfield University ( $n = 1$ ), Middlesex County College ( $n = 1$ ), Minnesota State University—Mankato ( $n = 1$ ), Modesto Junior College ( $n = 1$ ), Montclair State University ( $n = 1$ ), Mt. San Antonio College ( $n = 1$ ), New Mexico Highlands University ( $n = 1$ ), New Jersey Institute of Technology ( $n = 1$ ), Northeastern University ( $n = 2$ ), Northern Kentucky University ( $n = 1$ ), Ogeche Technical College ( $n = 1$ ), Peirce College ( $n = 1$ ), Pennsylvania State

University ( $n = 3$ ), Point Park University ( $n = 1$ ), Purdue University ( $n = 2$ ), Rensselaer Polytechnic Institute ( $n = 1$ ), Rochester Institute of Technology ( $n = 1$ ), Rutgers University ( $n = 1$ ), Salisbury University ( $n = 1$ ), Sam Houston State University ( $n = 1$ ), Santa Ana College ( $n = 1$ ), Southern New Hampshire University ( $n = 1$ ), Southeastern Oklahoma State University ( $n = 1$ ), Southwestern College ( $n = 1$ ), Stanford University ( $n = 1$ ), Suffolk County Community College ( $n = 1$ ), Tacoma Community College ( $n = 1$ ), Temple University ( $n = 1$ ), Ohio State University ( $n = 1$ ), University of Texas at Austin ( $n = 1$ ), University of California—Davis ( $n = 1$ ), University of California—Santa Barbara ( $n = 1$ ), University of Alaska—Anchorage ( $n = 1$ ), University of Arizona ( $n = 1$ ), University of Connecticut ( $n = 1$ ), University of Florida ( $n = 1$ ), University of Maine ( $n = 2$ ), University of Nebraska—Lincoln ( $n = 1$ ), University of New Mexico ( $n = 1$ ), University of Phoenix ( $n = 2$ ), University of Pittsburgh ( $n = 2$ ), University of Rochester ( $n = 1$ ), University of South Alabama ( $n = 1$ ), University of St. Francis ( $n = 1$ ), University of Texas at Dallas ( $n = 1$ ), University of Utah ( $n = 2$ ), University of Virginia ( $n = 2$ ), University of Washington ( $n = 1$ ), University of Wisconsin—Parkside ( $n = 1$ ), Virginia Commonwealth University ( $n = 1$ ), West Chester University ( $n = 1$ ), Winthrop University ( $n = 1$ ), and Wittenberg University ( $n = 1$ ).

### **Forced-Agreement Paradigm Manipulation Materials**

The following four items were used in the weak mobility condition:

1. People can do things differently, but their status in society can't really be changed.
2. The status a person has in society is something basic about them, and it can't be changed very much.
3. People cannot substantially change their status in society.
4. The status a person has in society at one point in their life is likely the same status that they will have at a latter point in their life.

The following four items were used in the strong mobility condition:

1. Just by doing a few things differently, people can greatly change their status in society.
2. The status a person has in society is something very flexible about them, and it can change a lot.
3. People can substantially change their status in society.
4. No matter what status a person has in society at one point in their life, they can always change it a lot.

In keeping with prior research, participants were provided with time to mentally justify their agreement by including 8-second delays between items, with a brief apology (“Our server is currently experiencing a delay, but should respond within 10 seconds. We appreciate your patience”) and the previously agreed-to item appearing on the screen as a subtle reminder of what they had just agreed to (Petrocelli, Martin, & Li, 2010).

### Manipulation Check

To assess the effectiveness of the manipulation procedure, participants in both conditions responded to two positive and two negative items from our socioeconomic mobility beliefs scale (#2, 6, 7, and 8 from the Scale Construction study). Responses were given using a 1-7 scale, ranging from “strongly disagree” to “strongly agree” ( $M = 4.88$ ,  $SD = 1.26$ ,  $\alpha = .88$ ). The manipulation was effective: participants in the strong mobility condition had significantly higher mobility belief scores ( $M = 5.17$ ,  $SD = 1.09$ ) than those in the weak mobility condition ( $M = 4.56$ ,  $SD = 1.35$ ),  $t(99) = -2.51$ ,  $p = .014$ ,  $d = .50$ . In addition, regressing post-manipulation perceptions of mobility on condition, SES, and their interaction (all mean-centered) revealed a non-significant main effect of SES,  $b = .08$  [-.04, .21],  $t(97) = 1.31$ ,  $p = .193$ , and a non-significant interaction term,  $b = .08$  [-.04, .20],  $t(97) = 1.30$ ,  $p = .198$ . In other words, both high- and low-SES students were similarly influenced the manipulation.

**Assessing academic persistence.** For the anagram task, participants were told that they would be completing an academic task that has been used with university students in the past. They were then told that they would be presented with seven letters and that their goal was to unscramble them to form as many real English words as possible, which had to be at least three letters long and could not include the same letter twice. Once they clicked over to the next screen, participants were presented with the seven letters (L C R A E K G; Clarkson, Hirt, Jia, & Alexander, 2010; Egan, Clarkson, & Hirt, 2015) and a large response box with instructions to separate their attempts with commas. In addition, this screen also included a visible countdown timer, as all participants were forced to work on the task for a fixed amount of time (3 minutes). To capture meaningful persistence on this task, we divided each participant’s total number of correct responses by their total number of attempts (Clarkson et al., 2010; Vohs et al., 2008).

### **Attention Checks**

In order to detect participants who did not follow instructions, as is often a risk in online studies (Crump, McDonnell, & Gureckis, 2013; J. K. Goodman, Cryder, & Cheema, 2013), two attention checks were included in the study—one amongst the manipulation check items and one amongst the lay theories of intelligence items. Because both attention checks appear amongst self-report scale items with Likert-style response options, these items read as “This item is here to screen out random responding; do not give a response to this item” and were presented with the same 1-7 scale, ranging from “strongly disagree” to “strongly agree,” as the scale items surrounding them. Accordingly, participants had the option to continue to the next page without answering this question—a response that would indicate that they had read the item (Oppenheimer, Meyvis, & Davidenko, 2009).

### **Analyses with Subjective SES**

In this socioeconomically diverse sample, we also conducted analyses with subjective SES, or students’ perceived socioeconomic ranking in society. Subjective SES was assessed using the MacArthur Scale of Subjective Social Status (Adler, Epel, Castellazzo, & Ickovics, 2000; Diemer, Mistry, Wadsworth, López, & Reimers, 2013). Specifically, participants were asked to indicate where they believed they stood in the United States (in terms of household income, job statuses, and levels of education) on a 10-runged ladder (Adler et al., 2000). Subjective SES ( $M = 4.80$ ,  $SD = 1.65$ ) was highly positively correlated with income,  $r(100) = .53$ ,  $p < .001$ . There were no significant between-condition differences in terms of subjective SES (weak mobility condition:  $M = 4.53$ ,  $SD = 1.75$ ; strong mobility condition:  $M = 5.06$ ,  $SD = 1.54$ ),  $t(100) = -1.62$ ,  $p = .109$ , and analyses including subjective SES were consistent with those that included income, except for an unexpected marginal negative effect of condition ( $-1 = \text{weak}$

mobility condition; 1 = strong mobility condition) among higher-SES students (see Table S3).

All main analysis results predicting anagram scores held when lay theories of intelligence were included as a control variable.

**Table S3.** Overall and simple effects of regressing anagram scores on condition (i.e., socioeconomic mobility beliefs), SES (income or subjective SES), and their interaction, and complementary analyses including lay theories of intelligence as a control variable (all mean-centered) in Study 2.

	Without control variable				With control variable			
	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>
Condition	.05 [-.05, .14]	.95	98	.345	.04 [-.05, .14]	.88	96	.383
SES	-.01 [-.07, .05]	-.41	98	.684	-.01 [-.07, .05]	-.28	96	.783
Condition × SES	-.10 [-.16, -.04]	-3.28	98	.001	-.09 [-.15, -.04]	-3.20	96	.002
	$\beta = -.32$				$\beta = -.30$			
Lay theories of intelligence					.04 [-.03, .10]	1.05	96	.296
Lay theories of intelligence × SES					.02 [-.01, .06]	1.32	96	.189
Simple effect of condition among lower-SES students (-1 <i>SD</i> )	.21 [.07, .34]	2.98	98	.004	.20 [.06, .34]	2.84	96	.006
Simple effect of condition among higher-SES students (+1 <i>SD</i> )	-.11 [-.25, .02]	-1.66	98	.099	-.11 [-.25, .02]	-1.66	96	.100

### Analyses with Gender

We conducted exploratory analyses for gender using the same coding scheme as in Study 1 (female coded as -1, male coded as +1). There were no significant differences in anagram scores by gender,  $t(100) = .52$ ,  $p = .604$ , and as shown in Table S4, and the condition × SES (income) effect was not moderated by gender. However, the condition × subjective SES effect was significantly moderated by gender, with significant positive and marginal negative simple effects of condition on lower and higher subjective SES students, respectively (noted in Table S3), emerging among male students, but not among female students. These exploratory findings should be interpreted with caution, however, as they were generally not replicated in our other samples and this study was not initially designed to investigate these higher-order (3-way) interactions with sufficient statistical power.

**Table S4.** Results of regressing anagram scores on socioeconomic mobility beliefs, SES, gender, and all 2- and 3-way interactions (all mean-centered) in Study 2.

	With income				With subjective SES			
	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CIs]	<i>t</i>	<i>df</i>	<i>p</i>
Condition	.05 [-.04, .15]	1.12	94	.265	.05 [-.04, .15]	1.07	94	.286
SES	.01 [-.04, .06]	.41	94	.686	-.02 [-.07, .04]	-.50	94	.616
Gender	-.02 [-.12, .08]	-.43	94	.668	.00 [-.10, .09]	-.04	94	.972
Condition × SES	-.06 [-.11, -.01]	-2.24	94	.027	-.10 [-.16, -.04]	-3.45	94	.001
Condition × gender	.05 [-.05, .14]	.94	94	.351	.06 [-.04, .15]	1.18	94	.239
Gender × SES	-.05 [-.10, .00]	-1.90	94	.060	-.03 [-.08, .03]	-.91	94	.365
3-way interaction	-.01 [-.06, .04]	-.52	94	.608	-.06 [-.12, -.01]	-2.25	94	.027
	$\beta = -.05$				$\beta = -.22$			
Simple effect of condition among female lower-SES students (-1 <i>SD</i> )	—	—	—	—	.05 [-.13, .24]	.57	94	.572
Simple effect of gender among female higher-SES students (+1 <i>SD</i> )	—	—	—	—	-.06 [-.25, .13]	-.67	94	.507
Simple effect of gender among male lower-SES students (-1 <i>SD</i> )	—	—	—	—	.38 [.18, .58]	3.85	94	.0002
Simple effect of gender among male higher-SES students (+1 <i>SD</i> )	—	—	—	—	-.17 [-.36, .02]	-1.74	94	.086

### Study 3: Additional Details

#### Participants

Participants in Study 3 were 55.3% White, 12.9% Black, 6.5% Asian, 3.5% Latino/a, 1.2% Middle-Eastern, and 20.6% Multi-racial, with a mean age of 14.1 years ( $SD = .32$ ).

#### Manipulating Perceptions of Socioeconomic Mobility

To manipulate socioeconomic mobility beliefs, participants in the weak mobility condition were presented with a figure adapted from a recent report on socioeconomic mobility in the United States (The Pew Charitable Trusts, 2012). Specifically, while the original figure depicted the mobility levels of Americans broken down by their childhood SES quintiles, the version presented in the low mobility condition included only the data from the highest and lowest quintiles, which depict a very low level of socioeconomic mobility. The figure also included the title, “Americans Are Likely to Stay at the Top or Bottom of the Income Ladder” (see Figure S2).

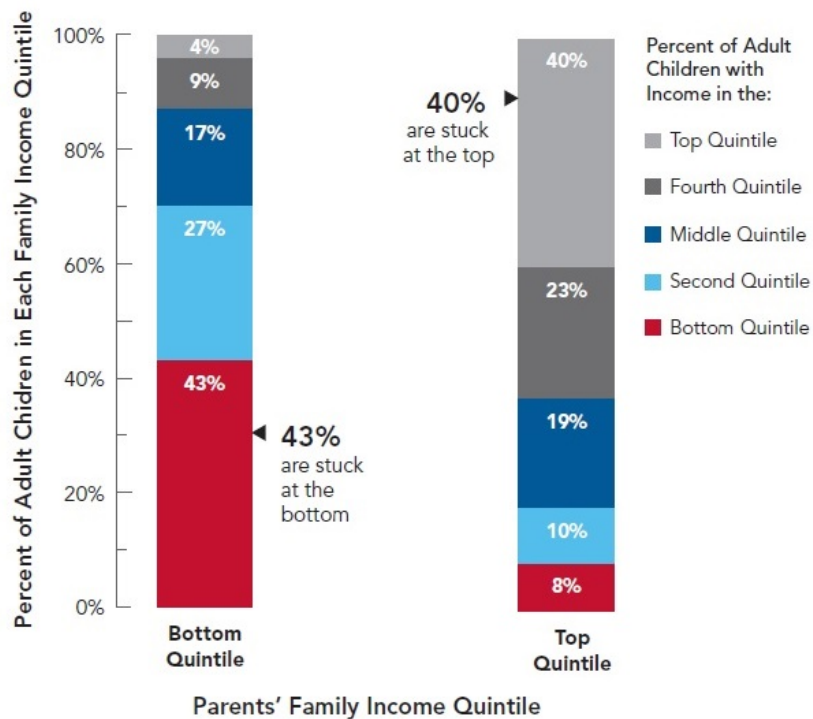
Participants assigned to the strong mobility condition were also presented with a figure adapted from the same report as that used in the weak mobility condition. The version used in the



high mobility condition, however, presented data from the middle three SES quintiles, which show a much greater level of socioeconomic mobility. The figure also included the title, “Americans Are Likely to Move Up the Income Ladder” (see Figure S3).

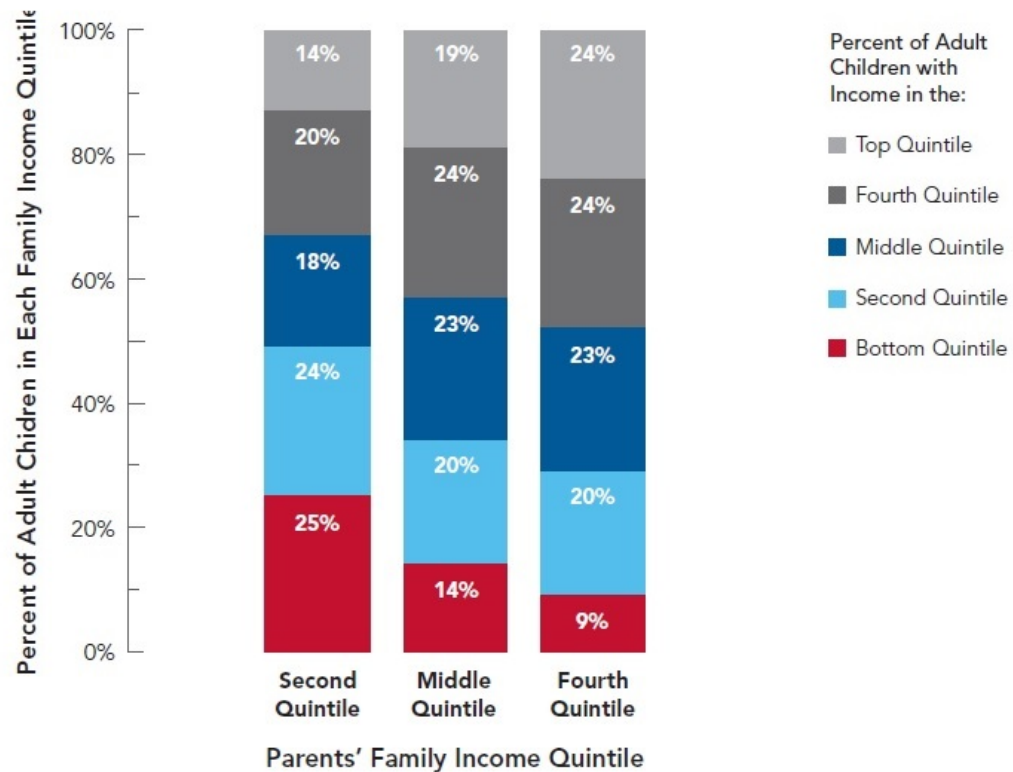
To ensure that participants understood the manipulation materials, in both condition, participants were required to answer two true-or-false comprehension questions correctly before proceeding to the next page of the study: “Many Americans are stuck where they came from, at the bottom or top of society,” and “Most Americans move up in society.”

### Americans Are Likely to Stay at the Top or Bottom of the Income Ladder



**Figure S2.** Figure presented in the weak mobility condition in Study 3.

## Americans Are Likely to Move Up the Income Ladder



**Figure S3.** Figure presented in the weak mobility condition in Study 3.

### Analyses with Subjective SES

Subjective SES was assessed using a measure similar to that used in Study 2 ( $M = 6.32$ ,  $SD = 1.80$ ). There were no between-condition differences in subjective SES (weak mobility beliefs condition:  $M = 6.44$ ,  $SD = 1.65$ ; strong mobility beliefs condition:  $M = 6.55$ ,  $SD = 1.85$ ; control condition:  $M = 5.98$ ,  $SD = 1.86$ ),  $F(2, 167) = 1.59$ ,  $p = .207$ . However, contrary to our university sample findings in Studies 1 and 2, the correlation between subjective SES and income was extremely small and non-significant,  $r(168) = .05$ ,  $p = .532$ . We caution that this subjective SES measure may therefore not have been appropriate for use with adolescent samples (see E. Goodman et al., 2001). Subjective SES was significantly positively correlated with GPA,  $r(168) = .28$ ,  $p = .0002$ , but not with academic persistence,  $r(168) = .10$ ,  $p = .213$ . In

addition, the condition  $\times$  subjective SES interaction was not a significant predictor of students' inclinations to persist academically,  $F(2, 164) = .10, p = .909$ , or their GPAs,  $F(2, 164) = .33, p = .720$ .

### **Race and Gender Analyses**

We also conducted exploratory analyses controlling for race and gender. Specifically, we grouped participants by whether their racial background was historically non-stigmatized in education (White and Asian [61.8% of participants]; coded as +1) or stigmatized in education (all other groups [38.2% of participants]; coded as -1). Gender was again coded -1 (female) and +1 (male). First, we did not find any significant differences in academic persistence between men ( $M = 5.03, SD = 1.15$ ) and women ( $M = 5.05, SD = 1.18$ ),  $t(167) = .12, p = .902$ , or between students from stigmatized ( $M = 4.91, SD = 1.15$ ) and non-stigmatized backgrounds ( $M = 5.12, SD = 1.16$ ),  $t(168) = 1.18, p = .238$ . We then separately regressed academic persistence on perceptions of mobility, SES (income), either race or gender, and all 2- and 3-way interactions of these factors (all mean-centered). The 3-way interactions involving race and gender were significant,  $F(2, 158) = 3.48, p = .033$ , and marginal,  $F(2, 157) = 2.53, p = .083$ , respectively. Specifically, as shown in Table S5a, the condition  $\times$  SES  $\times$  race interaction was driven by a significant positive effect of among non-stigmatized lower-SES students of being in the strong mobility beliefs condition versus the control condition. The condition  $\times$  SES  $\times$  gender interaction was driven by several simple effects (Table S5b), including: significant and marginal positive effects of among lower-SES male students of being in the strong or weak mobility beliefs conditions versus the control condition; a marginal negative effect of among higher-SES male students of being in the strong mobility beliefs condition versus the control condition; and significant and marginal positive effects of among lower-SES female students of being in the

strong mobility beliefs condition versus the weak beliefs or control condition. We also conducted these analyses with subjective SES in place of income; however, the neither the condition  $\times$  subjective SES  $\times$  race interaction,  $F(2, 158) = .14, p = .872$ , nor the condition  $\times$  subjective SES  $\times$  gender interaction,  $F(2, 157) = .37, p = .689$ , reached significance.

Finally, we conducted complementary analyses with GPA included as the outcome variable instead of academic persistence. First, we found that female students ( $M = 3.80, SD = .61$ ) had significantly higher GPAs than their male counterparts ( $M = 3.46, SD = .77$ ),  $t(166.88) = 3.17, p = .002$ , and students from non-stigmatized backgrounds ( $M = 3.87, SD = .56$ ) had significantly higher GPAs than their racially stigmatized counterparts ( $M = 3.21, SD = .76$ ),  $t(106.3) = 6.01, p = < .0001$ . In addition, the condition  $\times$  SES  $\times$  gender interaction was a marginally significant predictor of GPA,  $F(2, 157) = 2.89, p = .059$ . This interaction was driven by a marginal positive effect of among lower-SES male students of being in the weak mobility beliefs condition versus the control condition, and a marginal negative effect of among higher-SES male students of being in the strong mobility beliefs condition versus the control condition (Table S5c). By contrast, the condition  $\times$  SES  $\times$  race interaction,  $F(2, 158) = 1.38, p = .255$ , the condition  $\times$  subjective SES  $\times$  race interaction,  $F(2, 158) = .60, p = .548$ , and the condition  $\times$  subjective SES  $\times$  gender interaction,  $F(2, 157) = .23, p = .795$ , were all non-significant. Again, these exploratory findings should be interpreted with caution, as many did not replicate in our other studies and this study was not initially designed to investigate these higher-order (3-way) interactions with sufficient statistical power.

**Table S5.** Main results of regressing academic persistence on condition, SES, (a) race or (b) gender, and all 2- and 3-way interactions (all mean-centered), and (c) of regressing GPA on condition, SES, gender, and all 2- and 3-way interactions (all mean-centered) in Study 3.

<i>(a)</i>	<u>Weak (0) vs. Strong mobility (1)</u>				<u>Control (0) vs. Strong mobility (1)</u>				<u>Control (0) vs. Weak mobility (1)</u>			
	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>
Condition × SES x race	-.31 [-.79, .17] $\beta = -.15$	-1.27	158	.207	-.60 [-1.04, -.15] $\beta = -.28$	-2.64	158	.009	-.29 [-.75, .17] $\beta = -.12$	-1.24	158	.217
Simple effect of condition on non-stigmatized lower-SES students	.91 [.01, 1.81]	2.00	158	.048	1.61 [.75, 2.49]	3.69	158	.0003	.71 [-.24, 1.66]	1.48	158	.142
Simple effect of condition on non-stigmatized higher-SES students	-.32 [-1.12, .47]	-.81	158	.419	-.47 [-1.28, .33]	-1.16	158	.248	-.14 [-.91, .62]	-.37	158	.710
Simple effect of condition on stigmatized lower-SES students	.30 [-.53, 1.12]	.71	158	.477	.26 [-.50, 1.02]	.67	158	.504	-.04 [-.84, .76]	-.10	158	.921
Simple effect of condition on stigmatized higher-SES students	.26 [-.74, 1.27]	.52	158	.607	.49 [-.51, 1.49]	.96	158	.337	.22 [-.74, 1.20]	.46	158	.646
<i>(b)</i>	<u>Weak (0) vs. Strong mobility (1)</u>				<u>Control (0) vs. Strong mobility (1)</u>				<u>Control (0) vs. Weak mobility (1)</u>			
	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>
Condition × SES x gender	-.02 [-.47, .42] $\beta = -.01$	-.09	157	.925	-.43 [-.84, -.01] $\beta = -.22$	2.02	157	.046	-.40 [-.84, .04] $\beta = -.19$	-1.82	157	.071
Simple effect of condition on lower-SES male students	.23 [-.71, 1.17]	.48	157	.631	1.06 [.23, 1.88]	2.54	157	.012	.83 [-.11, 1.77]	1.74	157	.085
Simple effect of condition on higher-SES male students	-.50 [-1.30, .30]	-1.24	157	.215	-.77 [-1.60, .06]	-1.82	157	.070	-.26 [-1.09, .56]	-.63	157	.528
Simple effect of condition on lower-SES female students	.96 [.15, 1.78]	2.34	157	.021	.74 [-.07, 1.54]	1.81	157	.073	-.23 [-1.07, .62]	-.53	157	.597
Simple effect of condition on higher-SES female students	.32 [-.65, 1.28]	.64	157	.521	.61 [-.32, 1.54]	1.30	157	.197	.30 [-.55, 1.14]	.69	157	.490
<i>(c)</i>	<u>Weak (0) vs. Strong mobility (1)</u>				<u>Control (0) vs. Strong mobility (1)</u>				<u>Control (0) vs. Weak mobility (1)</u>			
	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>	<i>b</i> [95% CI]	<i>t</i>	<i>df</i>	<i>p</i>
Condition × SES x gender	.03 [-.24, .56] $\beta = .02$	.22	157	.829	-.26 [-.51, .00] $\beta = -.21$	-1.99	157	.048	-.29 [-.56, -.02] $\beta = -.21$	-2.11	157	.037
Simple effect of condition on lower-SES male students	-.21 [-.79, .36]	-.73	157	.469	.30 [-.20, .81]	1.18	157	.239	.52 [-.06, 1.09]	1.76	157	.081
Simple effect of condition on higher-SES male students	-.13 [-.62, .36]	-.53	157	.599	-.48 [-.99, .03]	-1.85	157	.066	-.35 [-.85, .16]	-1.36	157	.177
Simple effect of condition on lower-SES female students	.10 [-.40, .60]	.38	157	.704	.01 [-.48, .51]	.05	157	.960	-.08 [-.60, .43]	-.32	157	.750
Simple effect of condition on higher-SES female students	.06 [-.54, .65]	.19	157	.847	.26 [-.31, .84]	.91	157	.364	.21 [-.31, .72]	.78	157	.436

**Additional Variables**

A complete list of all the variables assessed as part of the larger Study 3 protocol can be found in Appendix B. None of the variables besides those discussed in here and in the main text were relevant to or analyzed to test the present hypotheses.

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## Appendix A: Additional Variables from Study 1

- Expected future occupation (Mello, 2008)
- Expected and aspired for levels of educational attainment (Mello, 2008)
- Expected future subjective SES (Shane & Heckhausen, 2013)
- Current and expected future STEM expectancies (e.g., “How good at science are you?”), utility value (e.g., “Math and science are important for my future”), and interest (e.g., “I think science is interesting”; Harackiewicz, Rozek, Hulleman, & Hyde, 2012; Hulleman & Harackiewicz, 2009; Rozek, Hyde, Svoboda, Hulleman, & Harackiewicz, 2015; Simpkins, Davis-Kean, & Eccles, 2006)
- Intrinsic, internalized, introjected, and externalized academic motivation (Sheldon & Krieger, 2004)
- Perceived value of school (Harris, 2008) and perceived barriers despite schooling (Harris, 2008)
- School trust (e.g., “I am treated fairly by teachers and other adults at [school name]”; Yeager et al., 2014)
- Academic efficacy (Midgley et al., 2000)
- Perceived barriers to future education (e.g., “In general, I think that there are many barriers that will make it difficult for me to go to college”; Hawley McWhirter, 1997)
- Difficulty means schoolwork is important (Oyserman et al., 2015)
- Grit (Duckworth & Quinn, 2009)
- Subjective SES at the country and community levels (Adler et al., 2000)
- Parental education
- Parental home ownership

### Appendix B: Additional Variables from Study 3

- Expected future occupation (Mello, 2008)
- Expected level of educational attainment (Mello, 2008)
- Plans to engage in academic and non-academic activities (Destin & Oyserman, 2009)
- Expected grades in math and language arts (Destin & Oyserman, 2009)
- Perceptions of socioeconomic mobility (*Note:* This study include our adult measure [see scale construction studies], which had not been previously used with children, and feedback from respondents in both Study 3 and subsequent pilot tests for other projects suggests that the wording of these items was not at their comprehension level. As described herein, the version used in Study 1 was modified to address these comprehension issues.)
- Difficulty means schoolwork is important (Oyserman et al., 2015)
- Grit (Duckworth & Quinn, 2009)
- Academic efficacy (Midgley et al., 2000)
- Perceived value of school (Harris, 2008) and perceived barriers despite schooling (Harris, 2008)
- One-item mood measure (Mayer & Gaschke, 1988)
- Subjective SES at the community level (Adler et al., 2000)
- Expected future subjective SES (Shane & Heckhausen, 2013)
- Parental occupations
- Parental home ownership