

Boosting College Prospects Among Low-Income Students: Using Self-Affirmation to Trigger Motivation and a Behavioral Ladder to Channel It

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Access to college for students from low-income families is disproportionately low because of many factors. A targeted intervention that addresses social psychological factors is introduced in the present paper. It is hypothesized that the steps needed to go to college—applying for college and applying for financial aid—can be blocked by both psychological and behavioral friction. The psychological friction arises from the threats to self-integrity that low-income students experience when considering attending college. Behavioral friction takes the form of institutional and bureaucratic barriers that students must overcome to apply to college and for financial aid. Two interventions are tested separately and in combination to address these dual barriers. A self-affirmation intervention in which students wrote about important values aimed to alleviate threats to self-integrity; and a behavioral ladder intervention that provided a series of timely reminders or “nudges” and accompanying strategies to students through a mobile application (app) at key decision points along the college admissions process addressed behavioral friction. Students who received the behavioral ladder made further progress along the college admission pipeline based on official records, an effect that was apparent only in the affirmation condition. These results illustrate the efficacy of combining “wise” interventions to address discrete barriers, the importance of tailoring and timing intervention content to key points of friction, and the potential of mobile technology to facilitate both objectives.

Keywords: affirmation, nudges, financial aid, achievement gap, wise intervention

Supplemental materials: <https://doi.org/10.1037/pspa0000283.supp>

More than any other time in history, upward mobility in the United States depends on the attainment of college education (Chetty et al., 2017). In 2020, postsecondary education is estimated to be required for 65% of jobs compared with only 28% of jobs in 1973 (Carnevale et al., 2013), and this trend is predicted to continue (Blumenstyk, 2020). Americans with a 4-year degree earn an hourly wage that is nearly double that of those without a degree—a gap that has been increasing over the past few decades (United States Department of Labor, 2019). Even without graduating, time spent in college is associated with greater lifetime earnings (Woolf et al., 2007). In addition to earning financial benefits, college graduates experience better life-satisfaction, well-being, job-satisfaction, as well as mental and physical health (Abel & Deitz, 2014; Boarini et al., 2012; Hout, 2012). These advantages then transfer to college graduates’ children, who are more likely to

do better in school and are less likely to display behavioral or disciplinary problems (Jencks, 2001; Murphy & Welch, 1993), putting subsequent generations on a trajectory of better opportunities. The need for social psychological research to help address and redress social inequality has grown all the more urgent in light of recent crises that have shed greater light on the disadvantages facing low-income and minority individuals.

The benefits of higher education are not equally available to all students. There is a large and widening gap in educational opportunities and achievement between affluent students and those from lower socioeconomic groups (Reardon, 2011). Even after controlling for academic performance, lower-income students enroll in college at dramatically lower rates than their higher-income peers (Autor, 2014). As a result, they end up in low-income jobs, with their children in turn less likely than higher-income children to

This article was published Online First October 7, 2021.

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The ideas42 group supported the development of the mobile application and implementation of the study. Additional funding was

provided as part of the Robin Hood competition. All data and analysis code is available at Open Science Framework (https://osf.io/f6ej3/?view_only=066bbc9827664d56bb6a81c3d4b16832).

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enroll in college—locking in a negative feedback loop that continues to magnify educational and economic inequality (Reardon, 2011).

A primary contributor to this problem is the financial barrier of higher education. The already high and still increasing cost of higher education puts college out of reach for many low-income families, especially when combined with limited opportunities for financial aid. Children from low-income families also receive less encouragement, guidance, and support to attend college (Belley & Lochner, 2007). For nearly all low-income students with the aspiration to attend college, a key precondition for enrollment is access to financial aid (Feeney & Heroff, 2013; Goldrick-Rab, 2016). Thus, providing access to financial aid resources and encouragement to apply for them is one leverage point where small efforts might yield large gains. Many studies have shown that simply providing low-income students with easy access to financial aid—indeed, even the promise that their college will be paid for—increases college enrollment (Bettinger et al., 2012; Flint, 1993; Nora et al., 2006; Scott-Clayton, 2015).

Although access to financial aid is necessary for college attendance, it is often insufficient. Here, we conceptualize the college application process as a channel that extends through time (Lewin, 1943, 1952). This channel presents many hurdles (e.g., passing required courses, taking the SAT/ACT, deciding on where to apply and how). This article focuses specifically on the hurdles related to completing the college application and financial aid application, as these are the major points of friction that dissuade too many qualified low-income students from applying to college (Bettinger et al., 2012).

To enter and remain in the college enrollment channel requires many small steps, and missing any one of them can stall or derail progress. For example, students need to complete the Free Application for Federal Student Aid (FAFSA; that includes multiple sections and requires gathering various financial information from parents) and to apply for a FAFSA PIN before the submission deadline. College applications can require a similar series of small steps, such as determining different school application deadlines and fulfilling varying application requirements, as well as answering different essay questions for each one. To state an obvious yet important fact, students who do not complete their applications for financial aid or college—indeed, who miss just one key step—will not receive financial aid or attend college, respectively. Additionally, students who apply to college but miss the financial aid deadline will receive limited, if any, financial aid, which greatly decreases the likelihood that they will be able to go to college even if accepted (Roderick et al., 2008). Each year, thousands of qualified students fail to apply for financial aid at all or fail to do so in a timely fashion (Bettinger et al., 2012; Castleman & Page, 2015; Dynarski & Scott-Clayton, 2006; King, 2004). Many also do not apply to selective colleges that they have the credentials to attend (Hoxby, 2007).

On the other hand, helping students to make early progress along this channel is likely to help them to build up momentum that increases the likelihood of later persistence. For example, in our own dataset at the school where we conducted this research, being awarded financial aid predicted later enrollment in college. Whereas 57% of those who did not receive financial aid went to college (either a 2- or 4-year institution), 80% of those who did receive financial aid went to college ($\chi^2(1) = 15.85, p < .001$).

What are the barriers to completing the steps along this college enrollment channel? The process of applying to college and for financial aid can be both psychologically threatening and behaviorally complex, especially for students from economically disadvantaged families who have to contend with extra stressors (Dynarski & Scott-Clayton, 2006). The combination of these two barriers can lead to behavioral inertia (Mullainathan & Thaler, 2000) in which students fail to take even the small steps they need to move forward in the channel. We review each of these sources of friction.

The college application process can be psychologically threatening for a number of reasons. First is the widespread stigmatization of the poor in America and the attendant negative stereotypes about their ability and belonging in school (Blascovich et al., 2001; Hall et al., 2014; Steele, 1988). As Claude Steele and his colleagues have shown, being the subject of such negative stereotypes can be psychologically threatening, and have a range of adverse consequences for achievement in school: stress and impaired performance on difficult tasks, avoidance of challenge, self-handicapping, disidentification from academics, and low self-efficacy (G. L. Cohen & Garcia, 2005; Schmader et al., 2008; Stangor et al., 1998; Steele, 1988; Steele & Aronson, 1995). An additional consequence of these negative stereotypes is the phenomenon of belonging uncertainty (Walton & Cohen, 2007). Uncertain if they truly belong in college, low-income students may worry that many of the common hurdles and worries that students experience during the college-application process are emblematic that they do not belong in college. These concerns about stereotypes may be especially intense among low-income students who also come from stereotyped ethnic minority groups, such as African American and Latinx American (Steele, 1988).

Yet, another source of psychological threat is the perceived reality of students' economic status, which can leave low-income students understandably feeling pessimistic about their ability to pay for college. What seems like a straightforward path to financial aid and college enrollment for well-off students may seem formidable to low-income students and likely to result in failure and disappointment (G. L. Cohen & Garcia, 2005; Schmader et al., 2008; Steele, 1988). Also, the everyday stressors that low-income people experience may continually compromise their "cognitive bandwidth," taking up precious attention with basic concerns related to survival and economic solvency, and diverting their attention away from long-term reward such as the possibility of college (Hall et al., 2014; Mullainathan & Shafir, 2013). Research also suggests that psychological threats deplete executive functioning, making it more difficult for people to regulate their behavior in light of long-term goals and values (Schmeichel & Vohs, 2009). Psychological threat is also apt to inhibit an approach motivation and prompt a prevention focus, wherein people are focused on reducing threat rather than seeking reward (Higgins, 1998). On the whole, this research suggests that the channel from high school to college may be perceived as relatively more threatening for poor students, repeatedly challenging their sense of adequacy.

Based on the reviewed literature, low-income students are likely to experience a wide range of psychological threats, which can contribute, through varying mechanisms, to decreased motivation to apply for financial aid and college. Because of the pervasiveness of the threat, and the multitude of mechanisms through which it can undermine motivation, it is difficult to pinpoint the specific

threat and psychological mechanism that impairs college outcomes. We suspect different triggers and mechanisms are at work for different students. Moreover, it is the nature of poverty in America that presents low-income students with a “bundle of threats” that may have varying motivational consequences for school, most of which will be negative.

Beyond the psychological friction of perceived threat, a behavioral friction may stall progress along the college application pipeline. Even if the motivation to succeed is intact, the necessary steps to take may be unclear. This is especially true for economically disadvantaged students who may lack the bandwidth that their more advantaged peers have to keep track of the various requirements and deadlines (Mullainathan & Shafir, 2013). Research suggests that the path from motivation to action is far from straightforward (Ross & Nisbett, 1991). Because there are so many small steps in the application process, each dependent on the previous, a single oversight or missed deadline can negate the possibility of college.

Here, we pair two intervention strategies that each address a unique source of friction in the college application process. Through their combination, we expect a combined benefit such that students from low-income families receiving both interventions will be more likely to progress in the financial aid and college application process, and ultimately enroll in college. We based our selection of intervention strategies on The Trigger and Channel Framework for social intervention (G. L. Cohen et al., 2017; Ferrer & Cohen, 2018). According to this framework, sustained positive change due to social psychological or “wise” interventions (Walton & Wilson, 2018) occurs through a two-step process: first, a positive psychological process is triggered, and second, its effects are then channeled by the environment into behavior. We selected one intervention to trigger a motivational process, self-affirmation; whereby, people reaffirm the integrity of the self in the face of a threat to it: a self-affirmation activity (G. L. Cohen & Sherman, 2014). We selected the second intervention to channel effects of this psychological process into action—a behavioral ladder that provided students with specific reminders with specific information about the concrete actions needed to complete the financial aid and college application processes. We discuss each of these interventions and its relevance to this specific problem in turn.

The first intervention, self-affirmation, has been shown to trigger a psychological process that promotes resilience in threatening situations. Research shows that what makes stressors particularly disruptive is the threat they pose to what Steele (1988) called global self-integrity—a broad, self-image of oneself as “morally and adaptively adequate” (G. L. Cohen & Sherman, 2014; Steele, 1988). But because global self-integrity is at stake, it can be reaffirmed by positive thoughts and feelings in altogether different domains that a person perceives to be central. One way of doing so is through the technique of self-affirmation (G. L. Cohen & Sherman, 2014; Steele, 1988). This is a brief reflective writing activity in which people identify self-defining values unrelated to the provoking threat and then reflect on their importance. For example, a student might identify “relationships with family” as a core value and then write about why that value is important to her. By thinking about “what really matters to me,” people broaden their self-concept (Critcher & Dunning, 2015) and a specific threat they face becomes less destabilizing to their overall conception of

personal worth. Research suggests that values affirmations promote the belonging and performance of people under psychological threat, such as ethnic minority students contending with stereotype threat (e.g., G. L. Cohen et al., 2009; Goyer et al., 2017; Sherman et al., 2013). However, an important aspect of values affirmations is that they mitigate psychological threat regardless of its source (G. L. Cohen & Sherman, 2014). They seem likely to be an effective strategy to help individuals, such as low-income students, who contend with a wide range of potential threats.

The second intervention is what we refer to as a “behavioral ladder,” delivered via a mobile application (app) developed for this study. This intervention was designed to send students timely reminders to complete specific steps along the complex financial aid and college admission path. Prior work has found that simple interventions that address these incremental steps are effective at increasing the financial aid application rate (Bettinger et al., 2012; Castleman & Page, 2016; Dai et al., 2013; Karlan et al., 2016). These interventions, often called nudges (Thaler & Sunstein, 2008) or channel factors (Ross & Nisbett, 1991), can have large effects and constitute a major contribution of social psychology and behavioral economics. Here, we introduce the notion of a behavioral ladder—a series of behavioral rungs of gradually increasing commitment and relevance to a final destination, which in this case is getting into college. Each “rung” in the ladder prompts students to do the next task required to move forward in the process, such as identifying colleges to apply to and their application deadlines, downloading the financial aid application, requesting a FAFSA PIN, and gathering specific financial information. We draw on the insight that behavioral nudges are most effective when they occur soon before a key decision point (Thaler & Sunstein, 2008), but also recognize that one- or two-shot nudge approaches do not always change behavior in the academic context (Bird et al., 2019). Thus, the behavioral ladder builds on the nudge approach, and strengthens its potential efficacy by tailoring and timing the sequential nudges to a specific behavioral channel. To time the prompts appropriately, we designed a mobile app, the *Aspire Labs* app, that students downloaded and which was programmed to deliver the reminders on predetermined dates.

Developments in mobile technology over the past decade have made it possible to deliver timely and tailored nudges through the multiple decision and action points of an entire process, such as the college admission process (see Castleman & Page, 2016). With mobile technology, each user has a portal for timely interventions in his or her pocket, permitting an unprecedented degree of precision in content and timing. Our smartphone application delivered the information and reminders related to the college application process. Smartphones are nearly ubiquitous among student populations, including among low-income students (Griffith, 2019). Over 95% of teens report having access to a smart phone and 45% say they are online “almost constantly” (Anderson & Jiang, 2018). As delivered over the app, the behavioral ladder is not a one-shot intervention but an intervention with multiple touchpoints that are tailored over time to where students are in the college admission and financial aid process. Each message helps to lift students to the next rung in the ladder.

We expected that the two interventions (i.e., the self-affirmation and the behavioral ladder) would each have independent positive effects on financial aid applications and later college enrollment, and that the two might interact synergistically. Many low-income

students want to go to college (Goyette, 2008), but the psychological threat they experience may make it difficult for them to stick to this goal in their everyday actions. Because affirmation has been found to activate reward seeking pathways in the central nervous system (Cascio et al., 2016; Creswell et al., 2005; Dutcher et al., 2016, 2020), it may also increase the reward appeal of college. With the motivation to apply to college better able to predominate in their decision-making, self-affirmed low-income students might be more likely to act on that motivation. This process that would be facilitated by the provision of a clear behavioral channel for how to turn their desire into specific actions, as provided by our behavioral ladder intervention. As an analogy, imagine a person who is both scared of heights and wants to ascend to the roof of a house. Clearly, her goal would be facilitated by a ladder, a technology that enables her to reach her goal through a series of very manageable steps. But, in addition, she would be even more likely to take the key first step if the sense of threat and dread she feels over heights were somehow first allayed.

A final consideration motivates our expectation that our light-touch interventions could have long-lasting effects. The recursive nature of social psychological processes permits even small or brief interventions to yield long-term benefits (G. L. Cohen et al., 2009; G. L. Cohen & Sherman, 2014; Walton & Wilson, 2018; Wilson & Linville, 1982; Yeager & Walton, 2011). An initial success might affirm self-integrity further, as well as trigger other psychological and social processes that promote success, such as the involvement of teachers, heightened self-efficacy, and behavioral momentum due to progress along the pipeline (Garcia & Cohen, 2013). Returning to the ladder analogy, a trepidatious person who has ascended the first rung of the ladder might experience a boost in self-efficacy which provides the confidence needed to ascend the next rung, in a repeating cycle. This experience might be enhanced by affirming onlookers, such as teachers applauding the climber's progress. Given this analysis, a key consideration in the timing of the affirmation is that it occur as early in a threatening circumstance as possible, at the beginning of the "ascent" (G. L. Cohen et al., 2009; Cook et al., 2012; Goyer et al., 2017). Accordingly, the affirmation delivered to our participants occurred as early in the school year as pragmatic constraints permitted.

Method

Participants

This study was conducted in partnership with an urban public high school in Northern California. Two cohorts of the senior student classes were invited to participate. Cohort 1 included the graduating class of 2015 ($n = 161$), Cohort 2 included the graduating class of 2016 ($n = 116$). Across both cohorts, 277 seniors were eligible to participate. One student did not have a smartphone during the time of the intervention implementation and was excluded from the study. The final analytic sample was 276 students.

A power analysis suggested that a total sample of 269 would be necessary to detect a medium effect size, using the standard 80% power cutoff and an alpha of .05, for a model that includes the main effects and interactions between the two intervention manipulations. Although reassuring, the result of the power analysis was necessarily uncertain because the estimated effect size was based

on the size of the affirmation effect established in prior research on dependent measures different from the ones used here (e.g., grades; G. L. Cohen et al., 2006, 2009; Sherman et al., 2013). As a practical reality, we were constrained by available resources and the size of the student population at our research site. We included as many students as we could gain access to over the 2-year period of our grant-supported project.

We worked with an urban California school that serves students from predominantly low-income families, most of whom are ethnic minorities. Approximately 80% of the student population at the school were from families that could be characterized as low in socioeconomic status.¹ On average, students were 17 years old ($SD = .47$). The sample was 58% female and 42% male. The majority of students were Hispanic (71%); 14% were Asian, 9% White, 6% Black, and fewer than 1% American Indian, Alaskan Native, or "other." Most students indicated that Spanish was their primary language (45%), followed by English (24%). There were no significant differences between cohorts along these demographic variables.

Design and Procedure

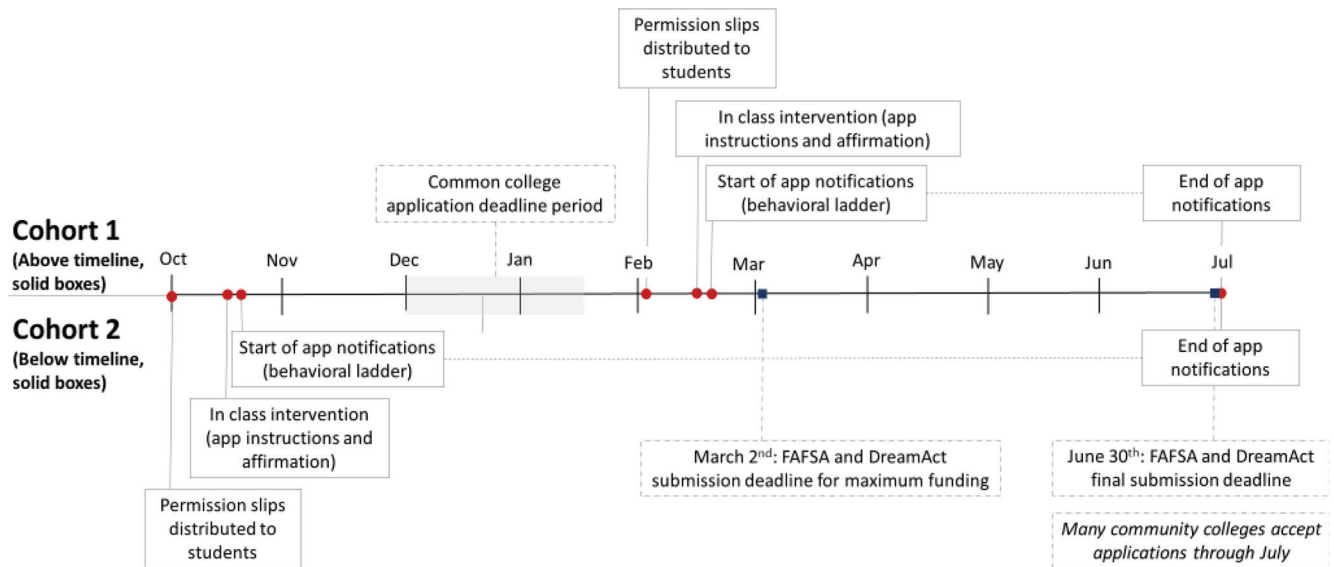
At the beginning of their senior year, students in both cohorts were randomly assigned to one of four experimental conditions in a 2 (Self-Affirmation: Affirmation vs. No Affirmation) \times 2 (Behavioral Ladder: Timely and Specific Reminders About Upcoming Application via the App vs. General Study Skills Recommendations via the App) factorial design. The study included two versions of the affirmation manipulation: a standard self-affirmation and a goal-relevant affirmation in which subjects related their most important values to the goal of gaining admission to college. However, because these two conditions did not have differential effects, they were combined for simplicity (analytic models that distinguish between the two types of affirmation are reported in the online supplemental materials). Given that the participating high school was in California, all study materials and reminders were tailored to the in-state public college systems (California State University [CSU] and University of California [UC]), and included support for both the FAFSA and the Dream Act, the latter being a California-specific financial aid application for some non-citizens and undocumented students.

Intervention Deployment Timeline

Working closely with the school staff and administrators, we identified specific courses that were mandatory for senior students (i.e., English or History) and that would allow access to the entire graduating class for each cohort. The week before the intervention, the teachers in those classes were given a consent form to distribute to their students. Students were asked to have their parents sign and return it within a week. Due to practical constraints, the timing of the interventions varied with the two cohorts, with the second cohort receiving the intervention earlier than the first. Figure 1 displays a timeline for the key events for each of the two cohorts. In Cohort 1, the interventions were delivered later in the

¹Data from California School Dashboard, <https://www.caschooldashboard.org/>. Includes students who are eligible for free or reduced priced meals or students who have parents who did not receive a high school diploma.

Figure 1
Intervention Timeline for Both Cohorts



Note. Approximate application deadlines are noted in boxes with dashed borders. See the online article for the color version of this figure.

school year, after many of the students had applied to college but before they had completed the financial aid application. In Cohort 2, the interventions were delivered earlier in the school year, before students had applied for college and financial aid. The interventions for both cohorts ended June 30th. Although the timing varied for the start of the intervention, both cohorts received college application and financial aid application process reminders, though Cohort 2 received more related to the college application submission process.

Although the initial deployment of the interventions varied between the two cohorts, both cohorts received reminders designed to help them complete the college application process, including submitting an application for financial aid. Because we were allowed to conduct the intervention earlier for students in the second cohort, we added more college application process reminders along with the later financial aid application reminders for the behavioral ladder intervention. This additional content included information about community college applications or 4-year college applications depending on the type of school students had indicated they wanted to attend. The community college content included 25 messages about selecting and applying to a community college (e.g., “Did you know that your school has advisors that can help you make a decision about community college?”). The 4-year college content included 36 messages focused on college application (e.g., “All of the UC and CSU schools have a November 30th deadline, which is much earlier than other private or public schools” and “Do not forget to ask your teachers for a letter of recommendation.”). The specific content for all reminders is provided in the online supplemental materials [Tables SM1–SM8](#).

For many students, the first step of the college application process is whether they apply to college or not. After selecting the colleges they want to apply to, they must complete the appropriate application before the deadline for each school. Once college applications are submitted, they can next apply for financial aid.

Students who do not apply for financial aid never receive it. Applying for financial aid does not guarantee getting it, but the odds favor it (U.S. Department of Education National Center for Education Statistics, 2019). After receiving a financial aid award, students must take several intermediary steps, such as completing additional forms and registrations, before they can apply their award and attend college. Interventions for both cohorts occurred before these many key steps, any one of which, if not completed, would likely prevent a student from attending college the fall after they graduated high school.

Initial Intervention Delivery

On the first day of the intervention, a member of the research team came to the designated classroom to introduce and implement the protocol. The researcher was trained to follow a specific script (provided in [online supplemental materials](#)) that introduced the project, the affirmation activity, and the app download process. The entire process took approximately 30 min of class time.

The self-affirmation intervention was delivered at the beginning of the class during this first session. It took the form of an in-class activity. At that time, students were randomly assigned to one of two affirmation conditions, or a no affirmation control condition: standard affirmation, goal-relevant affirmation, or no affirmation (described under Materials below). The randomization occurred during the preparation of the materials by shuffling the order of the various conditions into a single stack and distributing them to students. All packets for the in-class activity had an identical first page, so that it would not be possible for the researcher, the teacher, or other students to identify which condition the packet was from. Once the packet was distributed, the researcher gave some scripted instructions. All students were told, “I’m here today because your school and teachers are interested in having you work on a project with us. We’ve designed a new app that should be able to help with managing your tasks during the school year

by sending you notifications about school-related things like deadlines and helpful study information.” But first, the researcher explained, they were going to ask them to complete a brief activity: “I’m passing out the surveys I would like you to complete for me. We’re trying to get as much information as possible from you without taking up a lot of your time so there are a few different surveys being passed around.” The researcher asked that students complete the exercise quietly and to respond as honestly as they can. Students were given 20 min to complete the relevant affirmation or no affirmation activity included in the packet.

The researcher then guided students in both cohorts to identify which financial aid application (FAFSA or Dream Act) they were most likely to apply to. Because many students had not yet completed or even started their financial aid applications, the researcher handed out a checklist of criteria that would help students identify which application was right for them (see the Financial Aid Qualification Worksheet in the [online supplemental materials](#)). Students were guided through each of the questions, and could identify which application they qualified for before they moved on to the next section of the study. Knowing which financial aid application they would be applying to was necessary for designating the correct version of the app-based content for the students in the treatment condition.

Finally, the researcher instructed the students to take out their smartphones and guided them through the app download process. All students, except one without a smartphone, were able to download the app for the intervention. The download process included instructing students to find the project app on their respective Android or Apple app stores. Once the students had downloaded the required app, they were told to register by using any username or password they wanted to.

At this point, students were guided to view a list of four possible links to download onto their phone. Assignment to either the treatment (financial aid and college related notifications) or control (study tips notifications) conditions was determined randomly by inserting a sheet of paper with the letter “A” or “B” at the end of their writing activity. The researcher instructed students to look at this page to determine which version of the mobile app they should click on. The app for each of the two relevant conditions (behavioral ladder vs. study skills) was designated with a prefix that corresponded to the letter on the provided sheet. In addition, each version of the app-content had two subtypes, corresponding to the type of financial aid application the students were intending to apply for (i.e., “A_FAFSA,” “A_DreamAct,” “B_FAFSA,” or “B_DreamAct”). Students were asked to download one of these four versions of app that corresponded to their letter designation (in reality, condition assignment) and to the type of financial aid application that they had determined was most relevant to them.

Once students completed the registration process and clicked on the relevant app package, the collection of notifications (both the content and the specified timing triggers) downloaded onto their phones, allowing the app to begin sending the timely reminders regardless of Internet connectivity. The app was designed to send notifications on a regular basis, and the only way to stop getting those notifications was either to turn off the notifications for the app in the phone settings or to uninstall the app. On the evening of the first day of the intervention, students began to receive notifications with reminders either about their upcoming financial aid information in the treatment condition or about study skills tips in

the control condition (see the list of notifications, along with the timing of their delivery, in the online supplemental materials [Tables SM1–SM8](#)).

Materials

Self-Affirmation

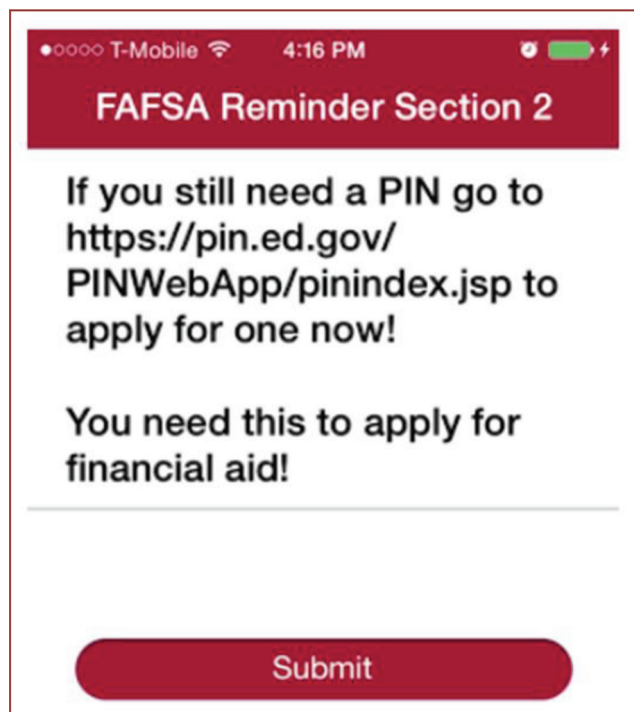
Students were randomly assigned to one of three affirmation conditions: no affirmation, standard self-affirmation, or goal-relevant self-affirmation. All materials were embedded in the packet circulated to students. In all three conditions, students were first presented with a list of 11 values. The standard version of the self-affirmation intervention was consistent with the protocol of past studies (G. L. Cohen & Sherman, 2014) and instructed students to choose their top two to three most important values, and then to write about why their chosen value(s) was important to them. The goal-relevant self-affirmation, developed and validated by Fotuhi (2013; see also Kizilcece et al., 2017) similarly asked students to choose their top two to three values, but then asked them to think of a person close to them who was supportive of the their goal to go to college and then to write about why their selected value was important to both of them. As noted, because these two conditions did not differ in their effects, they were collapsed in analyses (see [online supplemental materials](#) for closer inspection of each affirmation condition). Students in the no affirmation condition were asked to choose the two to three values that were the least important to them, and then asked to write about why those values “might be important to someone else.” This was consistent with the standard control procedures used in past research (G. L. Cohen & Sherman, 2014).

Behavioral Ladder

We created a mobile app for this project called *Aspire Labs*. It was prepopulated with the college and financial aid application tips and reminders (in the treatment condition) or with study skills content (in the control condition). The development of the app itself was a costly, complex, and lengthy process that spanned over 2 years. It included numerous iterations of user testing to ensure its ease of use, clarity of the messages, and troubleshooting of critical functionalities to send timely notifications across various device types and varying levels of Internet access. In the behavioral ladder condition, the mobile app was programmed to break down the long-term, complex application process into smaller and more manageable subtasks, each with its own associated set of deadlines. The app then sent out timely reminders and information to the students on how to effectively complete the relevant subtask. The messages also presented concrete instructions and relevant resources needed to accomplish the task (see the [online supplemental materials](#) for the content and timing of each of the messages). For example, one message alerted students, “To complete your FAFSA now, go to: <https://fafsa.ed.gov/index.htm>” and another, “For many students, entering tax information is as simple as clicking a button! Go here to learn about the IRS Tax Transfer Button: <https://studentaid.ed.gov/sa/sites/default/files/transfer-tax-info-to-fafsa.png>.” [Figure 2](#) presents a screenshot of one of the FAFSA reminders.

These reminders were timed to key deadlines along the college-enrollment pipeline which unfolded over the year. Thus, the early

Figure 2
 Screenshot of Free Application for Federal Student Aid (FAFSA) Reminder Provided to Students via the Behavioral Ladder Application



Note. See the online article for the color version of this figure.

messages focused students on the necessary first steps (websites to click on), others reminded them of midway steps (e.g., create a college application account, apply for a FAFSA PIN), while the later messages reminded them of imminent submission deadlines.

In the control condition, the messages focused on study skills, such as “Did you know that setting up a schedule for studying and homework can be really helpful?” and “Did you know that reviewing your notes every night is better than studying all at once?” For Cohort 1, the time period of the messages spanned from January 4 through June 30. For Cohort 2, the time period of the messages spanned from September 1 through June 30. Generally, study skill tips have been found to be ineffective and a suitable control condition (e.g., Walton et al., 2015).

Measures

The impact of the two interventions was assessed with three behavioral measures, data for which were obtained from students’ records: (1) did they apply for financial aid? (2) did they receive financial aid? and (3) did they matriculate to college the year following the intervention? Unfortunately, there were no official data on whether students *applied* to college versus ultimately enrolled. Official data related to financial aid applications and award were collected by school staff and shared with the researchers at the end of the school year in which the intervention was deployed. Data related to college matriculation were accessed through the National Student Clearinghouse (NSC) by the school district and

shared with the researchers at the end of the fall term for each of the year after the intervention was deployed. The NSC is a comprehensive database frequently used by researchers to track outcomes related to college enrollment and persistence (Dynarski et al., 2015). More than 3,600 colleges and universities participate. Consistent with standard practices (Dynarski et al., 2015), students who had no record in the NSC database were deemed not to have enrolled in college (institutions reporting to NSC cover 99% of students enrolled in college; National Student Clearinghouse, 2020). To reduce the possibility that students’ names might be matched incorrectly, we relied on a number of best practices and on the advice of experts in the use of the NSC database. We submitted multiple versions of first names, included middle names whenever possible, and submitted multiple birthdates where any minor typographical errors in the official data records were suspected (e.g., a year indicated as a day of the month). Despite these precautions, measurement error and omissions can still occur, especially with respect to information related to for-profit college enrollment. These institutions are less likely to submit data to the NSC, and when they do, it is less likely to be on time or accurate.

The process of successful college entry is much like ascending a ladder, with the completion of each step increasing the likelihood of taking the subsequent one. Whether students apply for college or not constitutes the first key step. Submitting financial aid applications, of course, is required to be awarded it. Completing the FAFSA requires setting up an account PIN, collecting information from the student’s parents, and completing all sections of the application. Applying for financial aid does not guarantee getting it, but the odds favor it; 76% of students in our dataset who applied for aid received it. But that is not the end. Not only must students be officially awarded the aid. They must take several intermediary steps, such as completing additional forms and registrations, to have the aid applied to the college of their choice. Still, being awarded financial aid portends enrollment in college.

To measure student progress along this process, we calculated a sum score corresponding to how many rungs out of three that they climbed: applying for financial aid, being awarded financial aid, and enrolling in college. Students received a value of 1 if they completed any rung. Twenty percent of students had a score of 0, 22% of students had a score of 1, 21% had a score of 2, and 38% had a score of 3 ($n_s = 54, 60, 57, \text{ and } 105$, respectively). We used all available data for each student and opted to treat missing values as zero as empty records at the school typically indicated noncompletion; alternative methods, such as using only those students who had data for all three indicators, yielded the same results. Using a sum score of the three possible steps students could take best captures the intervention effects, because our behavioral ladder intervention aimed to influence intermediary behaviors that could influence each of these three steps.

Results

Analytic Plan

First, an analysis of variance (ANOVA) tested for the effectiveness of randomization. Next, the primary analysis featured linear regression that examined the effect of the main and interactive effects of the interventions on the total number of steps that

students ultimately completed in the college application process. An ordinal regression model produced the same pattern of estimates and significance as the linear regression (and is reported in the [online supplemental materials](#)); given the equivalent findings between linear and ordinal regression models, we chose to feature the linear regression as its coefficients are more readily interpretable. As noted, data were available on three key binary indicators: whether students applied for financial aid, whether they received financial aid, and whether they enrolled in college. Analysis controlled for demographic variables known to predict college enrollment as well as cohort. Thus, gender was represented with a contrast variable ($-1 = \text{male}$, $1 = \text{female}$) and ethnicity was represented with three dummy variables to represent the four main ethnic group categories (Hispanic, $n = 196$; Asian, $n = 39$; Black/American Indian/Alaskan Native/other, $n = 17$; White, $n = 24$ and were the reference group).

Our primary analysis served as an “omnibus” test as to whether the interventions affect progress along the college enrollment path, with the dependent measure being the total number of steps taken. Two secondary analyses were planned in the event that the primary one yielded a significant effect. These secondary analyses served to assess the *scope* of the effect of the intervention, should one be obtained in the primary analysis. These secondary analyses feature two pragmatically important outcomes. One analysis tested whether the intervention increased the likelihood that students took one step along the application channel. Taking one step, rather than none, is a promising sign of intervention efficacy, even though more support may be found to be needed to help students to progress further. The other secondary analysis tested whether the intervention increased their likelihood of taking all three steps. This represents the pragmatically significant effect of a student completing all requisite steps along the pipeline and enrolling with financial aid in college, a watershed moment in the life course (Braveman et al., 2011; Card, 1999). All models used the same controls for gender, ethnicity, and cohort.

The affirmation condition was represented with a contrast code ($-1 = \text{no affirmation}$, $1 = \text{affirmation}$). Simultaneously, the two types of affirmation were also contrast coded, though, as noted, the effect of affirmation did not vary by the standard or goal-relevant affirmation, so our report collapses across these two affirmation variants (see [online supplemental materials](#) for a detailed report of the two affirmation variants). The behavioral ladder condition was similarly contrast coded ($-1 = \text{study skill reminders}$, $1 = \text{college and financial aid application reminders}$). Though there was a main effect of cohort, it did not interact with either condition, so it was simply included as a contrast coded covariate ($-1 = \text{Cohort 1}$, $1 = \text{Cohort 2}$). The interaction between the behavioral ladder condition and the affirmation contrasts were added to the model. Because there were interactions between gender and each of the manipulated variables, they were also included in the model. There were no interactions between student ethnicity and any of the manipulated variables; accordingly, only the main effect of student ethnicity was included in the models.

Effectiveness of Random Assignment

A two-way ANOVA tested for differences in gender and ethnicity by the two conditions (2 Affirmation Conditions \times 2 Behavioral Ladder Conditions). Gender did not differ by either

intervention or the interaction between them (omnibus $F(3, 272) = .84$, $p = .471$; individual coefficient $ps > .231$). Though there were some slight imbalances in the representation of Asian students by condition, the proportion of Hispanic, White, Asian, and Black, Native American, and other students in general did not vary by each condition or by the interaction of conditions ($F_s > 2.60$, $ps > .053$).

Differences in gender and ethnicity were also examined between the two cohorts. Cohort 2 contained more women than Cohort 1 (Welch's $t = 2.45$, $p = .015$) and fewer Black, Native American, and “other ethnicity” students (Welch's $t = 3.14$, $p = .002$). Overall, randomization was generally successful. However, because there was some minor variation in student gender and ethnicity, primarily by cohort, they are included as covariates in all models.

Primary Analysis: Total Number of College Enrollment Steps Completed

The overall model was significant, $F(10, 265) = 5.63$, $p < .001$, adjusted $R^2 = .14$. There were several noteworthy effects (see [Table 1](#) for all model coefficients). There was a significant main effect of the behavioral ladder, $B = .32$, $SE = .10$, $t = 3.23$, $p = .001$, and an interaction between the ladder and affirmation interventions, $B = .15$, $SE = .07$, $t = 2.14$, $p = .034$, suggesting a tendency for affirmation to synergize the effect of the behavioral ladder. As shown in [Figure 3](#) and [Table 2](#), students who received both the behavioral ladder intervention and affirmation completed, on average, the greatest number of steps toward college enrollment. Given the strong main effect of the behavioral ladder and its interaction with self-affirmation, we used contrasts to zero in on the effects of the behavioral ladder as a function of affirmation condition (see Rosnow & Rosenthal, 1996, for additional details on this approach). The first contrast tested for an effect of the behavioral ladder among those who completed the self-affirmation activity. It was highly significant $B = .65$, $SE = .16$, $t \text{ ratio} = 3.97$, $p < .001$, with a moderate-to-large effect size, Cohen's $d = .65$.² Among those who did not complete the self-affirmation activity, there was no effect of the behavioral ladder versus study skills activities on number of steps taken ($B = .06$, $SE = .22$, $t \text{ ratio} = .29$, $p = .769$), and the effect size was almost nil (Cohen's $d = .06$).

Additionally, females completed more steps than males, $B = .60$, $SE = .14$, $t = 4.28$, $p < .001$. There was also an interaction of gender with the behavioral ladder condition, $B = -.29$, $SE = .13$, $t = -2.20$, $p = .029$, such that boys benefited from the behavioral ladder more than girls, with the ladder lifting boys near to the level of girls.

Cohort also yielded a significant effect such that the first cohort completed more steps than the second, $B = .42$, $SE = .14$, $t = 3.11$, $p = .002$. The only effect of ethnicity was a tendency for Asians to display relatively greater progress compared with White students, $B = .84$, $SE = .29$, $t = 2.92$, $p = .004$.

²Conventional benchmarks: $d = .5$ for medium effect, $d = .8$ for large effect (J. Cohen, 1988)

Table 1
Regression Coefficients for the Three Models

Variable	Primary model-N of steps completed			Secondary Model 1-Took one step (dichotomous)			Secondary Model 2-Completed all steps (dichotomous)		
	B (SE)	p	[95% CI]	B (SE)	p	[95% CI]	B (SE)	p	[95% CI]
Intercept	1.30 (.26)	<.001	[.79, 1.81]	.29 (.57)	.619	[-.83, 1.45]	-.95 (.53)	.073	[-2.01, .07]
Cohort	-.42 (.14)	.002	[-.69, -.16]	-.79 (.35)	.023	[-1.49, -.12]	-.54 (.28)	.056	[-1.10, .01]
Gender	.60 (.14)	<.001	[.32, .87]	1.06 (.35)	.003	[.38, 1.77]	.96 (.30)	.001	[.39, 1.56]
Hispanic	.24 (.24)	.322	[-.23, .71]	1.02 (.53)	.053	[-.04, 2.05]	-.08 (.48)	.873	[-1.00, .89]
Black, Native American, and Other	.22 (.35)	.522	[-.46, .91]	.62 (.78)	.429	[-.90, 2.19]	-.32 (.73)	.667	[-1.80, 1.11]
Asian	.84 (.29)	.004	[.27, 1.41]	2.13 (.77)	.005	[.68, 3.73]	1.01 (.58)	.083	[-.11, 2.19]
No affirmation vs. affirmation	-.06 (.10)	.592	[-.26, .15]	.19 (.24)	.418	[-.27, .67]	-.15 (.23)	.517	[-.60, .30]
Behavioral ladder	.32 (.10)	.001	[.13, .52]	.58 (.24)	.016	[.12, 1.07]	.64 (.23)	.005	[.20, 1.11]
Affirmation × Behavioral Ladder	.15 (.07)	.034	[.01, .28]	.46 (.18)	.009	[.12, .82]	.18 (.14)	.199	[-.10, .46]
Gender × Affirmation	.11 (.14)	.421	[-.16, .38]	.05 (.35)	.884	[-.64, .73]	.13 (.29)	.640	[-.43, .70]
Gender × Behavioral Ladder	-.29 (.13)	.029	[-.55, -.03]	-.60 (.35)	.083	[-1.30, .07]	-.54 (.29)	.060	[-1.11, .01]

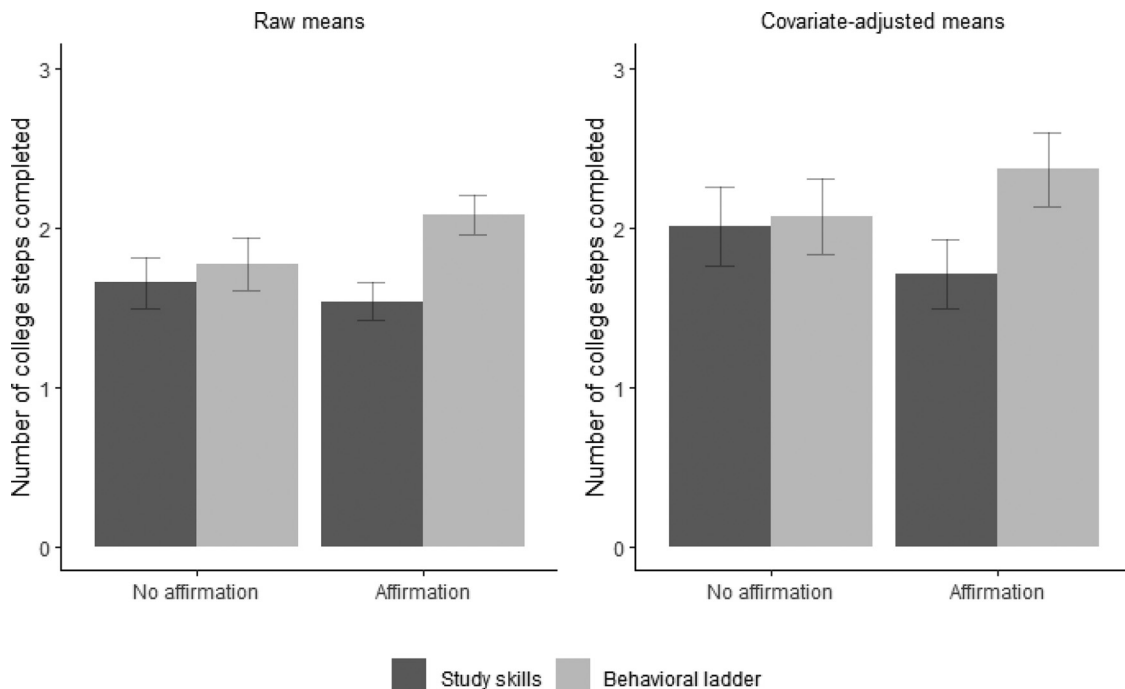
Note. CI = confidence interval. The comparison group for the three ethnicity variables was students who identified as White.

Secondary Model 1: Completing at Least One Enrollment Step

Although a single step may not translate to college enrollment, students are often embedded in an environment of support and other efforts to promote college enrollment. Thus, taking at least one step still marks an important outcome that, with the right support, could propel them to college enrollment. The present secondary analysis aimed at probing where the overall effect of our

interventions manifested. The overall logistic regression model was significant, $\chi^2(265) = 37.05, p < .001$, McFadden $R^2 = .14$ (see Table 1 for all model coefficients). There was again a significant main effect of behavioral ladder, $B = .58, SE = .24, z = 2.42, p = .016$, and an interaction between the behavioral ladder and affirmation, $B = .46, SE = .18, z = 2.61, p = .009$, suggesting a tendency for affirmation to synergize the effect of the behavioral ladder. As shown in Figure 4 and Table 3, students who received the affirmation and the behavioral ladder intervention were more

Figure 3
Mean of Number of Enrollment Steps Completed by Affirmation and Behavioral Ladder Conditions



Note. Raw means presented in the left panel and covariate-adjusted means presented in the right panel (controlling for cohort, gender, and ethnicity; means estimated at grand means of covariates). Error bars represent $\pm 1 SE$.

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Table 2
Raw and Covariate-Adjusted *M* of Number of Enrollment Steps Completed by Affirmation and Behavioral Ladder Conditions

Condition	Raw <i>M</i> (<i>SE</i>)	Covariate-adjusted <i>M</i> (<i>SE</i>)
No affirmation		
Study skills	1.65 (0.16)	2.01 (0.25)
Behavioral ladder	1.77 (0.16)	2.07 (0.24)
Affirmation		
Study skills	1.54 (0.12)	1.71 (0.22)
Behavioral ladder	2.08 (0.12)	2.36 (0.23)

Note. Covariates include cohort, gender, and ethnicity (covariates evaluated at grand means).

likely to complete at least one step toward college enrollment. We again used contrasts to assess the strength of the ladder effect by affirmation (Rosnow & Rosenthal, 1996). In the affirmation condition, the effect was positive and significant (odds ratio [*OR*] = 4.40, *SE* = 2.09, *z* ratio = 3.11, *p* = .002). In the no affirmation condition, it was not and even ran in a negative direction (*OR* = .69, *SE* = .35, *z* ratio = -.72, *p* = .472). To illustrate this pattern, we can see from Figure 4 that those who completed the affirmation and received the ladder had an estimated 10 percentage points greater likelihood of taking one step, in contrast to students who received the ladder but did not complete the affirmation.

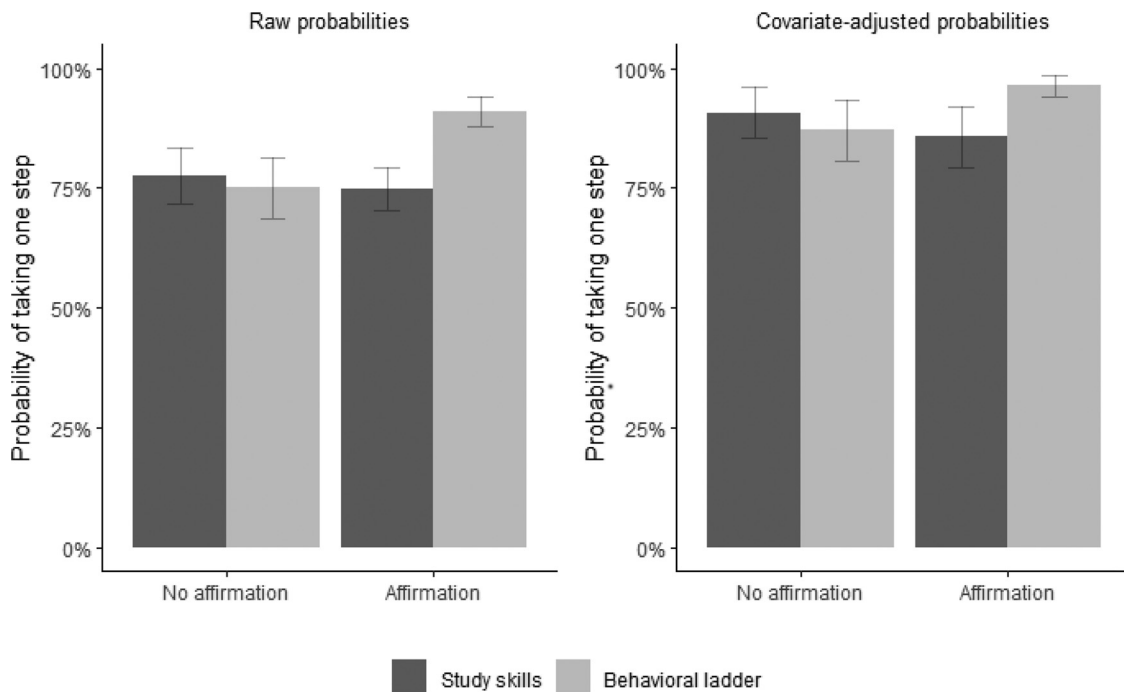
Paralleling the earlier results, females were more likely to complete at least one step than males, *B* = 1.06, *SE* = .35, *z* = 3.01, *p* = .003. Asians were more likely to take one step than White students, *B* =

2.13, *SE* = .77, *z* = 2.79, *p* = .005. Cohort also yielded a significant effect such that the first cohort showed better progress than the second, *B* = -.79, *SE* = .35, *z* = 2.28, *p* = .023. An additional model included all two-way and three-way interactions between the two affirmation contrasts, the behavioral ladder contrast, and the cohort contrast; there was no significant interactions involving cohort, against suggesting generality of results (*ps* > .328; see online supplemental materials for the full model).

Secondary Model 2: Completion of All Enrollment Steps

A second exploratory analysis considered if students completed all three key steps—applied for financial aid, received it, and attended college. The overall model was significant, $\chi^2(265) = 30.44$, *p* < .001, McFadden *R*² = .08 (see Table 1 for all model coefficients). There was a main effect of the behavioral ladder, *B* = .64, *SE* = .23, *z* = 2.79, *p* = .005. Unlike the primary model, the interaction between the behavioral ladder and affirmation was not significant, *B* = .18, *SE* = .14, *z* = 1.29, *p* = .199, but it was in the same direction as the interaction in the first model (see Figure 5 and Table 4). Although the interaction was not significant, the contrast tests revealed the same pattern of findings as the primary model and the first exploratory model. Among those students who had received an affirmation, the ladder had a significant and positive effect (*OR* = 3.03, *SE* = 1.09, *z* ratio = 3.08, *p* = .002). Among those who did not complete the self-affirmation activity, there was no effect of the behavioral ladder (*OR* = 1.46, *SE* = .65, *z* ratio = .85, *p* = .396). In the no affirmation condition, the ladder led to an estimated 9-point increase in the percentage of students completing all three steps. By contrast in the affirmation, condition, the behavioral ladder led to

Figure 4
Probability of Students Completing At Least One Enrollment Step by Affirmation and Behavioral Ladder Conditions



Note. Raw probabilities presented in the left panel and covariate-adjusted probabilities presented in the right panel (controlling for cohort, gender, and ethnicity; means estimated at grand means of covariates). Error bars represent ± 1 *SE*.

Table 3
Raw and Covariate-Adjusted Probabilities of Students Completing At Least One Enrollment Step by Affirmation and Behavioral Ladder

Condition	Raw probabilities (SE)	Covariate-adjusted probabilities (SE)
No affirmation		
Study skills	78% (6%)	91% (5%)
Behavioral ladder	75% (6%)	87% (6%)
Affirmation		
Study skills	75% (5%)	86% (7%)
Behavioral ladder	91% (3%)	96% (2%)

Note. Covariates include cohort, gender, and ethnicity (covariates evaluated at grand means).

an estimated 25-point increase in percentage of students completing all three steps.

Similar to the prior models, females were more likely to complete all three steps than males, $B = .96, SE = .30, z = 3.24, p = .001$. An additional model included all two-way and three-way interactions between the two affirmation contrasts, the behavioral ladder contrast, and the cohort contrast; the same pattern of results was found. There was one significant interaction between cohort and the behavioral ladder ($B = -.62, SE = .30, z = -2.07, p = .038$), suggesting the behavioral ladder was more effective for Cohort 1; however, this effect is not replicated in other models. The full model is presented in the [online supplemental materials](#).

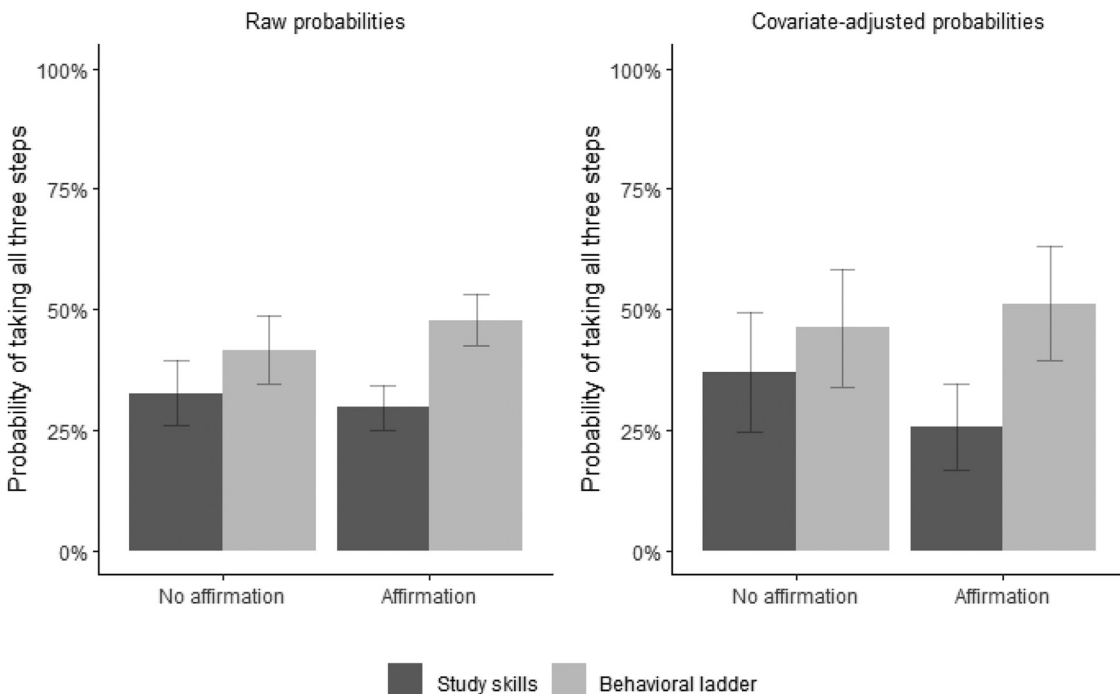
Effect Robustness

The primary model and each of the secondary models replicate a consistent pattern of results. The main effect of the behavioral ladder was always strong and robust. Because each predictor was centered on zero, this main effect is interpretable as the overall effect of the ladder intervention at the “mean” level of the other predictors. However, the follow-up contrasts showed that this effect was significant, robust, and with a strong effect size only in the affirmation condition, not in the no affirmation condition. Although the interaction effect was only $p = .036$ in the primary model, and not significant in one of the two secondary models, the contrast analysis is a practical alternative, and at least a persuasive supplement, to a reliance on the interaction test (see [Rosnow & Rosenthal, 1996](#)). Additional models examined the effect without covariates and with an ordinal regression model; in each of these cases, the same significant and robust pattern of results was obtained (see [online supplemental materials](#)).

Discussion

A dual intervention that combined a behavioral ladder with self-affirmation was most effective at increasing the likelihood that economically disadvantaged students took the required steps to apply for college and financial aid, and ultimately enroll in college. The combined affirmation and behavioral ladder intervention led to an approximate 14 percentage point increase in the number of low-income students completing all steps and enrolling in college compared with those in the no affirmation condition. The

Figure 5
Probability of Students Completed all Three Enrollment Steps by Affirmation and Behavioral Ladder Conditions



Note. Raw probabilities presented in the left panel and covariate-adjusted probabilities presented in the right panel (controlling for cohort, gender, and ethnicity; means estimated at grand means of covariates). Error bars represent $\pm 1 SE$.

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Table 4
Raw and Covariate-Adjusted Probability of Students Completing All Three Enrollment Steps by Affirmation and Behavioral Ladder Conditions

Condition	Raw probabilities (SE)	Covariate-adjusted probabilities (SE)
No affirmation		
Study skills	33% (7%)	37% (12%)
Behavioral ladder	42% (7%)	46% (12%)
Affirmation		
Study skills	30% (5%)	26% (9%)
Behavioral ladder	48% (5%)	51% (12%)

Note. Covariates include cohort, gender, and ethnicity (covariates evaluated at grand means).

interaction between the behavioral ladder and the self-affirmation passed the $p < .05$ threshold in our primary model, and emerged significant in one of our two exploratory models. Still, in all models, including the ones reported in the [online supplemental materials](#), there was a consistent and strong effect of the behavioral ladder in the affirmation condition and a near-nil effect size of the ladder in the no affirmation condition (cf., [Rosnow & Rosenthal, 1996](#)). The main effect of the behavioral ladder, estimated across both affirmation conditions, was highly significant in all models (all $ps < .016$) and represents an important finding in itself.

There are five key contributions of this research. First, it elucidates the predictions of the Trigger and Channel Framework of intervention effects ([G. L. Cohen et al., 2017](#); [Ferrer & Cohen, 2018](#)) in a specific context. A writing prompt triggered a self-affirmation process in students, the effects of which were then channeled by the availability of a clear behavioral path to advance toward their goals. The combination of motivational processes and situational outlets for them predicts behavior. It is for this reason that our study focused on both the behaviors preceding college enrollment and eventual college enrollment as relevant outcomes. Although a focus on college enrollment as the primary outcome offers meaningful insight about the potential impact and longevity of this intervention, it is also of theoretical relevance to understand the intermediary psychological and behavioral levers that the intervention is able to influence.

Second, the research shows the utility of combining multiple psychological interventions to address the multiple barriers that can block progress in real-world social arenas. In the present study, it took two interventions to overcome two discrete barriers—psychological threat and behavioral inertia. This “cocktail” approach may be helpful given that many of today’s social problems are multiply determined, particularly with regard to socioeconomic status.

Third, our findings add to the body of research on “nudges” or channel factors ([Ross & Nisbett, 1991](#); [Thaler & Sunstein, 2008](#)). Although some research suggests that nudges can produce large effects on behavior, other research has revealed mixed and nil effects (e.g., [Bird et al., 2019](#); [Hanselman et al., 2017](#)). Sometimes, in the words of one paper, “a nudge is not enough” ([Bronchetti et al., 2013](#)). One possible reason is that, even when a behavioral channel is open, psychological threat may impede

people from taking action. A student who is worried about being stereotyped as inferior may feel discouraged from applying for financial aid even when “nudged.” A second possible reason is that many times a decision arena takes the form not of a single “on-ramp” but a series of choices that build on one another, like rungs on a ladder. Taking one step is not enough. In such a context, a useful metaphor for intervention is not so much a “nudge” but a “ladder,” in which people are provided with tailored and timely reminders to ascend the rungs to their goal.

Fourth, our results add to the body of research on self-affirmation interventions ([G. L. Cohen & Sherman, 2014](#)). While some studies suggest powerful and lasting effects, others have yielded mixed and null results. Why? As the Trigger and Channel Framework suggests, the effects of the self-affirmation process depend on the environmental outlets for its expression in the environment. Here, we provided a clear environmental outlet through periodic suggestions of clear actions student could take. According to our theoretical framework, these gave self-affirmed students a clear way to express their “now-unblocked” motivation to pursue the long-term hope of a college degree. Absent such environmental outlets for motivational processes, the effects of self-affirmation—and other interventions ([Walton & Wilson, 2018](#))—may be fleeting.

Fifth, our research demonstrates the potential of mobile technology as a means to deliver psychological interventions that are targeted to people in need, tailored in content to their needs, and timely to when those needs arise (see also, [Manke et al., 2021](#))—key conditions for the efficacy of social psychological interventions ([G. L. Cohen et al., 2017](#)). This contribution is particularly useful given the trend for increasing distance education ([Mupinga, 2005](#)) that has been accelerated by the coronavirus disease 2019 (COVID-19) pandemic ([Goldstein, 2020](#)). Further development of these types of technology-delivered interventions could offer additional advantages. First, they allow practitioners to intervene at various points throughout a pipeline, where continued success requires continued action. With multiple intervention touchpoints, intervention effects may be more likely to persist rather than decay over time. Second, mobile technology allows practitioners to deploy interventions at the many psychologically threatening points along the pipeline; with more continued support, people will be less likely to be derailed in the path to their goals. Of course, in any future attempts at such long-range intervention, it should be borne in mind that no intervention will affect an outcome that people have little, if any, control over. Thus, a key conditionality of affirmation effects is the availability of resources that support people’s progress, a notion that received support in a recent meta-analysis of when affirmation interventions benefit performance in schools ([Wu et al., 2021](#)).

Limitations

We intervened only with one school, so we do not know the extent to which the same effects would generalize to other schools. The school we conducted our research in was made up of mostly Hispanic, low-income students. Future research should attempt to replicate our results in other school contexts and with other student populations. Key contextual variables to attend to are whether there is evidence of “underperformance,” with students doing worse than expected, and whether the school provides material

and human resources to support the college application process (see Wu et al., 2021).

Second, the mobile app did not have any ability to track how students interacted with the app and the reminders, such as whether they clicked on the link embedded in a reminder. Future research can exploit the rapidly developing technologies and range of functionalities offered by mobile technology.

The study also focused on college enrollment as the positive outcome after high school. However, some students may pursue alternative career pathways such as the military or working in a family business. Thus, students who failed to complete college application steps and enroll in college should not necessarily be seen as less successful. Nevertheless, college degrees remain among the most important predictors of later life outcomes, including health and wealth (Braveman et al., 2011; Card, 1999).

The contribution of our research would be more persuasive with a replication. On the other hand, it took 3 years to conduct this research, as it was necessary to build relationships with the school and develop the relevant intervention materials including a new mobile application. Moreover, our hypothesized effects are consistent with expectations derived from prior research and our theoretical model. Additionally, given the severity of the social problem we sought to address, and the difficulty in conducting replications in the era of COVID, we think that our findings make several important contributions both to psychological science and society.

A final limitation is that our research did not address the very real structural and systemic barriers to success among this population (Belley & Lochner, 2007; Bettinger et al., 2012). Clearly, structural and systemic changes are needed to help those in poverty and distress. Without the opportunity to receive financial aid, our interventions would have had little if any impact. In fact that is one of the very premises of the Trigger and Channel Framework that informed our intervention approach.

The findings reported here suggest that brief but psychologically and behaviorally leveraged interventions can help to ameliorate social inequality. The gap in college-going rates between well-off and low-income youth contributes to inequality in later career, economic, and health indices. Increasing financial aid uptake and college enrollment among low-income students—known to be an engine of social mobility—is critical to addressing this issue and ensuring a healthier society. Although the causes of this inequality can seem formidable, targeted and tailored interventions timed to key transitions in the life course can help at least a little.

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Received June 25, 2020

Revision received May 28, 2021

Accepted May 29, 2021 ■