

Self-affirmation facilitates minority middle schoolers' progress along college trajectories

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Significance

This research represents an experimental investigation of how a psychological process unfolds over many years to affect success at a later period of transition, even almost a decade later. A series of 15-min reflective writing exercises not only closed academic performance gaps in early adolescence but, years later, improved drivers of academic and economic opportunity among minority youth: high school course choices, college enrollment, and 4-y college selectivity. Long-term benefits occurred despite the barriers that confront minority students on the path to college. A psychological intervention can have a persistent positive effect when it ushers people onto positive structural pathways.

Abstract

Small but timely experiences can have long-term benefits when their psychological effects interact with institutional processes. In a follow-up of two randomized field experiments, a brief values affirmation intervention designed to buffer minority middle schoolers against the threat of negative stereotypes had long-term benefits on college-relevant outcomes. In study 1, conducted in the Mountain West, the intervention increased Latino Americans' probability of entering a college readiness track rather than a remedial one near the transition to high school 2 y later. In study 2, conducted in the Northeast, the intervention increased African Americans' probability of college enrollment 7–9 y later. Among those who enrolled in college, affirmed African Americans attended relatively more selective colleges. Lifting a psychological barrier at a key transition can facilitate students' access to positive institutional channels, giving rise to accumulative benefits.

- social psychological intervention
- adolescence
- college enrollment
- affirmation
- achievement gap

In a society in which economic, career, and health outcomes depend increasingly on a college degree (1↓–3), people without one have fallen further behind. This group consists disproportionately of African Americans, Latino Americans, and the poor of all ethnic groups. Racial gaps in enrollment rates prove even starker at selective colleges. Compared with whites, enrollment rates at these colleges are five times lower

for African Americans and three times lower for Latino Americans (4). Even a small closing of these gaps could lessen later differences in professional achievement, earnings, and health. But as many students seek to ascend the college path, they confront a host of seemingly insurmountable barriers, including economic disadvantage, negative peer influences and family dynamics, and discrimination. Given the size and scope of the problem, what steps can be taken to promote educational equity in college attendance?

One obvious and crucial step is to provide economic opportunity, such as financial aid for college. Another is to introduce experiences that promote adaptive psychological processes. Providing experiences that help students maintain their motivation in the face of early setbacks may help them surmount later ones on the path to college (5).

That a positive psychological experience at a key juncture could increase college enrollment at later transitions is suggested by three lines of research. First, research on the life course and on developmental cascades suggests that experiences at key transitions can have persistent effects through the accumulation of consequences they set in motion (5, 6). Transitions can fix or alter trajectories (5). For example, a seventh grader who performs well in middle school may come to be seen as capable by teachers, be given more opportunity, and as a consequence come to feel a greater sense of belonging in the classroom that propels the student to success in high school. Second, experimental intervention research buttresses the importance of transitions in life trajectories. Offering poor families the chance to move to a wealthier neighborhood, especially when their children are preadolescents (7), improves their children's college attendance rates and earnings. Third, research suggests that psychological processes have an important role in how people respond to adversity. A sense of optimism, purpose, and belonging can improve long-term educational and health outcomes even among the economically disadvantaged (8-12). The importance of psychological processes in no way lessens the imperative to reduce poverty, discrimination, and other structural disadvantages. Rather, it means that poor and marginalized individuals can exert an influence over their lives, through the way they think and feel, that helps them overcome difficult circumstances.

These three lines of research converge on the following hypothesis: An intervention that promotes an adaptive psychological process at a key transition, middle school, will improve outcomes at later transitions, high school and college. Randomized experiments conducted during transitions to middle school (13-15), high school, and college (11, 12, 16, 17) have shown that brief interventions that support adaptive psychological processes improve grades and school retention. They do so by encouraging students to reflect on core values (13-15), by assuring them of their belonging in school (11, 12), by highlighting the personal relevance of academic coursework (16), or by cultivating the belief that intelligence is malleable rather than fixed (11, 17). No study, however, has shown that a psychological process altered at one transition has persistent and direct causal effects on outcomes at later transitions and in new institutions years later, and, if this does occur, how. Interventions that seem promising in the short term often have benefits that decay (18). Moreover, the effect of many social psychological interventions in educational contexts has been assessed primarily on grades and test scores. It is unclear whether a statistically significant effect on these performance metrics leads to pragmatically consequential changes in later life opportunity. We take a different tack by assessing how a shift in psychological processes at an early transition affects college-relevant outcomes at a later transition. If such an effect were found, it would suggest that targeted low-cost interventions can improve academic destinies not only of those already admitted to college but also of those who would have otherwise strayed from the college path years before.

The barriers on the path to college, on average, are more formidable for some students. Among these are African Americans, Latino Americans, and the poor. They often contend with more economic and social disadvantage than their peers, barriers that have been long recognized as crucial to address. The depth and breadth of gaps in opportunity underscore the need for varied approaches to remedying educational inequity. Interventions that promote adaptive psychological responses may help students take advantage of environmental resources even in difficult circumstances. Aware that they are negatively stereotyped, minority students may worry that they and others in their ethnic group will be seen as intellectually limited and as not belonging in school (12, 19). Unchecked, this vigilance can make them understandably wary of academic authorities and may drain cognitive resources that could otherwise be expended on learning (20).

However, the threat of negative stereotypes can be countered by another psychological process: self-affirmation (10, 21). Self-affirmation is the process by which people try to reaffirm a sense of moral and adaptive adequacy, or self-integrity, when it comes under threat, sometimes by bolstering it in another domain (21). The self-affirmation process can be promoted by many experiences, such as a teacher's positive feedback or a student's positive relationships. One powerful and self-generated source of self-affirmation is reflecting on core personal values. Numerous studies demonstrate that the brief act of writing about important values can lessen psychological threat and improve performance in stressful situations (10, 22).

Early adolescence marks an opportune time to intervene because students' choices and performance at this time can open or close doors of opportunity for years to come (23, 24). For this reason, the consequences of psychological threat and affirmation may be relatively large. As documented in previous randomized experiments reported by our research group (13–15), the self-affirmation process improves academic outcomes in the middle school transition for minority youth. Responding to a series of structured writing assignments distributed by their teachers at the beginning of the academic year and before tests throughout the year, middle schoolers reflected on the importance of core values in their lives. One experiment showed that these affirmation activities improved the academic grades of African American middle schoolers, the predominant minority group at the school, in their remaining 2 y of middle school. These activities also reduced their probability of being assigned to the remedial track (14). At another middle school with a predominantly Latino American minority population, the same affirmation activities improved the academic grades of Latino American students over the course of 3 y (15). Consistent with self-affirmation theory, minority students who had completed the self-affirmation exercises were less likely to display drops in academic belonging and motivation at times of difficulty in school (15, 25).

Although questions remain about the moderators of affirmation effects (26), many researchers have observed positive affirmation effects in diverse settings. Affirmation interventions have improved grades among a wide range of students experiencing threats tied to their social identity, including minority middle school students in one large-scale, multischool project (27), female (28) and first-generation college students (29) in introductory science courses, and female business students (30).

Here we assess the robustness of affirmation effects not only across multiple contexts but also over a long period. Do the benefits of affirmation in middle school lead to better high school and college outcomes? One way a small benefit at a key transition could have long-term benefits is through recursive processes. These are processes that, fueled by their own consequences, repeat (14). For example, as a consequence

of being affirmed, students may perform better. Having performed better, they may feel more affirmed, with the cycle repeating.

Beyond recursive processes, a trigger-and-channel perspective is introduced here to inform the way an intervention can have long-term benefits. A psychological process is triggered and its effects channeled by the larger social system. At opportune moments, the better performance or adaptive mindset resulting from an intervention can place people onto an institutional channel that sustains forward momentum. For example, a student who performs better may be held to higher expectations by teachers (31, 32). Being seen as more capable, the student may be placed in more challenging courses and enter a “fast-flowing” college readiness track. Moreover, even if students do not perform better after the intervention, they may feel a greater sense of school belonging that helps keep them on the college path. Whereas a recursive process operates as a closed loop, a trigger-and-channel mechanism broadens and propagates outcomes by connecting a contained psychological process to a larger social system. As individuals act and interact with institutions in a positive cycle, their assets accumulate and their momentum increases (10).

Fig. 1 illustrates a key feature of the social system of middle school: the beginning of institutional tracking. Institutional tracking segregates students into increasingly dispersed streams of opportunity. A well-timed triggering of a psychological process at an early gateway to this system could channel students into streams of opportunity that diverge over time. We focus on the intermediate and long-term institutional outcomes of the two groups of minority students featured in the two studies cited earlier (14, 15). Each group received the affirmation intervention in middle school. They are now the oldest students to have ever participated in an affirmation experiment in school. Given that these students are members of different minority groups and come from different regions of the United States, they permit a robust test of whether the effects of an affirmation in early adolescence persist across altogether different contexts and through time. The intervention encompassed a series of brief self-affirming writing exercises that took place two to five times over approximately 1 y of middle school. In one study, some students received additional treatment “boosters” in a subsequent year, but these boosters had no additive effect (SI Appendix). Outcomes include milestones along remedial and advanced “tracks” near the transitions to high school (e.g., course difficulty) and college (e.g., college enrollment).

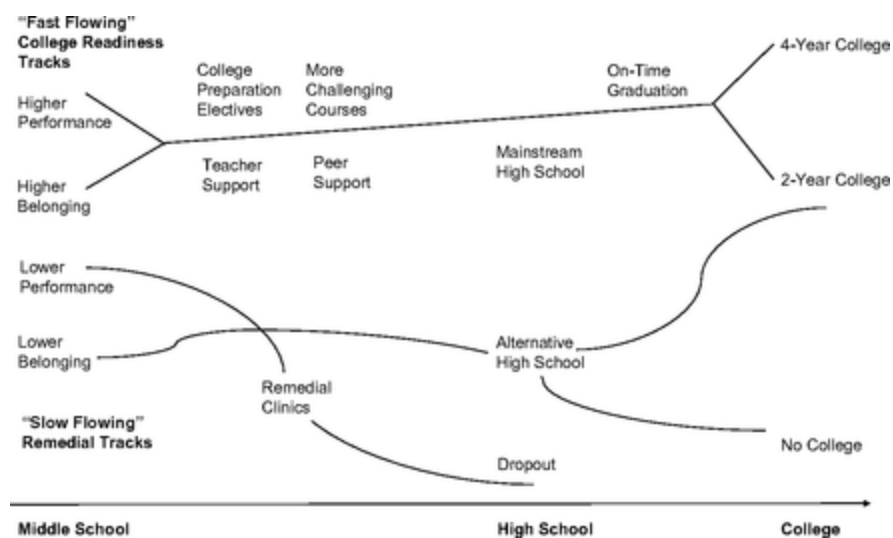


Fig. 1.

Implicit educational tracks in middle school, high school, and college. The remedial track is slower-flowing and less likely to lead to college enrollment. Affirmation can nudge minority students toward the college readiness track and away from the remedial track. The tracks depicted are examples drawn from the contexts of the school sites in this study, but are not exhaustive of all possible tracks. Transfer between the two kinds of tracks is possible, but is increasingly difficult as differentiation increases with time.

Study 1 ( $n = 185$ ) assesses the effects of affirmation relative to a control condition on the institutional trajectories of Latino American students ( $n = 81$ ) and white students ( $n = 104$ ) through middle school and into high school, focusing on course placement. These students, depending on their age, began the intervention in the sixth, seventh, or eighth grade of middle school. Study 2 ( $n = 339$ ) assesses the effects of affirmation relative to a control condition on African American ( $n = 158$ ) and white ( $n = 181$ ) middle schoolers' long-term institutional trajectories: their enrollment in college. Assessment of college enrollment was possible only for the study 2 students because they began the intervention several years before study 1. In study 2, the participants began the intervention at the beginning of seventh grade and remained enrolled in the participating school district through at least the end of eighth grade. In each study, students were randomly assigned to complete either affirmation or control exercises presented as a classroom assignment by their teachers (13–15). Student outcomes were tracked using official records. Extensive robustness checks confirmed the success of random assignment and the absence of differential attrition by condition (SI Appendix).

#### Intermediate Institutional Outcomes: Latino Americans

Study 1 features student outcomes immediately before and after the transition to high school. Two years after the conclusion of the intervention, students in the study 1 school had entered divergent channels. Although these channels may be implicit and even well-intended, they have the effect of creating a tracking system. The remedial channel began in eighth grade as remedial math and English clinics to supplement regular courses. Placement in the remedial track was associated with a higher likelihood of either dropping out of school or enrolling in an alternative high school. In contrast, the college readiness channel offered more challenging courses, and placement in it was associated with remaining in school and enrolling in the district's mainstream high school, the one intended for students on a college track. For Latino Americans, this channel also offered a selective college readiness elective designed for underserved students, called Advancement via Individual Determination (AVID). As students progress along these two channels (Fig. 1), their opportunities for enrichment, challenge, and access to higher-level educational opportunities diverge (the latter are examined in study 2).

Course difficulty reflects the rigor of a student's academic curriculum and heavily influences their educational trajectory, including college admission (33). Results revealed the predicted ethnic group  $\times$  condition interaction on course difficulty, indicating that the two ethnic groups responded differently to the affirmation [ $B = 0.26$ ;  $t(154) = 3.04$ ;  $P = 0.003$ ]. Latino Americans took more challenging courses in the affirmation condition than in the control condition [ $-0.37$  vs.  $-0.73$  on a standardized metric;  $B = 0.36$ ;  $t(154) = 2.75$ ;  $P = 0.007$ ;  $d = 0.48$ ]. Whites did not differ by condition [ $0.25$  vs.  $0.41$ ;  $B = -0.17$ ;  $t(154) = -1.48$ ;  $P = 0.141$ ;  $d = -0.22$ ; Fig. 2; all means and probabilities reported in the main text are adjusted for baseline covariates; see SI Appendix for raw values, which do not substantively differ].

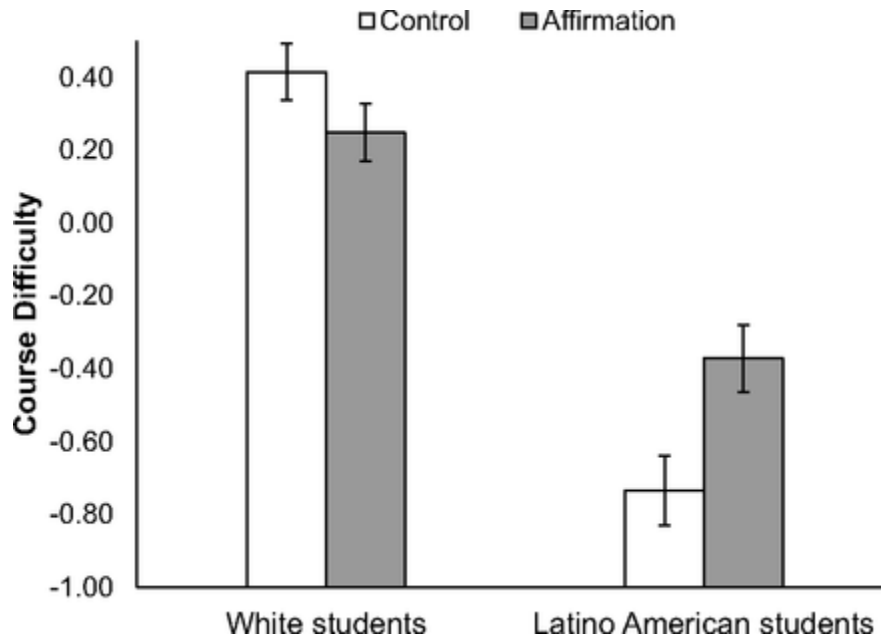


Fig. 2.

Outcomes corresponding to the college readiness track for students in study 1, as a function of ethnicity and condition, adjusted for preintervention academic performance and sex. The y-axis represents adjusted course difficulty for all three cohorts in study 1, 2 y after the intervention, standardized within grade level ( $n = 160$ ). Adjusted means were obtained from linear regression. Error bars represent  $\pm 1$  SE. See SI Appendix for analogous figures for enrollment in remedial clinics, AVID, and the mainstream high school, as well as raw means for each outcome.

We next focused on specific stages of the tracking system during the 3 y of data collection: placement in remedial clinics and in the college readiness elective AVID in eighth grade (available only for participants who began the intervention in either sixth or seventh grade; SI Appendix) and enrollment in the district's mainstream high school in ninth or 10th grade (available only for participants who began the intervention in either seventh or eighth grade; SI Appendix). Although remedial clinics contributed to the course difficulty composite, they are an important outcome in their own right because they can intensify stigmatization and narrow opportunity (19, 33).

Logistic regression yielded an ethnic group  $\times$  condition interaction for remedial clinic enrollment [ $B = -1.06$ ;  $z = -2.23$ ;  $P = 0.026$ ; odds ratio (OR) = 0.35; SI Appendix, Fig. S2A]. Affirmed Latino Americans were less likely to be placed in a remedial clinic than were nonaffirmed Latino Americans. Among Latino Americans, the probability of enrolling in a remedial clinic was 73% in the control condition and only 38% in the affirmation condition ( $B = -1.49$ ;  $z = -2.44$ ;  $P = 0.015$ ; OR = 0.22). For whites, the probability of enrolling in a remedial clinic was low and did not differ by condition (9% vs. 16%;  $B = 0.63$ ;  $z = 0.87$ ;  $P = 0.385$ ; OR = 1.87).

Affirmed Latino Americans were also more likely to enroll in AVID in eighth grade, providing further evidence that affirmation encouraged students onto a college readiness track. Enrollment in AVID was achieved by 44% of Latino Americans in the affirmation condition compared with 8% in the control condition ( $B = 2.21$ ;  $z = 2.59$ ;  $P = 0.009$ ; OR = 9.08; SI Appendix, Fig. S2B).

Enrollment in the mainstream high school also yielded a treatment effect for minority students. College-bound students typically attended the mainstream public high school in the district. Those not on this track attended alternative high schools for lower-performing students, dropped out, or left the district (although the latter two categories could not be distinguished in our dataset, both had lower baseline performance than those attending the mainstream high school, and excluding both of them from the analysis yields similar results; SI Appendix). As found for the other outcomes, logistic regression yielded an ethnic group  $\times$  condition interaction ( $B = 1.30$ ;  $z = 2.70$ ;  $P = 0.007$ ;  $OR = 3.69$ ). Two years after the intervention, Latino Americans were more likely to be enrolled in the mainstream public high school in the affirmation condition than in the control condition (89% vs. 50%;  $B = 2.08$ ;  $z = 2.83$ ;  $P = 0.005$ ;  $OR = 8.04$ ; SI Appendix, Fig. S2C). Whites in the affirmation and control conditions were equally likely to be enrolled in the mainstream high school (79% vs. 86%;  $B = -0.52$ ;  $z = -0.83$ ;  $P = 0.404$ ;  $OR = 0.59$ ).

#### Long-Term Institutional Outcomes: African Americans

In study 2, two outcomes were primary: whether or not students enrolled in college, and the selectivity of the college they attended as measured by official sources (e.g., percentage of students admitted; Materials and Methods). Students could enroll in a 2- or 4-y college.

Ordinal regression of the trichotomous college enrollment outcome (no college vs. 2-y vs. 4-y) yielded the predicted ethnic group  $\times$  condition interaction ( $B = 0.60$ ;  $z = 2.52$ ;  $P = 0.012$ ;  $OR = 1.83$ ). African American students had greater odds of higher college enrollment levels in the affirmation condition than in the control condition ( $B = 0.93$ ;  $z = 2.68$ ;  $P = 0.007$ ;  $OR = 2.54$ ). Whites were unaffected by condition ( $B = -0.27$ ;  $z = -0.84$ ;  $P = 0.400$ ;  $OR = 0.76$ ).

To examine this effect more closely, the trichotomous outcome was broken into two dichotomous ones, each analyzed with logistic regression. The first, examining whether students enrolled in any college (2- or 4-y) versus none, yielded an ethnic group  $\times$  condition interaction ( $B = 0.82$ ;  $z = 2.59$ ;  $P = 0.010$ ;  $OR = 2.26$ ). As shown in Fig. 3A, for African American students, affirmation increased the probability of enrolling in college from 78% to 92% ( $B = 1.19$ ;  $z = 2.47$ ;  $P = 0.013$ ;  $OR = 3.29$ ), with no effect on whites (86% vs. 80%;  $B = -0.44$ ;  $z = -1.09$ ;  $P = 0.274$ ;  $OR = 0.64$ ).

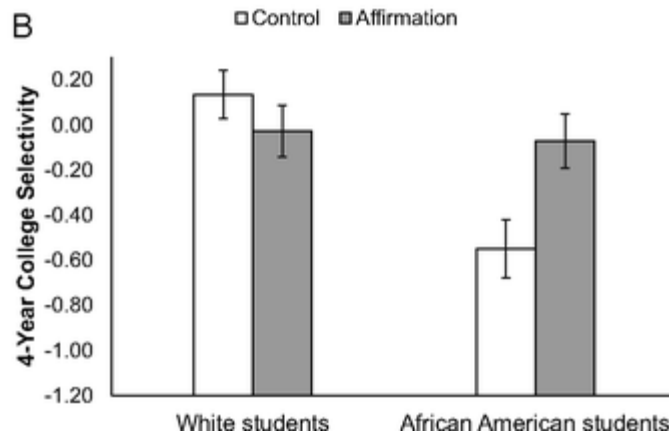
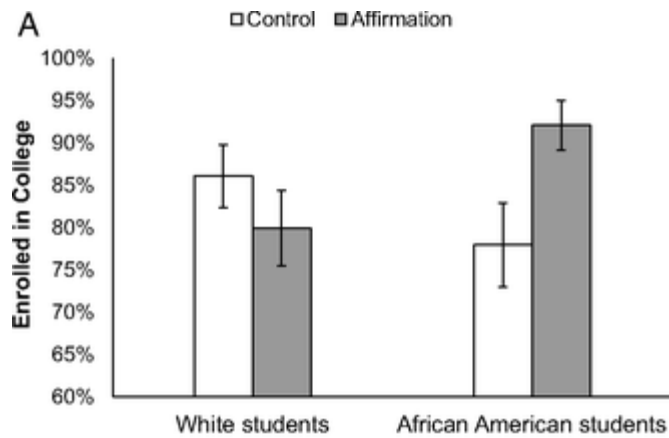


Figure 3. (A) Adjusted probability of enrolling in a 2- or 4-year college. (B) Selectivity of college choices for students who enrolled in a 4-year college. Error bars represent ±1 SE.

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Fig. 3.

The figure depicts (A) the adjusted probability that students in study 2 ever enrolled in a 2- or 4-y college relative to no college ( $n = 339$ ) and (B) the selectivity of college choices for students in study 2 who ever enrolled in a 4-y college, measured as an index derived from publicly available indicators ( $n = 199$ ). Means are presented as a function of ethnicity and condition, adjusted for preintervention academic performance and sex. Error bars represent  $\pm 1$  SE. For (A), adjusted means were obtained using logistic regression. For (B), adjusted means were obtained from linear regression, with baseline performance mean-centered on the average for each ethnicity, within the subsample of the 4-y college attendees. See SI Appendix for raw means for each outcome.

The second dichotomous outcome, comparing enrollment in a 4-y college with enrollment in a 2-y college or no college, also yielded an ethnic group  $\times$  condition interaction ( $B = 0.55$ ;  $z = 2.02$ ;  $P = 0.044$ ;  $OR = 1.73$ ). Among African American students, affirmation increased the probability of enrolling in a 4-y college from



47% to 67% ( $B = 0.85$ ;  $z = 2.13$ ;  $P = 0.033$ ;  $OR = 2.35$ ; SI Appendix, Fig. S4), with again no effect on Whites (66% vs. 60%;  $B = -0.24$ ;  $z = -0.66$ ;  $P = 0.511$ ;  $OR = 0.79$ ).

Many disadvantaged students enroll in less selective colleges than their academic potential merits (34). If minority students earn better grades and take more challenging courses as a result of being affirmed, they may be more likely to apply and gain admission to competitive colleges. Consistent with this possibility, linear regression yielded an ethnic group  $\times$  condition interaction on a standardized college selectivity index [ $B = 0.32$ ;  $t(193) = 2.73$ ;  $P = 0.007$ ]. Among students enrolling in 4-y colleges, African Americans attended more selective schools in the affirmation condition than in the control condition [ $-0.07$  vs.  $-0.55$ ; see Fig. 3B;  $B = 0.48$ ;  $t(193) = 2.73$ ;  $P = 0.007$ ;  $d = 0.49$ ]. In contrast, the selectivity of 4-y colleges attended by white students did not differ by condition [ $-0.03$  vs.  $0.14$ ;  $B = -0.16$ ;  $t(193) = -1.04$ ;  $P = 0.299$ ;  $d = -0.17$ ]. When we focused our analysis on whether students attended the most selective 4-y colleges (here represented by the top three categories in Barron's), the ones that are the strongest drivers of economic mobility among poor and minority students (4), the percentage of minority students who enrolled was 2.5% in the control condition and 14.2% in the affirmation condition, a more than fivefold improvement ( $B = 1.88$ ;  $z = 2.41$ ;  $P = 0.016$ ;  $OR = 6.57$ ) that closed the control–condition gap ( $B = 2.54$ ;  $z = 3.38$ ;  $P = 0.001$ ;  $OR = 12.63$ ) with their White peers ( $B = 0.31$ ;  $z = 0.56$ ;  $P = 0.577$ ;  $OR = 1.36$ ).

The intervention consistently closed ethnicity achievement gaps. In study 1, the achievement gap favoring white students in the control condition was highly significant for all outcomes ( $z$ s/ $t$ s  $> 2.90$ ;  $P$ s  $< 0.004$ ), but was reduced or eliminated in the affirmation condition (SI Appendix). In study 2, affirmation eliminated or reversed the gap in college outcomes. In the control condition, the ethnicity gap favoring white students was significant for all outcomes ( $z$ s  $> 2.00$ ;  $P$ s  $< 0.04$ ), except for enrollment in any college, where the gap still favored whites by an odds ratio of 1.75 (8.1 percentage points;  $z = 1.34$ ;  $P = 0.18$ ). In the affirmation condition, the ethnicity gaps were either nonsignificant or favored African Americans (SI Appendix).

What explained the effect of affirmation on college enrollment? One driver, it seems, was a stronger sense of belonging in school, which is among the most important psychological determinants of student success (12, 25). As previously reported (25), African Americans had a stronger sense of belonging in middle school in the affirmation condition than in the control condition. Stronger belonging partially mediated the long-term effect of affirmation on African Americans' enrollment in a 2- or 4-y college, over and above baseline belonging (SI Appendix, Fig. S6). For all students, a one SD increase in belonging, such as from 4.43 to the grand sample mean of 4.97 on a 1–6 scale, increased the odds of attending college by a factor of 1.71, from a probability of 73% to 82%. In contrast, the effect of affirmation on whether African Americans enrolled in a 4-y college in particular, instead of only a 2-y college or no college, was partially mediated by their higher GPA in middle school (SI Appendix, Fig. S7). For all students, a one SD increase in GPA, such as from 1.69 to the grand sample mean of 2.62 on a 0–4.30 metric, increased the odds of attending a 4-y college by a factor of 4.42, or from a probability of 26% to 61%. These findings suggest that the stronger feelings of school belonging promoted by the affirmation encouraged minority students toward college of some kind, including 2-y college, but only when its benefits on GPA were sufficiently high did the intervention help them to reach a 4-y college in particular.

Opportunity and belonging may have been especially undermined for the small subset of students in a low-expectation remedial track in middle school. As previously reported (14), affirmation helped minority students avoid this channel. African Americans assigned to the remedial track were less likely to enroll in

any college than those not assigned to that track, even controlling for their middle school GPA (SI Appendix). They also had a lower sense of belonging in middle school, controlling for their belonging at baseline (SI Appendix). Although remediation was a rare event, and thus these analyses are only suggestive, affirmation appears to be effective for some students because it deflects them from a stigmatizing and opportunity-limiting channel.

## Discussion

There are four key implications of our findings. First, they show that an individual's unfolding psychological experience can affect major drivers of academic and economic opportunity at later transitions. Second, the research reveals the importance of structural forces in shaping how psychological processes manifest themselves. Under the status quo, captured in the control condition, psychological processes interacted with an implicit tracking system to create separate and unequal school experiences for minority and majority students. Control-condition minority students not only experienced relatively less belonging in school but also were placed in remediation with greater frequency, and in advanced classes with lesser frequency, than white students. This psychological and structural inequality was lessened in the affirmation condition (SI Appendix). These findings demonstrate that the status quo was both inefficient and unjust: It failed to provide minority students with the positive experiences required to achieve their potential.

Third, the research demonstrates that psychological processes can have a longer temporal reach than previously thought. Earlier research examined psychological processes such as affirmation over relatively brief periods, often within the same institutional setting, ranging from a half hour laboratory study to a 3-y field study (e.g., ref. 15). Here we show that a psychological process can cast a long-term influence on major educational outcomes, even when students move through and across multiple institutions. This suggests that the utility of an intervention depends not just on the size of its benefits and on the number of people it benefits but also on the duration of these benefits. When well-timed, well-situated, and appropriately implemented, interventions with small or subtle initial benefits can set in motion a process whose full consequences accumulate with time. It is important for scientists, program evaluators, and funding agencies to examine the robustness of effects both across multiple institutional contexts and through time. Otherwise, interventions with large fleeting benefits could crowd out those whose benefits are slow to develop but last longer.

In terms of policy recommendations, we believe that the intervention should be used in appropriate contexts. The data underscore the importance of understanding the conditions under which a psychological process may be triggered and channeled. Our research shows that affirmation can help minority students ascend the path to college, but not that it does so in all circumstances. The effectiveness of the intervention depends on the context in which it is introduced. In the studies reported here, the affirmation could have the effect it did because the context contained resources that supported students in entering a college path, such as advanced courses, motivated teachers, and other channels of opportunity. The long-term effects observed here also depend on intervention protocols that carefully consider the meaning of the intervention from the student's point of view and that build on long-standing collaborative relationships with partner schools. The activity was given to students by their own teachers, signaling to children that their personal values mattered in the classroom. Extensive scripting and pilot-testing were conducted to ensure this meaning was conveyed.

The strongest contribution of our research is not the intervention per se, but the practical insight our data offer: There is often more untapped potential in a person than meets the eye. With a few timely and credible communications of their adequacy, those students receiving the least validation in school, the stigmatized and low-performing, are able to achieve much more than is often thought, including admission to college. Diverse backgrounds need not mean divergent opportunities.

## Materials and Methods

### Participants.

All participants and their caretakers provided informed consent to participate in the study. All procedures and data collection were approved by the relevant university institutional review boards and by institutional agreements with the partner schools. Study 1 included immigrant and low-income Latino American students in a suburban school in the Mountain West (the first study of ref. 15; the second study, per institutional agreement, lasted for only 1 y). Study 2 included middle- to lower-middle-class African American students in a suburban school in the Northeast (13, 14). Each study included three cohorts of students. In study 1, cohorts were based on whether students first participated in grade 6, 7, or 8. In study 2, cohorts were based on the chronological year in which students took part, as this study included three successive cohorts of students who began the study in grade 7 (students' second year at the middle school). All students who completed the original studies and who had available institutional outcome data were included.

### Procedure.

In both experiments, students were randomly assigned to an affirmation or a control condition. Students in the affirmation condition wrote about their most important values and why they were important to them, whereas students in the control condition wrote about values they considered unimportant or another neutral topic such as their afternoon routine. Each condition involved the completion of several exercises throughout the school year, typically once in the first few weeks and additionally before stressors such as in-class examinations (SI Appendix). In study 1, the exercises were distributed four to five times over the course of 1–2 y. In study 2, three to five exercises were given in the first year, and half of the affirmation condition was randomly assigned to receive two to four additional doses in the second year. Students in study 1 completed between two and five exercises over the course of 2 y (means ranged from 3.84 to 4.82 across cohorts; SI Appendix, Table S3). Students in study 2 completed between one and eight exercises during the same period (means ranged from 6.54 to 7.68 across cohorts; SI Appendix, Table S4). To prevent repetitiveness, exercises varied in form and content. Several precautionary features of the design helped ensure both students and teachers were unaware of condition (SI Appendix). In study 1, attrition (resulting from leaving the school district during middle school) did not differ by condition, either for all students or for minority students in particular (SI Appendix). In study 2, there was no attrition because long-term college enrollment data were obtained for all participants in the final sample of ref. 14, using a comprehensive national database, the National Student Clearinghouse.

### Measures.

Study 1 featured four primary measures. Course difficulty was a composite of the average difficulty level of students' course subjects (e.g., algebra vs. prealgebra) in the school grade 2 y after the intervention, with the difficulty score for each course subject first standardized to equate metrics (SI Appendix). Given

the three different cohorts, the composite reflects courses in which students were enrolled at the beginning of the eighth, ninth, or 10th grades.

Beyond course difficulty, three other outcomes illuminated students' allocation to the implicit remedial or college readiness tracks. The first was assignment to remedial clinics in math or English in the eighth grade. As noted, this outcome formed part of the course difficulty composite for the youngest (sixth grade) cohort, but because of its importance, it was isolated and examined separately. The statistical significance of effects on the course difficulty composite remain intact even when the youngest cohort, the only cohort for whom remedial clinics contributed to course levels, is excluded from analysis. The second outcome was assignment to the college readiness program AVID in the eighth grade. The third was enrollment in the mainstream high school during the ninth or 10th grade (for the seventh and eighth grade cohort, respectively). Our 3-y data collection window yielded data for two of the three cohorts on each outcome (SI Appendix, Table S1).

Study 2 featured two primary outcomes generated from college enrollment data obtained via the National Student Clearinghouse, a comprehensive national database (SI Appendix). The first, college enrollment, was represented as a trichotomous measure: did not enroll in college, enrolled in a 2-y college, or enrolled in a 4-y college. It was also analyzed as two separate dichotomous outcomes: enrollment in any college versus none, and enrollment in a 4-y college versus a 2-y college or no college. The second outcome was the selectivity of the 4-y college that students attended (data on selectivity of 2-y colleges were sparse). Selectivity was a composite based on the percentage of students admitted to the college (reverse-coded); the 25th and 75th percentile scores of incoming students on the SAT and, where available, ACT; and the college's rating in Barron's Profiles of American Colleges, an ordinal index ranging from 0 (less competitive) to 7 (most competitive). The first three indicators were obtained from the publicly available Integrated Postsecondary Education Data System. Each indicator reflected the average of data during a 3-y period near the time of college entry; for the small subset of students who attended more than one 4-y college, it was a cross-college average. The final index consisted of the mean of the standardized indicators for the 199 students who enrolled in 4-y colleges ( $\alpha = 0.93$ ; SI Appendix).

#### Analytical Approach.

For simplicity and comparability across studies, a single multiple regression model with similar predictors was applied to the data from both studies (SI Appendix). Beyond the ethnicity  $\times$  condition interaction, main effects of ethnicity, sex, condition, and a composite of baseline performance indicators were included in the model. The latter was mean-centered on zero within each ethnicity, as in the foundational paper for study 1 (15), so that estimated means would reflect those for the average-performing student for each ethnicity. For college selectivity analyses in study 2, this ethnicity mean-centering was performed only within the 199 students who enrolled in 4-y colleges. Simple effects tests assessed the effect of affirmation for each ethnicity (computing the effect of affirmation separately for each ethnicity in subsample analyses did not change results; SI Appendix). We report unstandardized regression coefficients and covariate-adjusted means; unadjusted outcomes are provided in the SI Appendix (SI Appendix, Fig. S1–S5, Left). For linear regression, effect sizes are calculated by dividing the covariate-adjusted condition difference by the raw SD of the outcome. For logistic and ordinal regression, effect sizes for each ethnic group represent a covariate-adjusted OR: the odds of attaining the given outcome in the affirmation condition divided by the odds of attaining it in the control condition.

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