

Search of the Intervention Literature

To gather evidence on relevant interventions, the committee searched the social-psychological intervention literature in several ways. The search started with all of the references cited in chapters in *Motivational Interventions* (Karabenick and Urdan, 2014), a recent edited volume summarizing work on the kinds of interventions the committee sought to describe. The committee also conducted searches in Google Scholar and searched Websites of researchers known to be conducting social-psychological interventions. Whenever relevant intervention studies were found, the committee reviewed their reference lists for additional studies. All told, the search uncovered 49 articles describing 61 studies that met the inclusion criteria. These criteria required that the intervention (1) sought to manipulate one of the competencies identified in this chapter, (2) included clearly defined treatment and control groups comprising college students or individuals who were about to matriculate in a college, (3) was based on at least 10 subjects per group (most samples were much larger), (4) incurred less than 50 percent attrition between its start and the time at which the outcome was measured, and (5) employed random assignment. The search produced the following numbers of studies, grouped by competency: behaviors related to conscientiousness (7), sense of belonging (10), academic self-efficacy (2), growth mindset (17), utility goals and values (15), intrinsic goals and interest (3), prosocial goals and values (2), and positive future self (5). Among these 61 studies, 29 were conducted after 2010.

Regarding the impact of the interventions, the committee coded information on the size of the impact reported for all of the academic and competency outcomes included in each study. Some 47 studies among those coded report results for academic achievement outcomes; an equal number report impacts on the committee's eight targeted competencies, although not all studies provide enough data for the committee to calculate the size of the impact, with some merely reporting whether findings were statistically significant. For academic outcomes, course grades and GPA are reported most frequently. Impacts on college retention are reported in 5 studies. Regarding long-term impact, very few studies report impacts more than 1 year after the end of the intervention.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Conscientiousness	Arroyo, S. G. (1981). Effects of a multifaceted study skills program on class performance of Chicano college students. <i>Hispanic Journal of Behavioral Sciences</i> , 3, 161-175.	<p>A study skills intervention</p> <p>Random assignment</p> <p>Chicano studies department, Washington State University: 18 Chicano participants & 14 non-Chicano participants completed training (10 females and 4 males).</p> <p><u>15 week semester intervention</u></p> <p>Baseline period (Weeks 1,2): participants recorded detailed study habits. Social reinforcement was given or withheld depending on whether participants completed their data sheets. 2 groups: training-maintenance (T-M) and control-training (C-T).</p> <p>Training (Weeks 3-13): The T-M group received 5 weeks of training (T), while the C-T group remained on baseline (served as C). During the second 5-week period, the C-T group received training in the same manner that the T-M group had during treatment, while the T-M group received no further training (i.e., they were returned to baseline procedures and were observed for maintenance).</p> <p>Training: The experimenter and the participant analyzed participants studying behavior, explored ways in which the participant could manipulate the environment to encourage productivity. Shaping and self-reinforcement procedures were initiated by the experimenter.</p> <p>Shaping instructions (Fox, 1962): participants were encouraged to pick a specific quiet place to study and to bring only the material to be studied for this class. If unable to concentrate, the participants were told to stop studying and instead engage in an activity that they found to be reinforcing (but to increase the number of pages read each day before engaging in the reinforcing activity).</p>	<p>Baseline equivalence established: baseline means, NS.</p> <p>ANOVA: 2 x 3 group (T-M or C-T) x time periods (baseline, treatment-control, and maintenance-treatment)</p> <p><u>Mid-term and final examinations</u></p> <p>ANOVA: 2 x 2 group (T-M or C-T) x examinations.</p>

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Competency	Reference	Intervention & Population	Evaluation
Conscientiousness	Bettinger, E., & Baker, R. (2014). The effects of student coaching: An evaluation of a randomized experiment in student advising. <i>Educational evaluation and policy analysis</i> , 36, 3-19.	A student coaching intervention. Random assignment n=13,555 <u>Two semester intervention</u> Treatment (n=8049) "Coached group": Participants were contacted by a coach regularly to develop a clear vision of participants goals, to guide them in connecting their daily activities to their long-term goals, and to support them in building skills, including time management, self-advocacy, and study skills. Control (n=5506)	Baseline equivalence established: no significant differences between the treatment and control conditions on observable characteristics (gender, age, SAT scores, or on- or off-campus residence). <u>Regression analysis:</u> COACH – main IV, the treatment. Lottery fixed effects and a vector of additional controls (gender, age, high school GPA, school type, degree program, living on campus, Pell grant receipt, prior remediation experience, SAT score).
Conscientiousness	Duckworth, A. L., White, R. E., Matteucci, A. J., Shearer, A., & Gross, J. J. (2016). A stitch in time: Strategic self-control in high school and college students. <i>Journal of Educational Psychology</i> , 108, 329–341.	A self-control intervention. <u>Study 3</u> Random assignment N=159, undergraduate psychology courses, UPenn Participants were asked to set a study goal that they would like to accomplish over the coming week. Situation modification condition: participants were instructed to remove temptations that might distract them from reaching an academic goal. They were also asked to modify their environment to minimize temptations. Response modulation condition: participants were instructed to exert willpower when faced with temptation. Control group: participants were instructed to set a study goal. One week later, all participants were asked to report progress toward their goal. Participants were also asked to provide a checklist of five strategies that they used to resist temptation.	Baseline equivalence established: no differences across condition in gender or age. Number of hours studied at baseline, $p < .01$. The response modulation group studied more than the situation modification group, $p < .001$, $d = 0.70$. No differences between either situation modification or response modulation and the control group. One way ANCOVAs with hours studied as a covariate.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Conscientiousness	Fitch, T., Marshall, J., & McCarthy, W. (2012). The effect of solution-focused groups on self-regulated learning. <i>Journal of College Student Development, 53</i> , 586-595.	<p>A goal setting intervention with outcome measures related to self-regulated learning.</p> <p>Participants came from two campuses (6 classes total). Sections were randomly selected so that 3 sections were control groups and 3 were experimental: 69 participants (50 female and 18 male), undergraduate students enrolled in first- and second-year psychology courses.</p> <p>Intervention:</p> <p>Treatment group -- participated in a series of goal-setting meetings during which the steps to solution-focused counseling were applied. Each group of 5 to 6 met at least 6 times for at least 20 minutes to discuss and track goals. Participants completed the modified MSLQ during the regularly scheduled class times at the beginning (prior to first group meeting) and end of the semester (after last group meeting).</p>	<p>Baseline equivalence established: no significant differences in pre-assessment measures.</p> <p>MANCOVA statistic computed using the five scales comparing the experimental and control groups, adjusting for pretest scores.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Conscientiousness	Liu, L., Bridgeman, B., & Adler, R. (2014). Measuring learning outcomes in higher education: Motivation matters. <i>Educational Researcher</i> , 41, 352-362.	<p>A motivation intervention, main outcome measures college-level skills.</p> <p>757 students recruited from three higher education institutions (one research institution, one master's institution, and one community college) in three states.</p> <p>Students were randomly assigned to 1 of 3 motivation conditions: Control (c), personal (p), and institutional (i).</p> <p>All prompts read: Your answers on the tests and the survey will be used only for research purposes and will not be disclosed to anyone except the research team.</p> <p>Personal condition - your test scores may be released to faculty in your college or to potential employers to evaluate your academic ability.</p> <p>Institutional condition - your test scores will be averaged with all other students taking the test at your college.</p> <p>After completing the tests, students filled out the SOS (Sundre, 1997, 1999; Sundre & Wise, 2003), a 10-item survey that measures students' motivation in test taking. The survey has been widely used in contexts of outcomes assessment similar to this study.</p>	An ANOVA was conducted to investigate the impact of the different conditions on self-reported motivation and on test scores. Standardized mean differences were computed between the three motivational conditions on the SOS, and the Proficiency Profile, and essay scores. A separate analysis was conducted for each measure and each institution.

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Competency	Reference	Intervention & Population	Evaluation
Conscientiousness	Morisano, D., Hirsh, J., Peterson, J., Pihl, R., & Shore, B. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. <i>Journal of Applied Psychology, 95</i> , 255-264	<p>A goal setting intervention.</p> <p>Random assignment</p> <p>Recruitment (N=85, 60 female): McGill University. Inclusion criteria -- Students must have planned to take a full-time course load (nine credits) each semester and be having academic difficulty.</p> <p><u>Stage 1: 2-3 hours</u></p> <p>Group 1 (goal group = 45) participated in a web-based, intensive, goal-setting program. The program led participants through a series of eight steps that facilitated the setting of specific personal goals along with detailed strategies for achievement.</p> <p>Group 2 (control group = 40) participated in 3 different web based tasks in lieu of the goal-setting intervention. In the second task, control group students wrote about positive past experiences.</p> <p><u>Stage 2 (16 weeks later)</u></p> <p>All participants completed the Concluding Questionnaire.</p>	<p>Baseline equivalence established, no significant differences in the following categories: gpa, age, sex, ethnicity, parents' income, self-reported average of high school grades, English as a first language, whether students were studying in English for the first time, whether they were on official academic probation, whether they were receiving tutoring, or whether they were enrolled in any other kind of intervention at the beginning of the study.</p> <p>Credits were lower in the control group but NS; $d=.36$. Pre-assessment measures not collected.</p> <p>ANOVA was used for main outcome variable, GPA.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Conscientiousness	Senko, C, Harackiewicz, J.M. (2005). Regulation of achievement goals: The role of competence feedback. <i>Journal of Educational Psychology</i> . 97, 320–336.	A goal theory intervention. <u>Study 2</u> Random assignment: N = 101 male and 106 female students in an introductory psychology course. Intervention: Participants solved multiplication problems using the traditional technique and completed a measure of their confidence in solving multiplication. Participants also reported their achievement goals for the session. Participants were taught a new technique for multiplying two-digit numbers and then solved 2 sets of problems. After the first set, participants completed a measure of their performance expectations. Participants then received feedback about their performance. Score-only feedback condition: received no other information. Negative Feedback and Positive Feedback conditions: received feedback that their score represented “below average” or “above average” performance. Participants then reported their achievement goals for the second problem set.	Regression analysis: achievement goal regulation in response to the competence feedback manipulation. In all analyses, main effect terms were standardized.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Academic self-efficacy	Betz, N., & Schifano, R. (2000). Evaluation of an intervention to increase realistic self-efficacy and interests in college women. <i>Journal of Vocational Behavior</i> , 56, 35-52.	Random assignment: 54 female psychology students Criteria: participants with at least moderate Realistic interests and low Realistic confidence. Realistic skills are those that are taught in high school "shop" classes and trade courses. Treatment group (n = 24) received the Realistic intervention, 7 hours, 3 sessions. Session 1: Lecture on architectural design and construction techniques. Session 2: Participants learned how to use tools and then asked to assemble metal shelving units. Session 3: Participants asked to use tools to perform a variety of tasks. Control group (n=30): participants discussed their opinions of recent films.	Repeated-measures ANOVA: evaluated changes in confidence, interests, and occupational self-efficacy over time and as a function of treatment group.

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Competency	Reference	Intervention & Population	Evaluation
Academic self-efficacy	Luzzo, D.A., Hasper, P., Albert, K.A., Bibby, M.A., Martinelli, E.A. (1999). Effects of self-efficacy-enhancing interventions on the math/science self-efficacy and career interests, goals, and actions of career undecided college students. <i>Journal of Counseling Psychology</i> , 46, 233-243.	Random assignment/pre-post measures: N=55 women and 39 men, large public university in the South, student orientation course (Spring quarter); inclusion criteria: ACT-M scores above the regional mean and career undecided status. Intervention No treatment (n = 24): 30 minute orientation to the university's career center. Vicarious-learning (n = 22): Participants viewed a 15 minute presentation of 2 university graduates who described how they were undeclared majors early in their collegiate career but—after several successful experiences in math and science endeavors—went on to major in math- and science-related fields and became successful in their respective careers. Performance-accomplishment (n = 22): Participants were informed that the number series task was a test of their mathematical abilities and that they needed to successfully solve at least half in order to pass the test. Vicarious learning + performance accomplishment (n = 26) Immediately following treatment and 4 weeks later – post measures collected.	MANCOVA: 2 x 2 x 2 (Gender x Vicarious Learning x Performance Accomplishment) with pretreatment measures of interests, self-efficacy, and math/science-relatedness of courses, majors, and aspirations as covariates.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Aronson, J., Fried, C., & Good, C. (2002). Reducing the effects of stereotype threat on african american college students by shaping theories of intelligence. <i>Journal of Experimental Social Psychology</i> . Online publication. Doi: doi:10.1006/jesp.2001.1491	79 male and female participants (42 Black, 37 White) recruited by phone (Stanford) Random assignment to one of six conditions, a 2 x 3 design yielded by crossing race with treatment. 1. T - malleable pen pal condition, intervention employed numerous attitude change techniques designed to teach and internalize the notion that intelligence is expandable. 2. C - pen pal condition, intervention is the same as group 1 but with a different intelligence orientation. 3. C - non pen pal condition (completed post intervention measures) Group 1 and 2 intervention took place in a lab (1 hour) at three different time points (spaced 10 days apart) Post-intervention - belief measures collected, the remaining measures were given several months later	Baseline equivalence established; significant differences between race groups and condition SAT scores. ANCOVA: 2 (race:African American or Caucasian) x 3 (condition: malleable pen pal, pen pal control, or non pen pal control), using SAT as the covariate.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Boese, G. D., Stewart, T. L., Perry, R. P., & Hamm, J. M. (2013). Assisting failure prone individuals to navigate achievement transitions using a cognitive motivation treatment (attributional retraining). <i>Journal of Applied Social Psychology, 43</i> , 1946–1955.	126 Introductory Psychology students (77 female, 36 male): 1993–1994 academic year October - Time 1 questionnaire measuring self-worth, causal attributions, and achievement related cognitions. January – Intervention AR treatment: students watched a brief video depicting two university students discussing the reasons for performing poorly at the university. Small discussion groups were held where participants discussed the 3 most important reasons for poor performance. They then participated in a brief activity - note-taking training. Note-taking training was selected because it indirectly teaches students that expending effort to take careful notes can lead to better performance, thereby reinforcing the importance and functionality of effort attributions. March -- students in both conditions completed a Time 2 follow-up questionnaire (similar to the Time 1 questionnaire). May -- Consenting students' (N not provided) grades were obtained from course instructors and institutional records.	ANCOVA: treatment condition (no-AR, AR) by failure avoidance (low, high) 2 × 2 with high school average as the covariate. Failure avoidance scale: 5 items ($\alpha = .82$); derived from Covington's (1993) full self-worth. An extreme-split procedure was used to transform failure avoidance scores into low and high levels; participants who scored one quarter standard deviation above (high levels) or below (low levels) the mean.

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Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Cohen, G.L., Steele, C.M., & Ross, L. D. (1999). The mentor's dilemma: Providing critical feedback across the racial divide. <i>Perspectives Social Psychology Bulletin</i> , 25, 1302–1318.	<p><u>Study 1</u></p> <p>Random assignment: Students (45 Black & 48 White) recruited by telephone from a registrar's list of Stanford undergraduates. Pre & Post measures assess task motivation & identification with academic skills</p> <p>Session 1: Students wrote a letter of commendation for their favorite teacher</p> <p>Session 2 (1 wk. later): Students received critical feedback, depending on condition.</p> <p>Unbuffered criticism condition -- students received feedback.</p> <p>Wise criticism condition -- students received feedback with an explicit invocation of high standards and an assurance of the particular student's capacity to reach those standards.</p> <p>Positive buffer -- students received feedback buffered by general praise of their performance.</p>	<p><u>Task Motivation & ID with writing</u></p> <p>2 x 3 ANCOVA using premanipulation measure as a covariate.</p>
Growth mindset	Eskreis-Winkler, L., Shulman, E. P., Young, V., Tsukayama, E., Brunwasser, S. M. & Duckworth, A. L. (in press). Using wise interventions to motivate deliberate practice. <i>Journal of Personality and Social Psychology</i> .	<p><u>Study 3</u></p> <p>N=60 (liberal arts college); N=60 (research university); female (69.2%)</p> <p>Intervention: Participants completed a short math pretest. Treatment condition: Participants learned the tenets of deliberate practice. The treatment module taught that talent and effort both contribute to success but stressed the importance of effort (particularly effort that is invested in deliberate practice). Each module ended with a saying-is-believing exercise in which the participant wrote a letter to another student endorsing deliberate practice.</p> <p>Control condition: Participants were taught standard study advice. They also ended with students writing a letter to another student, endorsing what they had learned.</p> <p>One week later, students were instructed to master college math content in Khan Academy.</p>	<p>Baseline equivalence established; treatment and control did not differ significantly on any baseline measure.</p> <p>OLS regression: Fall GPA (at the liberal arts college) and midterm scores (at the research university) were used as measures of prior achievement.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth Mindset	Hall, N., Hladkyj, S., Perry, R., & Ruthig, J. (2004). The role of attributional retraining and elaborative learning in college students' academic development. <i>The Journal of Social Psychology, 144</i> , 591-612.	Random assignment: n=203, introductory psychology course. Participants (AR treatment and Aptitude test AR treatment) watched a videotape that showed graduate students having a conversation about maintaining a controllable, malleable set of causal attributions following an exam (same as Menec 1994 and Struthers & Perry 1996). AR Treatment: participants completed a writing exercise consisting of summarizing, considering other related reason for academic difficulties, and personal relevance. Aptitude test AR treatment: participants were given an aptitude test (ARAT). Control: participants did not receive any experimental intervention.	Baseline measures addressed: differences between treatment conditions for high school grades, perceived success in school. ANCOVA: elaborative learning (low, high) by AR (no AR, Writing assignment AR, Aptitude test AR) 2 x 3 with phase 1 measures as covariates where available. Use of elaborative learning strategies (6-items, Pintrich et al. 1989): participants were classified as either high or low on this measure on the basis of a median split.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Hall, N. C., Perry, R. P., Chipperfield, J. G., Clifton, R. A., & Haynes, T. L. (2006). Enhancing primary and secondary control in achievement settings through writing-based attributional retraining. <i>Journal of Social and Clinical Psychology, 25</i> , 361– 391.	<p>N= 225 (172 females and 79 males, 4 students did not indicate their gender), two–semester introductory psychology course at a Midwestern university; attrition = 17%.</p> <p>Students selected a study session to attend from those allotted for their course section, and either the AR (attribution retraining) or No AR treatment condition was administered during a given session.</p> <p>Time 1 (October): Questionnaire (pre-assessment measures). AR was presented in one of two ways:</p> <ol style="list-style-type: none">1. Handout -- summarized the benefits of changing dysfunctional causal attributions to functional attributions.2. Videotape presentation (see Menec et al. 1994) <p>Writing assignment: Participants summarized the main points of the videotape, and then listed a number of important reasons for why first–year students may not perform as well as they could in their courses.</p> <p>Time 2 (February to March): post–AR follow–up questionnaire.</p> <p>Time 3 (May): scores and final grades obtained.</p>	<p>Baseline equivalence addressed: differences between conditions on high school grades, enjoyment, uncontrollable attributions variables. Time1 variables used as covariates.</p> <p>Analysis uses unsuccessful students high in primary control only. ANCOVA: A 2 [secondary control (low/high)] x 2 (AR v. No AR) High-PC/low-SC = at risk High-PC/high-SC = optimal</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Hamm, J. M., Perry, R. P., Clifton, R. A., Chipperfield, J. G., & Boese, G. D. (2014). Attributional retraining: A motivation treatment with differential psychosocial and performance benefits for failure prone individuals in competitive achievement settings. <i>Basic and Applied Social Psychology</i> , 36, 221–237.	<p>Sample was drawn from the Manitoba Motivation and Academic Achievement (MAACH) database. 2001–02 cohort: n=324 (women 67%); freshmen; intro psych course.</p> <p>Time 1 (September), students completed an exam.</p> <p>Time 2 (October), participants selected study sessions that were randomly assigned to treatment conditions and subsequently completed the first questionnaire.</p> <p>Intervention: Students rated the importance of various causal attributions to achievement failure. Next, students viewed a video of two students discussing potential ways in which academic performance can improve. Students were then asked to summarize the video and provide their own reasons why students may perform poorly in their courses, and write about how they could apply the main points of the video to their own lives.</p> <p>Time 3 (March), participants completed post intervention questionnaire.</p> <p>Time 4 (May), achievement data from consenting students was collected from institutional records.</p>	<p>Baseline equivalence established between high and low risk groups.</p> <p>ANCOVA or MANCOVA: AR (no-AR, AR) Performance Orientation Group (failure-acceptors, failure-ruminators, achievement-oriented, over-strivers) 2 x 4 factorial design.</p> <p>Controls: High school grade, gender, and age</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Haynes, T. L., Daniels, L. M., Stupnisky, R. H., Perry, R. P., & Hladkyj, S. (2008). The effect of attributional retraining on mastery and performance motivation among first-year college students. <i>Basic and Applied Social Psychology</i> , 30, 198–207.	<p>First year college students (intro psychology course) Canadian university, 1992 and 2005</p> <p>Random assignment of course section to AR or no-AR condition: Students selected a day/time to participate in the study without knowledge of the treatment/control conditions.</p> <p>Intervention: Time 1 pretest completed early in the academic year (October) to assess baseline levels of mastery and performance motivation. AR treatment immediately following Time 1 assessment administered (AR. 159, no-AR. 177).</p> <p>Students watched a video portraying 2 undergraduate students discussing how first year academic performance can be affected by causal attributions. Following the video, participants were given a one-page handout that consisted of two lists of possible attributions for poor academic performance (uncontrollable attributions and controllable attributions). The experimenter then gave a brief presentation detailing how attributions can be changed from one list to the other (i.e., maladaptive to adaptive). Students completed a writing assignment: (a) summarizing the main points of the video (b) listing important reasons why students may underperform, (c) citing examples of how the main points of the video could apply to their own studies, and (d) recalling an academic instance in which they performed poorly and how this made them feel.</p> <p>Time 2 posttest assessment (March) to reassess mastery and performance motivation. Academic achievement data obtained at year's end from institutional records (high school averages; first year GPAs).</p>	<p>Baseline equivalence established; no pre-existing differences between conditions in terms of motivation.</p> <p>ANOVA: 2 x 2 with AR Treatment as the between-subjects factor (AR vs. no-AR) and Time as the repeated within-subjects factor (Time 1 pre-AR measure vs. Time 2 post-AR measure).</p>

Intervention Study Table

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Growth mindset	Menec, V. H., Perry, R.P., Struthers, C.W., & Schonwetter, D.J., Hechter, F.J., & Eichholz, B.L. (1994). Assisting at-risk college students with attributional retraining and effective teaching. <i>Journal of Applied Social Psychology, 24</i> , 675–701.	<p><u>Study 1</u> 156 (77 female and 78 male) introductory psychology students at a midwestern Canadian university.</p> <p>Subjects participated in three sessions, with sessions being scheduled at one-week intervals. Control: 1. GRE type test, expectations 2. Lecture 3. achievement test. 1AR: 1. AR training, GRE type test, expectations 2. Lecture 3. achievement test. 2AR: 1. AR training, GRE type test 2. AR training, expectations, Lecture 3. achievement test.</p> <p>AR training: videotapes depicting students discussing the way in which effort and strategies are controllable.</p>	<p><u>Prelecture experience</u>: Failure versus success experience. 24-item version of an achievement test developed by Perry and Dickens (1984) was used to differentiate between failure and success students. Students were classified into failure and success groups according to a median split.</p> <p><u>Student achievement</u>: low-expressive instruction and high-expressive instruction ANOVA: Prelecture Experience (failure, success) x Attributional Retraining (control, 1 AR, 2AR) <u>Expectations</u> MANOVA: Prelecture Experience (Failure, Success) x Attributional Retraining (Control, 1 AR, 2AR), collapsing across instructor expressiveness.</p>
Growth mindset	See row above.	<p><u>Study 2: Low-achieving participants only</u> 257 participants (122 female and 129 male, with 6 individuals failing to report their gender), introductory psychology students at a midwestern Canadian university</p> <p>Intervention: see study 1.</p>	<p><u>Locus of control</u>: measured with a subscale of the Multidimensional Multiattributional Causality Scale (MMCS; Lefcourt, Von Baeyer, Ware, & Cox, 1979). Internal attributions (ability and skill): 3 items. External attributions (luck): 3 items.</p> <p><u>Student achievement</u>: low-expressive instruction and high-expressive instruction ANOVA: Attributional Retraining (control, 1 AR, 2AR) x Locus of Control (internal, external) factorial analyses <u>Attributions & Expectations</u> MANOVA: Attributional Retraining (control, 1 AR, 2AR) x Locus of Control (internal, external) factorial analyses</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Perry, R.P. & Magnusson, J. (1989). Causal attributions and perceived performance: Consequences for college students' achievement and perceived control in different instructional conditions. <i>Journal of Educational Psychology</i> , 81, 164-172.	N= 223, introductory psychology students, the University of Manitoba Subjects selected a session time, and experimental conditions were assigned to sessions. Intervention: A two-stage procedure was used that involved (a) the contingency task (aptitude test) feedback and (b) the classroom lecture simulation. In the first stage, participants were given general instructions, attributions were induced by specifying that performance on the subsequent aptitude test would be determined primarily by ability, effort, OR test difficulty (3 treatment groups). In the second stage, videotaped lectures were presented to each group. Following the low or high expressive lecture, each group took the achievement test and responded to the post lecture questionnaire.	Perceived performance: Nondisortion -- participants who accurately perceived their performance as failure. Distortion -- participants who perceived their performance as success. <u>Task measures</u> ANOVA: 2 x 3 design -- perceived performance variable (nondistortion, distortion) and attribution (ability, effort, test difficulty) <u>Student achievement</u> ANOVA: 3 x 2 x 2 – causal attributions, perceived performance, instructor expressiveness.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Perry, R. P., Stupnisky, R. H., Hall, N. C., Chipperfield, J. G., & Weiner, B. (2010). Bad starts and better finishes: Attributional retraining and initial performance in competitive achievement settings. <i>Journal of Social and Clinical Psychology, 29</i> , 668– 700.	<p>Introductory Psychology, first year students (N = 459) (285 females; 172 males).</p> <p>Random assignment: Students selected one of several session times to complete a Time 1 questionnaire without knowing which treatment condition (AR--attribution retraining or No-AR) would occur in a given session.</p> <p>Intervention:</p> <p>October -- Students completed Time 1 questionnaire (demographic information), and then received AR (N=200). In the No AR condition (N=259), students responded to the Time 1 questionnaire and left immediately after completing it.</p> <p>AR: Students watched a videotape depicting 2 students discussing how poor performance can improve. The dialogue focused on controllable attributions which were summarized at the end by a male professor. Students completed a GRE-type aptitude test after which they rated their performance on the test and their perceived success.</p> <p>March -- 78% (n = 359). Time 2 questionnaire containing the attribution and emotion measures.</p> <p>June -- 98% (n = 451) After the course was completed, test results and final course grades were obtained from course instructors, and cumulative GPAs were provided by OIR.</p>	<p>Baseline equivalence established: no differences between the treatment conditions on pre-AR Test 1.</p> <p>ANOVA (or MANOCOVA): AR (No-AR, AR) by initial test performance (low, average, high) 2 X 3 factorial design, with age and self-reported high school grade included as covariates. Students were classified into initial test performance groups based on the first class test (pre-AR Test 1).</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Ruthig, J. C., Perry, R. P., Hall, N. C., & Hladkyj, S. (2004). Optimism and attributional retraining: Longitudinal effects on academic achievement, test anxiety, and voluntary course withdrawal in college students. <i>Journal of Applied Social Psychology</i> , 34, 709–730.	n=236 (156 female, 57 male, first-year students, midwestern university, intro Psychology course) <u>Phase 1</u> Participants complete questionnaire. <u>Phase 2 (approximately 1 month later)</u> Intervention: AR condition (n = 184) and no-AR control condition (n = 52). Random Assignment of course sections. 1. AR condition, (videotape; n=70): viewed a brief film depicting two students discussing their academic failure experiences. One student explained to the other that after performing poorly in his courses, he began to put more effort into studying and his grades improved accordingly. 2. AR condition (video-and-discussion; n = 44): same film as group 1. Film was followed by a 20-min discussion (students discuss their own success and failure experiences, the experimenter explained the importance of using adaptive attributions). 3. AR group (handout only; n = 56): participants reviewed a single page handout summarizing the benefits of changing dysfunctional causal attributions for failure (i.e., lack of ability) to functional attributions (i.e., lack of effort). 4. Control – completed a filler questionnaire. <u>Phase 3 (end of the academic year)</u> Participants completed a questionnaire that included a measure of students' test anxiety. Participants' cumulative GPA and VW (voluntary course withdrawal) were obtained from institutional records.	Baseline equivalence: No significant differences were found between course instructors on any dependent measure. No significant differences between treatment groups on dependent variables. All three groups were combined to form one AR treatment group. Low (L) and high (H) optimism groups: For all median splits, scores at or above the median were classified as high. ANCOVA: Optimism (Low vs. High) by AR (AR vs. No AR) 2 x 2 factorial, high school percentage (average of students final grades in college entrance courses) as the covariate for achievement outcomes only.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Struthers, C.W., & Perry, R. (1996). Attributional style, attributional retraining, and inoculation against motivational deficits. <i>Social Psychology of Education, 1</i> , 171-187.	Random assignment n=433; final sample = 257 (67%) <u>Treatment</u> : beginning of second semester. Videotape plus discussion; participants were told about the complexities of college life and how students adjusted to such experiences. They were also told that students' beliefs about poor performances could influence subsequent tests and what they could do to have such beliefs work for them rather than against them. <u>Control</u> : similar to treatment except attribution information was omitted from the video and discussion. End of semester grades obtained.	ANOVA: attributional style x condition x time (pre versus post-measure).

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	Wilson, T. D., & Linville, P. W. (1982). Improving the academic performance of college freshmen: Attribution therapy revisited. <i>Journal of Personality and Social Psychology</i> , 42, 367– 376.	<p>Random assignment N=40. College freshmen were selected only if they were concerned about their academic performance.</p> <p>GPA information condition: participants reviewed statistical data and viewed interviews with upperclassmen indicating that most freshmen improve their GPA over time. Half of the participants in both the GPA and no-information conditions were randomly assigned to a reasons analysis condition where they listed reasons why freshmen might improve their GPA and factors that currently affected them.</p>	<p>Baseline equivalence addressed; no difference in baseline GPA between treatment and control.</p> <p><u>GRE sample items</u> ANOVA: 2 (GPA information) x 2 (reasons analysis) x 2 (time: pre versus post)</p> <p><u>GPA</u> ANOVA: 2 (GPA information) x 2 (reasons analysis) x 2 (time: pre versus post)</p> <p><u>Expectations about future academic performance</u> ANOVA: 2 (GPA information) x 2 (reasons analysis) x 2 (time: pre versus post)</p>
Growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	<p>Random assignment: Web-based intervention, taking approximately 25 to 35 minutes to complete. Participants completed single-session, online, intervention or control materials prior to matriculation.</p> <p><u>Study 1 (n=584)</u> Social belonging: students read results of a survey conducted with older students and conveyed two key ideas, 1. in the transition to college most students worry about whether they belong and 2. that these worries subside with time when students take active steps to create social ties to other college students. After, participants engage in a writing exercise. Growth mindset: Participants read an article summarizing scientific research supporting the idea that intelligence is malleable and can be developed with effort. Participants were predominantly African American or first-generation students.</p>	<p><u>Study 1</u> Regression models: All estimates are raw percentages or means, unadjusted for covariates. Significance levels do not differ without covariates. “intent-to-treat.”</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Growth mindset	See row above.	<u>Study 2</u> Extended study 1 with incoming students at a 4-year public institution, instead of outgoing students at a high school. Also, the interventions came from the university instead of the high school. N=7335	<u>Study 2</u> Compared students in the randomized cohort to students in previous and later cohorts not randomized to condition.
Intrinsic goals/values	Hamm et al. (2014)	see Hamm et al. (2014)	see Hamm et al. (2014)
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., Lacante, M. (2004). Less is something more: Goal content matters. <i>Journal of Educational Psychology</i> , 96, 755-764.	Random assignment: n=245 1st year students enrolled at a Belgian teacher training college. 3 types of conditions regarding goal content for recycling, intervention embedded in instructions: future intrinsic goal - focused on contributing to the community. future extrinsic goal - focused on receiving financial benefits for recycling double goal condition - focused on both	One-way ANOVAs for each of the dependent variables.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy support. <i>Journal of Personality and Social Psychology</i> , 87, 246–260	<u>Study 1</u> N=200, first-year Belgian college students studying to become preschool teachers. Instruction sheets with different experimental manipulations were randomly distributed within each class. Target activity: read a text about recycling. Intrinsic goal conditions: instructions stated that “reading the text could help you know how to teach your future toddlers that they can do something to help the environment,” which was intended to represent the intrinsic goal of contributing to the community. Extrinsic goal conditions: instructions stated that “reading the text could teach you how to save money by reusing materials,” which was intended to represent the extrinsic goal of attaining monetary benefit. Autonomy-supportive climate vs. Controlling learning climate – these two manipulations were also contained within the instruction sheet by differences in the wording of seven phrases. After reading the text, participants completed a series of questionnaires. A week later, students were placed in randomly formed groups of 6 members to discuss the issue of recycling. All students were graded individually by their teachers regarding the quality of their personal contribution to the group discussion.	MANOVA

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Positive future self	Harrison, L.A., Stevens, A.M., Coakley, C.A. (2006). The consequences of stereotype threat on the academic performance of white and non-white lower income college students. <i>Social Psychology of Education, 9</i> , 341-357.	<p>Random assignment; N= 260 students, northern California university, undergraduate psychology course (205 women)</p> <p><u>Intervention</u></p> <p>Diagnostic condition: instructions stated that middle and upper income students consistently performed better than lower income students on standardized tests. The instructions also stated that this test would provide a valid assessment of abilities and limitations, and that participants' performance would be compared to other students from across the nation in order to determine why lower income students generally perform worse than higher income students.</p> <p>Non-diagnostic condition: instructions stated that the purpose was to understand the psychological factors involved in completing standardized tests. The participants were further informed that their performance would not be graded or used to evaluate their math and verbal abilities.</p> <p>Participants completed a math and verbal test.</p> <p>Participants completed questionnaires (outcome measures and demographic information).</p>	ANOVA: condition (diagnostic vs. non-diagnostic) x socioeconomic status (lower income vs. middle income vs. upper income) x participant race (White vs. non-White)

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Positive future self	Landau, M. J., Oyserman, D., Keefer, L. A., & Smith, G. C. (2014). The college journey and academic engagement: How metaphor use enhances identity-based motivation. <i>Journal of Personality and Social Psychology</i> , 106, 679-698.	<p>Random assignment: Participants recruited from an introductory psychology course.</p> <p><u>Study 1</u> 92 KU freshmen, (54% female, 82% White) random assignment to: journey-framed academic possible identity (PI), nonmetaphoric academic PI, container-framed academic PI, and nonmetaphoric social PI.</p> <p>Participants completed a packet, the first three pages of which constitute the priming manipulation. Academic intention measure collected.</p>	<p>Baseline equivalence established.</p> <p><u>Academic intention (self-report)</u>: ANOVA <u>Academic intention (behavioral)</u>: Chi-square test</p>
Positive future self	See row above.	<p><u>Study 2</u> 82 KU freshmen, random assignment to: journey-framed academic PI, container-framed academic PI, journey-framed social PI, journey-framed past academic achievement.</p> <p>Materials same as study 1: Participants completed numerical addition problems designed to be relatively simple, thereby ensuring that academic effort could be measured as percentage of problems solved.</p>	One-way ANOVA
Positive future self	See row above.	<p><u>Study 3</u> 90 KU undergraduates, random assignment to: journey framed academic PI or container-framed academic PI</p> <p>One week before final exams participants were asked to make a study/nonacademic schedule for the upcoming weekend.</p>	Poisson regression analysis to regress scores (hours allotted to each activity) onto priming condition.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Positive future self	Schwartz, S.J., Kurtines, W.M., & Montgomery, M.J. (2005). Facilitating identity exploration processes in emerging adults: An exploratory study. <i>Journal of Adolescent Research</i> , 20, 309-345.	Random assignment (after pretest) N = 114 (98 females, 16 males), undergraduate psychology course; 79% completed all phases of the intervention. Intervention: Workshop participants met weekly for 6 to 8 weeks. CF (cognitively focused) condition (n=45): each participant brought an identity-related life choice or dilemma to the workshop. Life dilemmas were analyzed and groups discussed problem resolutions. EF (emotionally focused) condition (n=36): Each participant brought goals to the workshop. For each goal, the participant, with help from fellow group members, followed a series of steps. No-intervention (CC): (n=32) Pretest and posttest (10 week interval): Posttest assessments for the CF and EF conditions were administered during the last intervention session.	RMANOVA

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Prosocial or transcendent goals/values	Yaeger, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D' Mello, S., Spitzer, B. J., & Duckworth, A. (2014). Boring but important: A self transcendent purpose for learning fosters academic self-regulation. <i>Journal of Personality and Social Psychology</i> , 107, 559-580	<p><u>Study 3</u></p> <p>Random assignment: n=89, undergraduate psychology course; 71 (80%; 78% were women) completed the intervention materials and provided any data on dependent measures.</p> <p>End of term (prior to final exam): students completed the online purpose intervention or control and then participated in an online exam review activity (answering over 100 multiple-choice questions, instructions guided students on how to actually learn from the questions). During the review activity, the survey software tracked students' behavior (e.g., time spent on each practice problem), and this constituted the primary dependent measure.</p> <p>Purpose intervention: Students review self-transcendent purpose materials -- participants saw summary statistics, read messages from former psych students and wrote essays about how their lives were different now compared to when they were in high school -- all materials related to reasons for learning psychology, learning to gain skills and for prosocial ends.</p> <p>Control: Same materials but completely devoid of the focus on motives for learning.</p>	<p>Baseline equivalence addressed: Treatment versus control students did not differ in terms of the number of questions students completed ($p = .38$).</p> <p>All analyses are from regressions that control for prior test performance.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Prosocial or transcendent goals/values	See row above.	<p><u>Study 4</u> <u>N = 429, introductory psychology at the University of Texas at Austin (48% male, 52% were female).</u></p> <p><u>Intervention materials</u> <u>Purpose and control conditions: see Study 3.</u> <u>Self-oriented control condition: Similar to the purpose manipulation in nearly every way except for the elimination of self-transcendent prompts in the stimuli. It was future oriented, goal-directed (self-interested), and highly focused on learning and on developing skills. This group was designed to rule out the alternative explanation that any manipulation involving reading and writing about intrinsic personal motives for learning would be sufficient to lead to greater self-regulation on an uninteresting task.</u> <u>Students proceed to the diligence task.</u> <u>Diligence task: measures academic self-regulation. This task involves the choice of completing boring math problems (single-digit subtraction) or consuming captivating but time-wasting media (watching videos or playing video games).</u> <u>Problems divided into three blocks. Block 1 and 2 involve choices; block 2 more boring than block 1. Participants were told that successfully completing the tasks could possibly help them sharpen their math skills and stay prepared for their future careers. Participants were presented with summaries of actual scientific studies showing that increasingly as people rely on technology to do simple tasks, their grasp of basic skills can atrophy.</u></p>	<p>Baseline equivalence: There were no differences across conditions in terms of the word count on the open-ended essay prompts or ratings of boredom (at the end of the diligence task).</p> <p>OLS regression analysis comparing difference scores (Block 2 problems solved minus Block 1 problems solved, by condition).</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging	Cohen, G. L., & Garcia, J. (2005). I am us: Negative stereotypes as collective threats. <i>Journal of Personality and Social Psychology</i> , 89, 566– 582.	Random assignment: 63 Black undergraduates at Yale University (44 women, 19 men) 2 conditions: threat condition or no-threat condition. Threat condition: Participants were placed into a threat inducing situation where they took a standardized test purportedly testing their ability. No threat: identical to that of the threat condition except the experimenter did not mention ability. Participants were told to expend their best effort. Participants then completed the dependent measure questionnaire assessing state self-esteem, stereotype distancing, and racial stereotype activation.	One-way ANOVA.
Sense of belonging	Folger, W.A., Carter, J.A., & Chase, P.B. (2004). Supporting first generation college freshmen with small group intervention. <i>College Student Journal</i> , 38, 472-476	Fall-semester, first-generation college freshmen. Participants were selected based on their responses to the College Student Inventory (CSI); students low on academic motivation, social motivation, and general coping measures were considered. A random sample of 200 students was taken from a list of those expressing interest in the Freshmen Empowerment Program (FEP). 53 were randomly selected and placed in FEP groups (14 males and 39 females). The control group (n=53) was drawn from the 147 students remaining from the original random sample of 200. Intervention: Groups met for 6 weeks. The groups were facilitated by FEP staff. Topics discussed included academics, college resources, adjustment, relationships, and other issues of concern to the students.	Baseline equivalence addressed: FEP and control groups equivalent in terms of original ACT scores, gender, and ethnicity. <u>GPA</u> Independent t-tests ($p = .05$) were used to compare fall semester GPA, spring semester GPA, and cumulative freshman GPA of the FEP and control groups.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging	Hausmann, L., Ye, R., Schofield, J., Woods, R. (2009). Sense of belonging and persistence in white and african american first-year students. <i>Research in Higher Education</i> , 50, 649-669.	<p>Random assignment: large, public mid-atlantic university. African American students, n=254; white students, n=291. Participants received three surveys throughout their first year of college. Participants were randomly assigned after the first survey.</p> <p>Enhanced sense of belonging group (ESB): participants received several written communications from university administrators emphasizing that they were valued members of the community, and free university apparel.</p> <p>One control group received similar apparel without university logos (GC), and the other control group received nothing (NGC).</p>	<p>Baseline equivalence addressed: mean levels of study measures did not differ between intervention groups.</p> <p>Multigroup SEM model</p>
Sense of belonging	Stephens, N., Hamedani, M., & Destin, M. (2014). Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition. <i>Psychological Science</i> , 25, 943-953.	<p><u>Study 1</u></p> <p>Random assignment: incoming first year students at a private university (N=147; 81 CG, 66 FG)</p> <p>Intervention takes place at the start of college year.</p> <p>Difference education panel (Treatment): participants sit in on a one hour-long student discussion panel about college adjustment. Panelists' responses across conditions highlighted how they adjusted to and found success in college. The key difference between the two conditions was whether the panelists' stories highlighted how their social class backgrounds mattered for their college experience. The study also included a campus-wide control group of all other CG and FG nonparticipants in the same academic cohort as the intervention participants (n=1697).</p> <p>Participants completed a short survey and created a short video testimonial that would allegedly be used to share the panel's main teachings with next year's students.</p>	<p>Baseline equivalence established between FG and CG, not between treatment groups: no differences in low-income status or ethnicity.</p> <p><u>GPA & tendency to seek resources</u></p> <p>ANCOVA: 2 (generation status: first vs. continuing) X 2 (condition: difference education vs. standard), controlling for race and ethnicity, gender, income, highest SAT scores, and high school GPA.</p> <p><u>Psychosocial measures</u></p> <p>MANCOVA: 2 (generation status) X 2 (intervention condition) controlling for race and ethnicity, gender, income, highest SAT scores, and high school GPA</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging	Walton G.M. & Cohen, G. (2007). A question of belonging: Race, social fit, and achievement. <i>Journal of Personality and Social Psychology</i> , 92, 82-96.	<p><u>Study 2 (end of freshmen year)</u> Random assignment Stage 1: 25 Black & 30 white first year students enrolled in an intro psychology course. Students complete a 5-minute questionnaire -</p> <ol style="list-style-type: none">1. Academic identification survey2. Report on pre-manipulation covariates (e.g. the average number of hours studied)3. Sensitivity to Race-Based Rejection Questionnaire <p>Stage 2: 3-10 days after stage 1; 18 Black and 19 white students -- 12 men and 25 women</p> <p>Intervention Treatment: read survey responses from upperclassmen indicating that most upperclassmen at their school worried about being accepted during their first year, but that these concerns lessened with time. Students then wrote an essay and gave a videotaped speech indicating how they, too, had worried about being accepted but that these concerns lessened with time. Control: informed that students' social and political beliefs tend to become more sophisticated over time, and wrote essays to support this position. Post intervention measures and student demographic information collected.</p> <p>Stage 3: Post intervention (each of the 7 days following the intervention) students reported how much adversity they had experienced that day and their sense of fit in college.</p>	<p>Stage 2 & 3: Baseline equivalence established; analyses found no effect of condition on pre-measures or reported SAT score.</p> <p>ANCOVA: 2 (race: Black or White) X 2 (condition: treatment or control). Participants' SAT scores and pre-intervention levels of academic identification and race-based rejection sensitivity were tested as covariates and included if significant. In analyses of post-intervention achievement behavior, preintervention achievement behavior included as a covariate.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging	Walton, G.M., & Cohen, G.L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. <i>Science</i> , 331, 1447-1451.	Random assignment 2 cohorts: African-American (N = 49) and European-American (N = 43) students, selective college 2 groups: Belonging-treatment condition or control Plus, an additional campus-wide control group. Intervention: Participants were provided with the results of a survey (by upperclassmen) indicating that most students had worried about whether they belonged in college during the first year but grew confident in their belonging with time. Participants were asked to write an essay describing how their own experiences in college echoed the experiences summarized in the survey. They then turned their essay into a speech. In the control condition, the procedure was the same but the survey addressed topics unrelated to belonging. Completed daily surveys in the first week after the intervention. End of college survey, 3 years later (completion rate 78.26%).	Baseline equivalence addressed: no differences between conditions. Multiple regression analysis: student race, experimental condition, and academic term.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging	Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. <i>Journal of Personality and Social Psychology</i> , 102, 513–532.	<p><u>Study 1</u></p> <p>Random assignment: 72 (43 females and 29 males) European American undergraduates; students who scored at or above the midpoint on a prestudy math identification measure.</p> <p>Random assignment to skill promotive context condition or to the relational context condition. In addition, one-third of women were randomly assigned to the no report condition.</p> <p>“Context” conditions: students read a fabricated report written by a recent graduate of the math department. In both conditions, the author had qualities that made him or her a positive role model. The author’s gender also matched participants’ gender.</p> <p>The reports in the two context conditions were parallel and varied only in their characterization of the social climate of the math department. In the skill-promotive context condition, the report portrayed the department as providing students opportunities to develop their personal ability and interests in math. In the relational context condition, the report portrayed opportunities for positive, collaborative social interactions.</p> <p>No report condition (women only): read no report and proceeded immediately to the dependent measures.</p> <p>Participants completed the dependent measures -- first, a puzzle and then participants in the context conditions were tested on their recall of the report.</p>	<p>Baseline equivalence established; only variables that were significantly different between groups were used as covariates.</p> <p>ANCOVA: 2 (participant gender) x 2 (relational vs. skill-promotive context condition) design excluding the no report condition. Where gender did not moderate results, follow-up ANCOVAs were conducted with all three experimental conditions, gender was retained as a covariate to calculate contrasts involving the no report condition.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging	Walton, G.M., Logel, C., Peach, J.M., Spencer, S.J., Zanna, M.P. (2015). Two brief interventions to mitigate a “chilly climate” transform women’s experience, relationships, and achievement in engineering. <i>Journal of Educational Psychology</i> , 107, 468–485.	Random assignment: First-year engineering students, the University of Waterloo; N=228 (92 women and 136 men) <u>Intervention:</u> Students listened to audio recordings of senior engineering students (and viewed each student’s quotation, name, year, and major, photographs of campus engineering buildings). 3 groups: Social-belonging: the materials emphasized that both men and women worry about their social belonging at first in engineering but that these concerns dissipate with time and eventually most students come to feel at home. Affirmation-training: emphasized that upper year students, both men and women, learn to incorporate broader aspects of their self-identity in their daily lives to manage stress and find “balance” in engineering. Study skills control condition: materials addressed an unrelated topic, study skills. Following audio recordings, students completed 2 writing activities (saying is believing exercises) meant to internalize the message. Daily adversities: students completed surveys every other evening (online) over the next 12 days. Each survey assessed students’ construals of daily adversities and stressors as well as daily functioning (i.e., daily self-esteem).	Baseline equivalence established; no difference by condition on any preintervention measure. Multiple regression analysis: gender, major type (gender-diverse vs. male-dominated), condition, and all two- and three-way interaction terms. Covariates: Where available, the preintervention assessment of each outcome was included in analyses. The analysis of engineering GPA controlled for the mean GPA earned in students’ major.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging **DUPLICATE: see growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	Random assignment: Web-based intervention, taking approximately 25 to 35 minutes to complete. Participants completed single-session, online, intervention or control materials prior to matriculation (N>9,500). <u>Study 1</u> Social belonging: students read results of a survey conducted with older students and conveyed two key ideas, 1. in the transition to college most students worry about whether they belong and 2. that these worries subside with time when students take active steps to create social ties to other college students. After, participants engage in a writing exercise. Growth mindset: Participants read an article summarizing scientific research supporting the idea that intelligence is malleable and can be developed with effort. Participants were predominantly African American or first-generation students.	<u>Study 1</u> Regression models: All estimates are raw percentages or means, unadjusted for covariates. Significance levels do not differ without covariates. "intent-to-treat."
Sense of belonging **DUPLICATE: see growth mindset	See row above.	<u>Study 2</u> Extended study 1 with incoming students at a 4-year public institution, instead of outgoing students at a high school. Also, the interventions came from the university instead of the high school. N=7335	Compared students in the randomized cohort to students in previous and later cohorts not randomized to condition.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Sense of belonging	See row above.	<p><u>Study 3</u> Extended study 2's results by testing interventions at a private university (n=1592) and by testing social belongingness and two other interventions, not growth mindset interventions.</p>	See study 1.
Utility goals/values	<p>Brady, S. T., Reeves, S. L., Garcia, J., Purdie-Vaughns, V., Cook, J. E., Taborsky-Barba, S., . . . Cohen, G. L. (2016). The psychology of the affirmed learner: Spontaneous self-affirmation in the face of stress. <i>Journal of Educational Psychology</i>, 108, 353–373</p>	<p>N=183 (Latino and white students, 62% female) Part 1, spring year 1 Experimental manipulations; participants ranked the personal importance of 11 values. Affirmation condition: wrote about their most important value and why it was important to them. Control: wrote about their 9th ranked value and why it may be important to someone else. Manipulations were crossed with expectation manipulations -- Positive expectation condition: participants were led to believe that the activity (the affirmation exercise in the affirmation condition, the control exercise in the control condition) would be beneficial. Students read a report about how writing about values can reduce stress and boost long-term performance. No expectation condition: participants read a report about a new paper-manufacturing technique. Part 2, 3 semesters (72% retention): transcripts collected. Part 3, Spring year 3 (101 of the 183): Measures collected; transcripts collected.</p>	<p>Baseline equivalence established; no significant differences between experimental conditions along student gender, age, class year, or pre-intervention GPA emerged for either Latino or White participants. ANOVA: 2 (affirmation condition) x 2 (student ethnicity); researchers collapsed across expectation conditions in the analyses presented. Regression analysis used for GPA with preintervention GPA used as a covariate.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Durik, A. M., Shechter, O. G., Noh, M., Rozek, C. S., & Harackiewicz, J. M. (2015). What if I can't? Success expectancies moderate the effects of utility value information on situational interest and performance. <i>Motivation and Emotion</i> , 39, 104-118.	<u>Study 1</u> Random assignment: 62 participants, (50% women) from a Midwestern university. Intervention: 1. Participants solved multiplication problems using traditional methods (2 min.) and reported initial interest and PCM (perceived competence in math). 2. Participants learned a new technique to solve problems. The utility value information was embedded in the beginning, middle, and end of the instructions. The control condition did not contain utility information. 3. Participants solved two 4-min problem sets using the new technique, then reported their situational interest. Baseline performance in math and individual interest in math (assessed with four items) were collected.	Multiple regression: Gender, baseline performance, PCM (or initial interest), utility intervention, PCM (or initial interest) x condition
Utility goals/values	Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Giffen, C. J., Blair, S. S., Rouse, D. I., & Hyde, J. S. (2014). Closing the social class achievement gap for first-generation students in undergraduate biology. <i>Journal of Educational Psychology</i> . 106, 375-389	Random assignment within lab sections. Introductory biology sequence (2 semesters) at a large midwestern university; 798 students (320 M and 478 W; 644 continuing generation (CG) and 154 first generation (FG) students. T: 325 CG & 77 FG/C: 319 CG & 77 FG <u>Intervention</u> Wk 2: Baseline measures collected. Brief writing assignment administered week 3 and week 8. The assignment required students to select two or three values from a list of 12 that were the most important to them and then write an essay describing why their selected values were important. Control condition were directed to circle two or three values that were least important to them and then write an essay describing why those values might be important to someone else. Wk 14: Post-intervention questionnaires collected.	Baseline equivalence established; no significant differences between measures. Multiple regression models, testing treatment effects at the student level, controlling for lecture section. Final model: the main effects of treatment condition, generational status, gender, and lecture section (two terms), 3 two-way interactions (one between condition and generational status, and two between generational status and lecture condition).

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2015). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. <i>Journal of Personality and Social Psychology</i> .	<p>Random assignment; Biology course (one semester), large Midwestern university; N=1040 (423 CG-majority, 427 FG-majority, 126 CG-URM and 64 FG-URM).</p> <p><u>UV intervention</u></p> <p>Students completed either three UV or three control assignments. The UV assignment asked students to answer a question using course material and discuss the relevance of the concept or issue to their own life or to the lives of others. Control assignment instructed students to address a question by summarizing course material.</p> <p><u>VA intervention</u></p> <p>Administered in laboratory sessions early in the semester, and students wrote about personal values. Students in the VA condition were instructed to write about why two or three values, selected from a list, were important to them. Students in the control condition were instructed to choose the two or three values that were least important to them, and to write about why other people might hold those values.</p>	<p>Baseline equivalence addressed.</p> <p>Preliminary analyses revealed that there were no significant effects of the VA intervention for any group and no significant interactions of VA with UV. The authors collapsed across VA condition for the analyses reported here, resulting in a two-cell UV versus control design.</p> <p>The regression model includes: the main effects of the UV intervention, URM status, and FG status, 3 two-way interactions (UV Intervention x URM Status, UV Intervention x FG Status, and URM Status x FG Status).</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. <i>Journal of Educational Psychology, 102</i> , 880-895.	<p><u>Study 1</u> Random assignment: 107 (50 men, 57 women, 92% white) students, intro psychology class at University of Wisconsin–Madison</p> <p>Intervention Relevance: participants wrote a short essay describing how the math activity could relate to their lives or to the lives of college students in general. Control: participants completed a writing task unrelated to the math activity.</p> <p>After completing a measure of initial interest in math, participants learned a fourstep method for solving two-digit multiplication problems in their head. Next, participants were given 3 min to practice the technique on a problem set. Following this practice period, they reported their performance expectations for the experimental session. Next, participants were given instructions for writing either a relevance or control essay.</p> <p>After writing the essay, participants worked on the official problem set while using the new technique. They then completed measures of utility value and situational interest. They were then assessed as to whether they would use the technique in the future (maintained situational interest).</p>	The basic regression model consisted of 4 terms: initial interest in math, performance expectations, the relevance intervention contrast (-1 = control, +1 = relevance), and the two-way interaction.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	See row above.	<p><u>Study 2</u> Random assignment, intro psychology class (15-week semester at a large Midwestern university) N = 318; 91% of the students in the course 237 students (74%) had complete data on all three waves. Time 1 (day 2): assessed interest in the course topic and inclination to major in psychology Time 2 (2 weeks, prior to first exam): assessed initial perceptions of utility value for the course Weeks 9-12: intervention. Students were asked to complete their assigned essays once in the 10th week and again in the 12th week. In each condition, students were asked to select a topic that was currently being covered in class and write an essay. Relevance condition (letter, N = 78): write a letter to a significant person, relating the relevance of this topic to your significant person. Relevance condition (media, N = 82): find a media report related to the topic and discuss the relevance of the media report to information from class. Preliminary testing of these conditions showed no differences on outcomes, these 2 conditions were combined into one relevance condition. Control condition (outline, N = 78): write an outlined summary of the topic. Control condition (PsycINFO, N = 80): search the PsycINFO database for two abstracts relating to the topic, discuss how the abstracts expanded upon the class material. Control conditions were combined. Time 3 (week 13): assessed final measures of utility value, interest in the course, and inclination to major in psychology.</p>	Regression analysis using the following 6 terms: Initial interest, initial inclination, initial utility value, midterm exams, the relevance contrast, and the interaction between the relevance contrast and midterm exams.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Kost-Smith, L., Pollock, S.J., Finkelstein, N.D., Cohen, G., Ito, T., Miyake, A. (2011). <i>Physics education research conference</i> , 231-234.	Study 2 (follow up to Miyake et al. 2010) Random experiment: N = 363 (T = 168 males and 74 females, C = 86 males and 35 females). Two conditions: writing exercises took place in the first and fourth weeks of the course and took about 15 minutes to complete. Self-affirmation – students wrote about values that were important to them. Control – students wrote about values that were important to others.	Baseline equivalence addressed: There were no significant differences on any prior factors, such as SAT-Verbal, SAT-Math, SAT total score, ACT-Reading, ACT-English, ACT-Math, ACT-Scientific Reasoning, ACT total score, years of high school physics and calculus, and high school GPA between treatment and control groups. Multiple regression: dependent measure regressed on gender, condition, stereotype threat endorsement, and prior math score, and all interactions.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Martens, A., Johns, M., Greenberg, J., & Schimel, J. (2006). Combating stereotype threat: The effect of self-affirmation on women's intellectual performance. <i>Journal of Experimental Social Psychology, 42</i> , 236– 243.	<p><u>Study 1</u></p> <p>Random assignment: females only. 77 female and 70 male, introductory psychology 3 conditions:</p> <p>Non-diagnostic test control condition: participants worked on reasoning problems.</p> <p>Stereotype threat condition: participants were informed that they would work on some reasoning problems and that the study was concerned with “math and reasoning abilities.” They were told that the test was described as a direct measure of math intelligence. They were randomly assigned to two conditions within the threat condition: self-affirmation or non-affirmation control.</p> <p>Self affirmation: Participants rank order a list of 11 “characteristics and values” in order of personal importance. After ranking, participants in the self-affirmation condition were instructed to write about why their most valued characteristic (the item ranked “1”) was personally important and to describe a time when it had been particularly important to them.</p> <p>Non-affirmation control condition: participants were instructed to write about why their 9th most important characteristic was important to other people and describe a time when it had been important to others.</p> <p>The male participants (regardless of the threat instructions) and women in the non-diagnostic control were all given a non-affirmation control packet.</p> <p>Participants were administered the math test after completing the preliminary form. Following the test, participants completed a brief form that assessed stereotype knowledge, SAT (or ACT) scores, and gender.</p>	One-way ANOVA (5 groups): female- and male-non-threat control, female- and male-threat, and female-threat+self-affirmation.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	See row above.	<p><u>Study 2</u> <u>Random assignment: 52 female and 53 male, introductory psychology</u> <u>2 groups: Stereotype threat condition, Stereotype threat plus self-affirmation condition (see study 1). Participants complete a spatial rotation test. Stereotype threat was induced by explicitly telling female participants that they were stereotyped as deficient in spatial rotation ability. Participants were told that they would receive feedback to give them an idea of their strengths and weaknesses on this kind of task. After the test, students provide SAT/ACT scores, GPA, and gender.</u></p>	ANOVA: 2 (male vs. female) x 2 (no-affirm vs. affirm)
Utility goals/values	Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. <i>Science</i> , 330, 1234–1237.	<p>Random assignment, intro physics course (15 week) N = 399 students (283 men and 116 women) Values affirmation group: Selected their most important values from a list and wrote about why these values were important. Control group: Selected their least important values from the same list and wrote why these values might be important to other people. <u>Intervention:</u> 15-min writing exercise, integrated into the class and was given once during week 1 and once in an online homework assignment (week 4) shortly before the first midterm exam (week 5). The other two midterms were administered Week 9 and 14.</p>	<p>Baseline equivalence established for SAT/ACT score and FMCE score.</p> <p>Regression models: the outcome measures were regressed on gender, affirmation condition, and the gender x condition interaction. SAT/ACT math scores were controlled for in the analysis of exam scores, and beginning-of-semester FMCE scores were controlled for in the analysis of end-of-semester FMCE scores. All b weights reported in this article are standardized weights.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Schechter, O. G., Durik, A. M., Miyamoto, Y., & Harackiewicz, J. M. (2011). The role of utility value in achievement behavior: The importance of culture. <i>Personality and Social Psychology Bulletin</i> , 36, 303-317.	<p><u>Study 1</u></p> <p>Random assignment: 282 undergraduates (131 males and 151 females) from a Midwestern university. 210 Westerners (100 males and 110 females) and 72 East Asians (31 males and 41 females).</p> <p>Intervention:</p> <ol style="list-style-type: none">1. Baseline math performance and interest obtained.2. Participants learned a new four-step technique for solving two-digit multiplication problems. <p>UV condition: Participants were told about the usefulness of the technique for their performance in future classes, preparation for graduate school admissions tests, and their careers.</p> <p>Control condition: no mention of utility value.</p> <ol style="list-style-type: none">3. Participants practiced the new technique on multiplication problems.4. Participants completed a questionnaire assessing the degree of utility value they perceived from the new technique.5. Participants solved two sets of multiplication problems, which constituted a measure of their performance. Participants reported their interest in the technique.	<p>Baseline equivalence established: no significant differences between racial groups in terms of initial interest. there was a difference between initial performance, this variable was added as a covariate.</p> <p>Multiple regression was used to analyze the effects of culture, initial interest, and the utility value intervention on behavioral effort, performance, and interest, with initial performance as a control.</p> <p>Regression analyses conducted separately for each culture.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Silverman, A., Logel, C., & Cohen, G.L. (2013). Self-affirmation as a deliberate coping strategy: The moderating role of choice. <i>Journal of Experimental Social Psychology</i> , 49, 93– 98.	<p><u>Study 1</u></p> <p>Random assignment: 59 students at a western university (27 women).</p> <p>Part 1: First, participants ranked a list of values.</p> <p>(a) Aware-affirmed: participants read an article explaining the benefits of affirmation, and then completed an affirmation exercise (i.e. wrote about a personally important value).</p> <p>(b) Aware-spontaneous writing: participants read an article explaining the benefits of self-affirmation, and were free to write about whatever they wanted.</p> <p>(c) Unaware-affirmed: participants read a neutral article and completed the same affirmation exercise noted in (a). Standard affirmation condition.</p> <p>(d) Control condition: participants read a neutral article and wrote about their ninth most important value and why it would be important to another person</p> <p>Standard control condition.</p> <p>Part 2: Participants took two math tests. The first, difficult math test was intended to reinforce threat by presenting participants with failure - 30 extremely challenging problems taken from the GRE and was described as diagnostic of math ability. Following the difficult math test, participants were given the main dependent measure assessing recovery from failure -- a set of moderately difficult math problems taken from the Scholastic Aptitude Test (SAT).</p>	<p>Baseline equivalence established: There were no effects of condition on the number of problems attempted, number answered correctly, or accuracy on the first test, or gender, ethnicity, and math SAT score.</p> <p>ANCOVA with 3 orthogonal contrasts were created to test predictions -- see outcomes.</p>
Utility goals/values	See row above.	<p><u>Study 2</u></p> <p>Random assignment: 81 participants (54 females), University of Colorado</p> <p>Part 1: participants ranked their values.</p> <p>(a) Control condition: see study 1.</p> <p>(b) Aware-affirmed: see study 1.</p> <p>(c) Aware-affirmed+choice: After reading the report explaining the effects of affirmation, participants <u>chose</u> which value to write about.</p> <p>Part 2: See study 1.</p>	<p>Baseline equivalence established: There were no effects of condition on the number of problems attempted, number answered correctly, or accuracy on the first test, or gender, ethnicity, and math SAT score.</p> <p>ANCOVA: control vs. aware-affirmed vs. aware + choice, performance on the first math test as a control.</p>

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Taylor V.J., & Walton G.M. (2011). Stereotype threat undermines academic learning. <i>Personality and Social Psychology Bulletin</i> . 37, 1055–67.	Study 2: 29 Black undergraduates (16 women). Students participated individually in two sessions 6 to 13 days apart. In Session 1, students studied the definitions of 24 rare words under either learning-threat or learning-no-threat conditions. Learning-threat condition: the task was described to participants as in as evaluative of learning ability. Control condition: the task was described so as to be irrelevant to intellectual stereotypes. Before studying word definitions, participants were given 10 minutes to complete a writing exercise (value affirmation manipulation). Participants either circled their most important value from a brief list of values and wrote about why that value was important to them (affirmation condition) or circled their least important value and wrote about why it might matter to someone else (no-affirmation condition).	Baseline equivalence addressed: no significant differences between SAT Verbal score, year in school, the number of days between Sessions 1 and 2, and gender. ANCOVA with family SES as a covariate.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Utility goals/values	Woolf, K., McManus, I.C., Gill, D., Dacre, J. (2009). The effect of a brief social intervention on the examination results of UK medical students: a cluster randomised controlled trial. <i>BMC Medical Education</i> , 9-35.	Random assignment: 348 Year 3 white (W) and ethnic minority (EM) students at one UK medical school Intervention condition: writing about one's own values) Control condition: writing about another's values	Baseline equivalence established: groups were statistically identical at baseline on demographic and psychological factors. ANCOVA: Group comparisons on post intervention written and OSCE (clinical) assessment scores adjusted for baseline written assessment scores. All assessment scores were transformed to z-scores (mean = 0 standard deviation = 1).

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Conscientiousness	Arroyo, S. G. (1981). Effects of a multifaceted study skills program on class performance of Chicano college students. <i>Hispanic Journal of Behavioral Sciences</i> , 3, 161-175.	<u>Percentage (mean) of material studied</u> T-M group (Post-Pre): 84-48.9; $F(1,24)=14.9$, $p<.01$ C-T group (Post-Pre): 45.1-46.5 C-T group -- after receiving treatment (Post-Pre): 85.2-45.1; $F(1,24)=19.4$, $p<.01$ <u>Quiz scores (average of 4 quizzes)</u> T-M group (Post-Pre): 7.6-5.2; $F(1,24)=19.2$, $p<.01$ C-T group (Post-Pre): 5.1-5.1 C-T group -- after receiving treatment (Post-Pre): 7.7-5.1; $F(1,24)=21.5$, $p<.01$ <u>The percentage of material reviewed for mid-term and final examinations</u> T-M group (Post-Pre): 81.4-91.4; $F(1,24)=1.3$, $p>.05$ C-T group -- after receiving treatment (Post-Pre): 93.6-43.6; $F(1,24)=32.3$, $p<.01$ <u>Scores on two examinations</u> T-M group (Post-Pre): 42.7-40.9; $F(1,12)=2.08$, $p>.05$ C-T group -- after receiving treatment (Post-Pre): 40.1-31.3; $F(1,12)=45.2$, $p<.01$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Conscientiousness	Bettinger, E., & Baker, R. (2014). The effects of student coaching: An evaluation of a randomized experiment in student advising. <i>Educational evaluation and policy analysis</i> , 36, 3-19.	<u>College persistence</u> : measured in 6-month increments from the start of treatment (ITT). Main effect -- 6 month retention: .051*** (the difference, in percentage points, between treatment and control group persistence rates). 12 month retention: .052*** 18 month retention: .042*** 24 month retention: .033** Completed degree (n=1346): .040* Students who were randomly assigned to a coach were more likely to persist during the treatment period (two semesters) and were more likely to be attending the university 1 year after the coaching had ended.
Conscientiousness	Duckworth, A. L., White, R. E., Matteucci, A. J., Shearer, A., & Gross, J. J. (2016). A stitch in time: Strategic self-control in high school and college students. <i>Journal of Educational Psychology</i> , 108, 329–341.	NA

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Conscientiousness	Fitch, T., Marshall, J., & McCarthy, W. (2012). The effect of solution-focused groups on self-regulated learning. <i>Journal of College Student Development, 53</i> , 586-595.	NA

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Conscientiousness	Liu, L., Bridgeman, B., & Adler, R. (2014). Measuring learning outcomes in higher education: Motivation matters. <i>Educational Researcher</i> , 41, 352-362.	<u>ETS Proficiency profile scores (alpha ranged from .83 to .86 depending on the institution):</u> Measures college-level skills in critical thinking, reading, writing, and mathematics and has been used by over 500 institutions as an outcomes assessment for the past 5 years (Klein et al., 2009). Total mean score (also available separately for each type of institution) institutional > control; $p < .05$, $d = .26$ personal > control; $p < .001$, $d = .41$ personal > institutional; ns, $d = .16$ <u>Essay score</u> (also available separately for each type of institution) institutional > control; $p < .05$, $d = .23$ personal > control; $p < .001$, $d = .41$ personal > institutional; ns, $d = .18$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Conscientiousness	Morisano, D., Hirsh, J., Peterson, J., Pihl, R., & Shore, B. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. <i>Journal of Applied Psychology</i> , 95, 255-264	<u>Change in GPA (GPA2-GPA1)</u> Treatment: $2.91-2.25=0.66$; $p<.01$; $d=.65$ Control: $2.46-2.26=0.2$; $p=.28$; $d=0.17$. <u>Retention Rates</u> : measured by the number of students whose course load dropped below that of full-time status (nine credits or more) in the postintervention semester. The retention-rate difference between groups was significant at $p < .005$. Post-treatment retention rates not provided, only significance level; pre-treatment retentions are provided.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Conscientiousness	Senko, C, Harackiewicz, J.M. (2005). NA Regulation of achievement goals: The role of competence feedback. <i>Journal of Educational Psychology</i> . 97, 320– 336.	

Intervention Study Table

Competency	Reference	NA	Outcome & Impact: Achievement
Academic self-efficacy	Betz, N., & Schifano, R. (2000). Evaluation of an intervention to increase realistic self-efficacy and interests in college women. <i>Journal of Vocational Behavior</i> , 56, 35-52.		

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Academic self-efficacy	Luzzo, D.A., Hasper, P., Albert, K.A., Bibby, M.A., Martinelli, E.A. (1999). Effects of self-efficacy-enhancing interventions on the math/science self-efficacy and career interests, goals, and actions of career undecided college students. <i>Journal of Counseling Psychology</i> , 46, 233-243.	<u>Enrolled in math- and/or science-related courses for the following quarter</u> Main effect, performance accomplishment only (relative to those who did not receive this treatment), $p < .01$, $d = .90$ <u>Selected math- and/or science related majors</u> Main effect, performance accomplishment only (relative to those who did not receive this treatment), $p < .01$, $d = .42$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Aronson, J., Fried, C., & Good, C. (2002). Reducing the effects of stereotype threat on african american college students by shaping theories of intelligence. <i>Journal of Experimental Social Psychology</i> . Online publication. Doi: doi:10.1006/jesp.2001.1491	<u>Spring quarter GPA</u> Main effect (malleable versus no malleable) $F(2, 72) = 4.93, p < .01$ <i>Differences by groups: Black participants</i> Malleability > Control pen pal: 3.32-3.05; $p < .05$ Malleability > No pen pal: 3.32-3.10; $p < .05$ Control pen pal < No pen pal: 3.05-3.10; $p < .05$ <i>Differences by groups: White participants</i> Malleability > Control pen pal: 3.55-3.34; $p < .05$ Malleability > No pen pal: 3.55-3.35; ns Control pen pal < No pen pal: 3.34-3.35; ns

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Boese, G. D., Stewart, T. L., Perry, R. P., & Hamm, J. M. (2013). Assisting failure prone individuals to navigate achievement transitions using a cognitive motivation treatment (attributional retraining). <i>Journal of Applied Social Psychology, 43</i> , 1946–1955.	<u>Grade in course (measured as a percentage)</u> Main effect: Conditions means not provided; main effect significance level not provided. <i>Differences between groups</i> Low failure (treatment-control): 67.97-69.47; p=.276 High failure (treatment-control): 69.40-63.02; p=.010 Control group (high<low): p=.011. AR group (high vs. low): p=.278 <u>GPA (all courses taken in the second semester)</u> Main effect: Conditions means not provided; main effect significance level not provided. <i>Differences between groups</i> Low failure (treatment-control): 2.37-2.56; p = .200 High failure (treatment-control): 2.70-2.18; p=.008 Control group (high<low): p = .044 AR group (high vs. low): p = .061

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Cohen, G.L., Steele, C.M., & Ross, L. NA D. (1999). The mentor's dilemma: Providing critical feedback across the racial divide. <i>Perspectives Social Psychology Bulletin</i> , 25, 1302–1318.	
Growth mindset	Eskreis-Winkler, L., Shulman, E. P., Young, V., Tsukayama, E., Brunwasser, S. M. & Duckworth, A. L. (in press). Using wise interventions to motivate deliberate practice. <i>Journal of Personality and Social Psychology</i> .	<u>Academic achievement: end of semester grades</u> Liberal arts college measured by fall and spring semester GPA Research university measured by final grade in psychology course Main effect: $p = .04$, $d = .38$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth Mindset	Hall, N., Hladkyj, S., Perry, R., & Ruthig, J. (2004). The role of attributional retraining and elaborative learning in college students' academic development. <i>The Journal of Social Psychology, 144</i> , 591-612.	<u>Final course grade</u> Main effect favors AR group, $F=5.41^{**}$ <i>Differences by groups, high versus low elaborative learning</i> Low elaborators Writing AR ($m=70.18$) versus control ($m=64.27$): $t(115)=3.05$, $p<.01$ Test AR ($m=69.85$) versus control: $t(110)=2.82$, $p<.01$ High elaborators Writing AR ($m=70$) versus control ($m=65$) Test AR ($m=71$) versus control Parallel a priori contrasts for low and high elaborators separately were also significant at $p<.05$. Both low and high elaborators experienced significant improvements in their final grades, relative to controls, after either AR technique. <u>GPA</u> Main effect for AR group, ns, $F=0.62$ <i>Differences by groups, high versus low elaborative learning</i> Low elaborators Writing AR ($m=2.55$) versus control ($m=2.5$): ns Test AR ($m=2.45$) versus control: ns High elaborators Writing AR ($m=2.8$) versus control ($m=2.59$): $t(114)=1.33$, $p<.10$ Test AR ($m=2.81$) versus control: $t(112)=1.35$, $p<.10$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Hall, N. C., Perry, R. P., Chipperfield, J. G., Clifton, R. A., & Haynes, T. L. (2006). Enhancing primary and secondary control in achievement settings through writing-based attributional retraining. <i>Journal of Social and Clinical Psychology, 25</i> , 361– 391.	Unsuccessful students; no main effects for successful students . <u>Final course grade (a percentage based off of exams)</u> Main effect: ns; $F(1,66)=1.63$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Hamm, J. M., Perry, R. P., Clifton, R. A., Chipperfield, J. G., & Boese, G. D. (2014). Attributional retraining: A motivation treatment with differential psychosocial and performance benefits for failure prone individuals in competitive achievement settings. <i>Basic and Applied Social Psychology</i> , 36, 221–237.	<u>Cumulative first-year GPA</u> <u>Main effect: $F(1, 309) = 1.18$; $p = .140$. Treatment and control group means not provided.</u> <u>Differences between groups: only one significant difference</u> <u>Failure-acceptor (T-C): 0.33; $p = .03$; $d = .46$</u> <u>Voluntary course withdrawals: represent the cumulative credit hours students dropped in the first and second semesters in their 1st year</u> <u>Main effect: not provided.</u> <u>Differences between groups: only one significant difference</u> <u>Failure-acceptor: AR (vs. no-AR) resulted in fewer dropped classes, $p = .040$, odds ratio = 0.39.</u> <u>Failure-acceptors in the AR condition were 61 % less likely to drop a class than their peers in the no-AR condition.</u>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Haynes, T. L., Daniels, L. M., Stupnisky, R. H., Perry, R. P., & Hladkyj, S. (2008). The effect of attributional retraining on mastery and performance motivation among first-year college students. <i>Basic and Applied Social Psychology, 30</i> , 198–207.	<u>GPA (all courses)</u> AR on GPA ($b=.13$, $p<.01$) was no longer significant with the inclusion of mastery motivation in the model ($b=.08$, $p>.05$). The relationship between AR and GPA is mediated by mastery motivation. No evidence emerged to suggest that performance motivation mediates the relationship between AR and GPA.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Menec, V. H., Perry, R.P., Struthers, C.W., & Schonwetter, D.J., Hechter, F.J., & Eichholz, B.L. (1994). Assisting at-risk college students with attributional retraining and effective teaching. <i>Journal of Applied Social Psychology</i> , 24, 675–701.	<u>Student achievement:</u> Assessed with a 30-item, multiple-choice test based on the lecture. <i>Low-expressive instruction</i> Main effect: ns; $F(2,75) = 1.24$. Treatment and control means not provided. <i>High-expressive instruction</i> Main effect: ns; $F(2,69) = 2.09$. Treatment and control means not provided. <i>Differences between groups: failure versus success students</i> Failure students -- 1AR - control: 15.25-11.00; $p < .05$ 2AR - control: 16.26-11.00; $p < .05$ 1AR - 2AR: ns Success students -- treatment versus control, ns.
Growth mindset	See row above.	<u>Student achievement:</u> Assessed with a 30-item, multiple-choice test based on the lecture. Low-expressive instruction: $F(2,114) = 3.64$; $p < .05$. Treatment and control means not provided. High-expressive instruction: $F(2,116) = 0.82$; $p > .05$. Treatment and control means not provided.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Perry, R.P. & Magnusson, J. (1989). Causal attributions and perceived performance: Consequences for college students' achievement and perceived control in different instructional conditions. <i>Journal of Educational Psychology</i> , 81, 164-172.	<u>Student achievement</u> (measured with a 30-item multiple-choice test based on the lecture) Main effect, attribution groups: $F(2,211)=9.37$; $p < .001$. Treatment and control means not provided. <i>Differences by groups</i> Low expressive instruction/Distortion students: Effort group - test difficulty group = 4.77 ($t=3.25$) Effort group - ability group = 2.04, ns ($t=1.48$) Ability group - test difficulty group = 2.73, ns Low expressive instruction/Non-distortion students: Effort group - test difficulty group = -0.27, ns Effort group - ability group = -3.03, ($t = 2.49$) Ability group - test difficulty = 2.76, ($t = 2.46$) High expressive instruction/Distortion students: group differences were not significantly different.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Perry, R. P., Stupnisky, R. H., Hall, N. C., Chipperfield, J. G., & Weiner, B. (2010). Bad starts and better finishes: Attributional retraining and initial performance in competitive achievement settings. <i>Journal of Social and Clinical Psychology, 29</i> , 668– 700.	<u>Test performance (POST-intervention class test)</u> Main effect (Treatment-Control): 74.98-65.33=9.65; $p < .01$ <i>Differences by groups</i> Low-performance: AR > control, $p < .01$, $d = .96$ Average-performance: AR > control, $p < .01$, $d = .92$ High-performance: ns <u>Course grade (cumulative percentage based on all tests completed in the course)</u> Main effect (Treatment-Control): 70.53-67.36=3.17, $p < .01$ <i>Differences by groups</i> Low-performance: AR > control, $p = .02$, $d = .37$ Average-performance: AR > control, $p < .01$, $d = .43$ High-performance: ns <u>GPA (first-year)</u> Main effect (Treatment - Control): 2.88-2.62=0.26; $p < .01$ <i>Differences by groups</i> Low-performance: AR > control, $p < .01$, $d = .39$ Average-performance: AR > control, $p < .01$, $d = .51$ High-performance: ns

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Ruthig, J. C., Perry, R. P., Hall, N. C., & Hladkyj, S. (2004). Optimism and attributional retraining: Longitudinal effects on academic achievement, test anxiety, and voluntary course withdrawal in college students. <i>Journal of Applied Social Psychology</i> , 34, 709–730.	<u>Cumulative grade point average (GPA) for the school year</u> Main effect, condition: $F(1,180)=3.19$; $p = .08$. Treatment and control means not provided. <i>High versus Low groups</i> Treatment (H-L): $2.00-3.1 = -1.1$; p-value not provided. Control (H-L): $2.22-2.72 = -.5$; $p = .08$ High (T-C): $2.82-2.22 = .6$; $p < .05$. Low (T-C): $2.67-2.72$; ns <u>Voluntary course withdrawal (VW)</u> : assessed by the number of credit hours students dropped during the year, where 3 credit hours were equivalent to a one-semester course and 6 credit hours were equivalent to a two semester course. Main effect: $F(1,189) = 6.53$; $p < .05$. Participants who received AR dropped fewer credit hours than did those who did not receive AR. Means are not provided. <i>High versus Low groups</i> Treatment (H-L): $2.1-3.26 = -1.16$; p-value not provided. Control (H-L): $7.26-3.24$; ns High (T-C): $2.1-7.26 = -5.16$; $p < .01$ Low (T-C) $3.26-3.24$; ns

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Struthers, C.W., & Perry, R. (1996). Attributional style, attributional retraining, and inoculation against motivational deficits. <i>Social Psychology of Education, 1</i> , 171-187.	<u>Letter grade in course (mean)</u> Treatment and control means not provided, significance test not provided; cannot assess main effect on condition. <i>Differences between attributional styles</i> <i>S=stable; US=unstable; C=controllable; UC=uncontrollable</i> S-C (T-C): 0.70; ns S-UC (T-C): -0.50; ns US-C (T-C): -0.16; ns US-UC (T-C): 0.85; p<.05

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	Wilson, T. D., & Linville, P. W. (1982). Improving the academic performance of college freshmen: Attribution therapy revisited. <i>Journal of Personality and Social Psychology</i> , 42, 367– 376.	<p><u>GRE items</u>: Average number of sample GRE questions answered correctly, averaged over Weeks 1 and 2. Main effect (Treatment-Control): $4.18 - 3.50 = .68$; $p < .05$</p> <p><u>College dropout</u>: Percent no longer enrolled as of the second semester of the sophomore year. Main effect (Treatment-Control): $5 - 25 = -20$; $p = .059$. The GPA information reduced the percentage of subjects who left Duke by 80%.</p> <p><u>GPA's</u>: Average increase in GPA between the second semester of the sophomore year (1 year after treatment) and the first semester of the freshman year (pre-treatment). These figures do not include those who dropped out by the second semester of their sophomore year. Treatment (GPA2-GPA1): $2.92 - 2.58 = .11$ Control (GPA2-GPA1): $2.82 - 2.87 = -0.05$ Treatment vs. control; $F(1,26) = 4.27$; $p < .05$</p>
Growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	<p><u>Full-time enrollment -- both semesters first year in college</u> Treatment group (social belonging + growth mindset) = 41%; growth mindset only = 36%, social belonging only = 45%; Control group = 32%. Growth mindset only condition showed poorer outcomes compared with the two social belonging conditions ($p = .046$) and did not differ from active controls ($p > .50$). The two social belonging interventions did not differ on the basis of whether students also received a growth mindset component ($p = .26$). Both social belonging interventions combined differed from the active control ($p = .007$). The intervention increased full-time enrollment among disadvantaged students over the next academic year by 34%, $p = .004$.</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Growth mindset	See row above.	<u>First-year full-time enrollment</u> Randomized group: Disadvantaged students in the control condition were 10 percentage points less likely to complete the first-year full-time enrolled in both terms compared with advantaged students (69% versus 79%; $p < 0.001$). The treatment reduces this inequality by 40%, increasing the percentage of full-time enrolled disadvantaged students to 73%; $p = 0.024$. Interventions were equally effective. No effect of interventions among advantaged students.
Intrinsic goals/values	Hamm et al. (2014)	see Hamm et al. (2014)
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., Lacante, M. (2004). Less is something more: Goal content matters. <i>Journal of Educational Psychology</i> , 96, 755-764.	<u>Test performance</u> : performance on the written test of comprehension and contribution to the collective presentation, graded by instructor on a scale from 1-10. Future intrinsic ($m = 6.58$), future extrinsic ($m = 5.57$), double goal ($m = 6.07$) future intrinsic versus double goal: $t(243) = 2.51$, $p < .05$, $d = 0.39$ future extrinsic versus double goal: $t(243) = 2.29$, $p < .05$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy support. <i>Journal of Personality and Social Psychology</i> , 87, 246–260	<p><u>Test performance (post)</u>: measured by student performance on a written test of comprehension and student contribution to the group discussion (graded by instructors). The correlation between the two scores = .92.</p> <p><i>Autonomy-supportive context</i> Intrinsic - extrinsic group: 7.38-6.04; $F(1,196)=53.87$, $p<.001$, $\eta^2=.21$, $d=1.25$</p> <p><i>Controlling context</i> Intrinsic-extrinsic: 5.75-5.14, $d=0.71$</p> <p><u>Persistence (post)</u>: an electronic swipe card recorded who went to the library during the days following the learning session on recycling (to learn more about recycling and ecology).</p> <p><i>Autonomy-supportive context</i> Intrinsic - extrinsic group: 1.94-1.16; $F(1,196)=27.61$, $p<.001$, $\eta^2=.12$</p> <p><i>Controlling context</i> Intrinsic-extrinsic: 0.94-0.48</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Positive future self	Harrison, L.A., Stevens, A.M., Coakley, C.A. (2006). The consequences of stereotype threat on the academic performance of white and non-white lower income college students. <i>Social Psychology of Education, 9</i> , 341-357.	<p><u>Math and verbal performance</u>: An index = correct math items/number of math items attempted.</p> <p>Math Main effect, condition: Not reported. <i>Differences by groups</i> Low-income (Treatment-Control): 0.27-0.44=-0.17; p<.001 Middle-income (Treatment-Control): 0.41-0.38; p=0.76 Upper-income (Treatment-Control): 0.71-0.40=0.31; p=.003</p> <p>Verbal performance Main effect, condition: Not reported. <i>Differences by groups</i> Low-income (Treatment-Control): 0.51-0.60; p=0.03 Middle-income (Treatment-Control): 0.60-0.60; p=0.99 Upper-income (Treatment-Control): 0.69-0.57; p<.001</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Positive future self	Landau, M. J., Oyserman, D., Keefer, L. A., & Smith, G. C. (2014). The college journey and academic engagement: How metaphor use enhances identity-based motivation. <i>Journal of Personality and Social Psychology, 106</i> , 679-698.	NA
Positive future self	See row above.	NA
Positive future self	See row above.	<u>Academic effort</u> : measured with final exam score (1 week after treatment). Main effect, $p = .05$ Journey-framed academic PI: $M = 92.08$, $SD = 4.73$ Container-framed academic PI: $M = 88.6$, $SD = 7.34$ $d = 0.56$

Intervention Study Table

Competency	Reference		Outcome & Impact: Achievement
Positive future self	Schwartz, S.J., Kurtines, W.M., & Montgomery, M.J. (2005). Facilitating identity exploration processes in emerging adults: An exploratory study. <i>Journal of Adolescent Research</i> , 20, 309-345.	NA	

Intervention Study Table

Competency	Reference	NA	Outcome & Impact: Achievement
Prosocial or transcendent goals/values	Yaeger, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D' Mello, S., Spitzer, B. J., & Duckworth, A. (2014). Boring but important: A self transcendent purpose for leaning fosters academic self-regulation. <i>Journal of Personality and Social Psychology</i> , 107, 559-580		

Intervention Study Table

Competency	Reference		Outcome & Impact: Achievement
Prosocial or transcendent goals/values	See row above.	NA	

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Sense of belonging	Cohen, G. L., & Garcia, J. (2005). I am us: Negative stereotypes as collective threats. <i>Journal of Personality and Social Psychology</i> , 89, 566– 582.	NA
Sense of belonging	Folger, W.A., Carter, J.A., & Chase, P.B. (2004). Supporting first generation college freshmen with small group intervention. <i>College Student Journal</i> , 38, 472-476	<u>GPA</u> First semester: Main effect (Treatment-Control): 2.26-1.51; p=0.0002 Second semester: Main effect (Treatment-Control): 2.70-1.70; p=0.0001 Cumulative GPA: Main effect (Treatment-Control): 2.56-1.64; p=0.0001

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Sense of belonging	Hausmann, L., Ye, R., Schofield, J., Woods, R. (2009). Sense of belonging and persistence in white and african american first-year students. <i>Research in Higher Education</i> , 50, 649-669.	See figures 3 & 4: no direct impacts on achievement outcomes.
Sense of belonging	Stephens, N., Hamedani, M., & Destin, M. (2014). Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition. <i>Psychological Science</i> , 25, 943-953.	<u>End of year GPA</u> <u>Main effect, intervention condition, $F(1,125) = 7.75; p = .006$</u> <u>Control (FG-CG): 3.16-3.46; $p=.01$</u> <u>Treatment (FG-CG): 3.40-3.51; $p=.95$</u> <u>Differences by groups</u> <u>FG students (treatment-control): $p=.0004; d=0.70$</u> <u>FG students versus campus wide control: $p=.02; d=0.49$</u> <u>CG students (treatment-control): $p=.66; d=0.66$</u> <u>CG versus campus wide control: $F(1, 1726)=2.69; p=.10$</u>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Sense of belonging	Walton G.M. & Cohen, G. (2007). A question of belonging: Race, social fit, and achievement. <i>Journal of Personality and Social Psychology</i> , 92, 82-96.	<p><u>Index of challenge-seeking in course selection</u>: number of difficult but educational courses each participant selected divided by the total number of courses he or she selected. Main effect favors treatment group in full sample, $p=.003$, $d=.95$</p> <p><i>Differences by groups</i> Black students experience treatment effect, $p=.014$, $d=1.11$ White students, no differences between conditions, $p=.068$, $d=.77$</p> <p><u>Achievement behavior</u>: attending review sessions, making office hour appointments, or study group meetings; how many e-mail queries they had sent to professors, questions they had asked in class, and hours they had studied. Main effect: condition means and significance level not provided. <i>Differences by groups</i> Black (treatment-control): .30(-.30); $p=.009$; $d=1.47$ White (treatment-control): -.20-.05; ns</p> <p><u>GPA</u>: the difference between students' actual post-GPA and expected GPA based off of prior grades; a change score (cs). Main effect: condition means and significance level not provided. <i>Differences by group</i> Black (treatment cs-control cs): 0.12(-0.22); $p=0.22$; $d=1.10$ White students (treatment cs - control cs): -0.14-0.23; $p=.050$, $d=.88$.</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Sense of belonging	Walton, G.M., & Cohen, G.L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. <i>Science</i> , 331, 1447-1451.	<u>Change in GPA</u> : measured by mean postintervention GPA(sophomore through senior years) minus mean preintervention GPA (fall term, first year) African Americans: treatment versus control, $B = 0.30$, $P = 0.014$ European Americans: no difference between groups <u>3-year post-intervention GPA</u> : Treatment (minority gap): .14 grade points Control (minority gap): .29 grade points The intervention closed the minority gap by 52%.

Intervention Study Table

Competency	Reference		Outcome & Impact: Achievement
Sense of belonging	Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. <i>Journal of Personality and Social Psychology</i> , 102, 513–532.	NA	

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Sense of belonging	Walton, G.M., Logel, C., Peach, J.M., Spencer, S.J., Zanna, M.P. (2015). Two brief interventions to mitigate a “chilly climate” transform women’s experience, relationships, and achievement in engineering. <i>Journal of Educational Psychology</i> , 107, 468–485.	<u>First-year cumulative engineering GPA (scale of 0 to 100)</u> <u><i>Women in male dominated majors</i></u> <u>Social belonging > control: B = 11.66, p = .017, d = 1.07</u> <u>Affirmation > control: B = 11.13, p = .023, d = 1.02</u> <u>Social belong versus affirmation: ns; social belonging = 77; affirmation = 76</u> <u><i>Women in gender-diverse majors</i></u> <u>Social belonging > control: ns; social belonging = 75; control = 77</u> <u>Affirmation < control: B = -7.56, p = .043, d = -0.69</u> <u>Social belong versus affirmation: ns; social belonging = 75; affirmation = 74</u>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Sense of belonging **DUPLICATE: see growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	<u>Full-time enrollment -- both semesters first year in college</u> Treatment group (social belonging + growth mindset) = 41%; growth mindset only = 36%, social belonging only = 45%; Control group = 32%. Growth mindset only condition showed poorer outcomes compared with the two social belonging conditions ($p=.046$) and did not differ from active controls ($p>.50$). The two social belonging interventions did not differ on the basis of whether students also received a growth mindset component ($p=.26$). Both social belonging interventions combined differed from the active control ($p=.007$). The intervention increased full-time enrollment among disadvantaged students over the next academic year by 34%, $p=.004$. <u>Growth mindset: Full-time enrollment - both semesters first year in college</u> Main effect, ns. Treatment and control group means not provided.
Sense of belonging **DUPLICATE: see growth mindset	See row above.	<u>First-year full-time enrollment</u> Randomized group: Disadvantaged students in the control condition were 10 percentage points less likely to complete the first-year full-time enrolled in both terms compared with advantaged students (69% versus 79%; $p<0.001$). The treatment reduces this inequality by 40%, increasing the percentage of full-time enrolled disadvantaged students to 73%; $p=0.024$. Interventions were equally effective. No effect of interventions among advantaged students.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Sense of belonging	See row above.	<u>First-year GPA</u> Control: disadvantaged students (m=3.33) earned lower GPAs than advantaged students (m=3.62); $t(1591) = 6.99, p < .001, d = .80$ Treatment: raised disadvantaged students gpa by .09 grade points to 3.42, $t(1591) = 2.16, p = .031, d = .25$ Interventions were equally effective. No intervention effect for advantaged students.
Utility goals/values	Brady, S. T., Reeves, S. L., Garcia, J., Purdie-Vaughns, V., Cook, J. E., Taborsky-Barba, S., . . . Cohen, G. L. (2016). The psychology of the affirmed learner: Spontaneous self-affirmation in the face of stress. <i>Journal of Educational Psychology, 108</i> , 353–373	<u>GPA</u> : average over 2 years post intervention Main effect: Condition means and significance levels not provided. Latino participants: affirmation GPA > control GPA, $b = .18, p = .02, d = 0.52$ White participants: affirmation GPA < control GPA, $b = -.15, p = .04, d = -0.43$ <u>GPA</u> : fourth term post intervention Control: Latino participants < White participants, $p = .05, d = 0.46$ Treatment Latino participants do not differ from control white participants; $t(139) = -0.18, p = .86, d = 0.04$. For Latino students, affirmation led to a 90% reduction in the ethnic achievement gap.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Durik, A. M., Shechter, O. G., Noh, M., Rozek, C. S., & Harackiewicz, J. M. (2015). What if I can't? Success expectancies moderate the effects of utility value information on situational interest and performance. <i>Motivation and Emotion</i> , 39, 104-118.	<u>Performance</u> : total number of problems solved correctly on the two problem sets Perceived competence in math (PCM) model Main effect: condition means and significance level not provided. <i>Differences by group</i> Low PCM: treatment < control; 30<33, p=.13, B=-.33 High PCM: treatment > control; 41>32; p<.05, B=.46
Utility goals/values	Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Giffen, C. J., Blair, S. S., Rouse, D. I., & Hyde, J. S. (2014). Closing the social class achievement gap for first-generation students in undergraduate biology. <i>Journal of Educational Psychology</i> . 106, 375-389	<u>Biology course grade</u> Control (FG-CG): 2.38-2.86; d=.39 , p<.001 Treatment (FG-CG): 2.62-2.82; d=.18 , p<.05 Treatment closed the achievement gap by .21 (.39-.18) FG (treatment - control): .24 points; p<.05 <u>Semester GPA (excluding the biology course grade)</u> Control (FG-CG): 2.81-3.20 Treatment (FG-CG): 3.05-3.17 FG (treatment - control): .24 points; t(789)=2.36, p=.02 <u>Continuation in second semester biology course</u> Main effect, condition: p=.03 Control (FG-CG): 66.2-77.7 Treatment (FG-CG): 85.7-74.8 FG (treatment>control): p<.01 CG (treatment versus control): p=.41

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2015). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. <i>Journal of Personality and Social Psychology</i> .	<u>Biology course grade</u> Main effect (treatment > control): $B=.08$, $P=.024$, $d = 0.06$ <i>Differences by groups</i> Control (performance gap, URM versus majority student): $2.3-2.8 = .50$ grade points, $d=.60$, $p<.001$ Treatment (performance gap, URM versus majority student): $2.5-2.9 = .40$ grade points Majority (treatment-control): ns URM (treatment - control): .20 grade points, $d=0.23$ FG-URM versus CG-majority gap: .84 grade points, $d=.98$, $p<.001$ FG-URM (treatment > control): .51 grade points, $d=.55$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. <i>Journal of Educational Psychology, 102</i> , 880-895.	<u>Achievement Performance</u> : the total number of problems solved correctly on the official problem set Main effect: ns. Condition means not provided.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	See row above.	<u>Course grades</u> : obtained from departmental records Main effect: ns. Condition means not provided.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Kost-Smith, L., Pollock, S.J., Finkelstein, N.D., Cohen, G., Ito, T., Miyake, A. (2011). <i>Physics education research conference</i> , 231-234.	<u>Force and Motion Concept Evaluation (FMCE)</u> : pre and post. Scores reflect adjusted score, controlling for pre-score. Main effect: condition means and significance not provided. <i>Differences by group</i> Females: control condition (score=78) > treatment condition (score=67); p=.02 Gender x condition, ns: post-FMCE gender gap in the treatment and control conditions were not significantly different. <u>Exams: the average score on 3 midterm exams and a final.</u> Main effect: condition means and significance not provided. <i>Differences by group</i> Females: treatment condition (score=66) > control condition (score=62); p=.03. Gender x condition, ns: the gender gaps in the treatment and control groups were not significantly different.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Martens, A., Johns, M., Greenberg, J., & Schimel, J. (2006). Combating stereotype threat: The effect of self-affirmation on women's intellectual performance. <i>Journal of Experimental Social Psychology</i> , 42, 236–243.	<u>Math test performance</u> : measures the total number of questions participants answered correctly. Pairwise comparisons: Females Self-affirmed group (M = 6.42) > stereotype threat condition (M = 3.60); $p < .01$ Stereotype threat condition (M = 3.60) < non-threat control condition (M = 5.70); $p = .05$ Stereotype threat condition: Females (M = 3.60) < Males (M = 8.31); $p < .01$ Males: no significant difference between groups.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	See row above.	<u>Spatial test performance</u> : measured as the total items correct. Main effects (treatment versus control): $F(1,67)=3.78$, $p = .06$. Differences between groups ~ gender Females (treatment-control): 13.44-10.05; $p<.05$ Males (treatment-control): 14.24-13.13; ns
Utility goals/values	Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. <i>Science</i> , 330, 1234–1237.	Standardized coefficients <u>Overall exam score in the course (the average of the percent correct for the four exams)</u> Main effect: condition means and significance level not provided. <i>Differences by groups ~ gender</i> Control group (gender gap): $d = 0.93$, $p<.01$ Treatment (gender gap): $d = 0.18$, $p=.13$ <u>End of semester FMCE score [the Force and Motion Conceptual Evaluation (assesses the effect of values affirmation)]: administered Week 1 and Week 15</u> Main effect: condition means and significance level not provided. <i>Differences by groups ~ gender</i> Control group (gender gap): $d = 0.46$, $P= 0.01$ Treatment (gender gap): $d = -0.12$, $P = 0.33$

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Schechter, O. G., Durik, A. M., Miyamoto, Y., & Harackiewicz, J. M. (2011). The role of utility value in achievement behavior: The importance of culture. <i>Personality and Social Psychology Bulletin</i> , 36, 303-317.	<u>Performance:</u> The total number of problems participants solved correctly on the two problem sets. Main effect: ns. Condition means not provided.

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Silverman, A., Logel, C., & Cohen, G.L. (2013). Self-affirmation as a deliberate coping strategy: The moderating role of choice. <i>Journal of Experimental Social Psychology</i> , 49, 93– 98.	<p><u>Test performance (SAT problems -- moderate test)</u>: Measures recovery from failure -- see Dweck, 1986. This is equal to the number of problems correct divided by the number attempted.</p> <p>Aware-affirmed condition (M-adj.=.148, SD=.22) Aware-spontaneous (M-adj.=.325, SD=.21) Unaware-affirmed (standard) (M-adj.=.306, SD=.23) Control participants (M-adj.=.239, SD=.19)</p> <p><i>Differences between groups</i></p> <p>Unaware-affirmed + aware-spontaneous writing <u>versus</u> control + aware-affirmed; F (1,52) = 4.00, p=.050 Control <u>versus</u> aware-affirmed conditions; ns Unaware-affirmed <u>versus</u> aware-spontaneous conditions; ns</p>
Utility goals/values	See row above.	<p><u>Test performance (SAT problems)</u>: Measures recovery from failure -- see Dweck, 1986. This is equal to the number of problems correct divided by the number attempted.</p> <p>Aware-affirmed < control : .13<.19; F(1,77)=1.29, p=.260 Aware-choice > control: .305>.19, F(1,77)=4.30, p=.042 Aware-choice > aware-affirmed: F(1,77)=10.654, p < .01</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Taylor V.J., & Walton G.M. (2011). Stereotype threat undermines academic learning. <i>Personality and Social Psychology Bulletin</i> . 37, 1055–67.	<p><u>Recall performance on the nonthreatening “warm-up.”:</u> Black students defined approximately half as many words correctly in the learning-threat condition as in the learning no-threat condition, $t(70) = 2.32$, $p = .023$, $d = 0.83$. White students showed no condition effect, $t < 1$.</p> <p><u>Matching performance on the nonthreatening “warm-up.”:</u> Black students matched fewer words correctly in the learning threat condition (M adj = 0.60, SD = 0.23) than in the learning no-threat condition (M adj = 0.72, SD = 0.25), $t(70) = 1.37$, $p = .18$. White students showed the opposite pattern (Learning No-Threat: M adj = 0.58, SD = 0.24; Learning-Threat: M adj = 0.71, SD = 0.24), $t(70) = 1.81$, $p = .074$, $d = 0.55$. Learning-threat condition: Black students tended to perform worse than Whites, $t(70) = 1.45$, $p = .15$. Learning no-threat condition: Black students tended to perform better than Whites, $t(70) = 1.68$, $p = .097$, $d = 0.57$.</p> <p><u>Recall performance on the threatening “test.”:</u> Black students defined marginally fewer words correctly in the learning-threat condition than in the learning- no-threat condition, $t(70) = 1.88$, $p = .064$, $d = 0.68$. White students showed the opposite pattern, $t(70) = 1.37$, $p = .18$. Learning-threat condition: Black students defined fewer words correctly than did White students, $t(70) = 1.97$, $p = .052$, $d = 0.64$. Learning no-threat: Black students defined more words correctly than did White students, $t(70) = 1.32$, $p = .19$.</p> <p><u>Matching performance on the threatening “test.”:</u> The condition difference for Black students was not significant (Learning-Threat: M adj = 0.55, SD = 0.22; Learning-No-Threat: M adj = 0.64, SD = 0.24), $t < 1.15$. White students performed marginally better in the learning-threat condition (adj = 0.69, SD = 0.23) than in the learning-no-threat condition (M adj = 0.57, SD = 0.24), $t(70) = 1.70$, $p = .093$, $d = 0.51$. Learning-threat condition: Black students performed marginally worse than White students (M adj = 0.55, SD = 0.22 vs. M adj = 0.69, SD = 0.23), $t(70) = 1.88$, $p = .064$, $d = 0.61$.</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Achievement
Utility goals/values	Woolf, K., McManus, I.C., Gill, D., Dacre, J. (2009). The effect of a brief social intervention on the examination results of UK medical students: a cluster randomised controlled trial. <i>BMC Medical Education</i> , 9-35.	<p><u>Mean written z-score: measures performance in postintervention summative written assessments</u> (August 2007), adjusted for pre-intervention summative written assessments (March 2007)</p> <p>Main effect: ns; condition means not reported.</p> <p><i>Differences by group: ethnicity x interaction is significant; [F(4,334) = 5.74; p = 0.017] ~ due to decreased scores in white group</i></p> <p>White (treatment-control): .063-.244 = scores decrease EM (treatment-control): -.098-(-0.175) = scores improve</p> <p><u>Mean OSCE z-score: measures performance in post-intervention summative objective structured clinical examination (OSCE)</u> assessment (August 2007), adjusted for pre-intervention summative written assessment (March 2007); measured clinical and communication skills.</p> <p>Main effect: students in the intervention condition outperformed those in the control condition [mean difference = 0.261; F(4,334) = 6.17; p = 0.013].</p> <p><i>Differences by group ~interaction is not significant.</i></p> <p>White (treatment-control): .271-(-.002) EM (treatment-control): .001-(-.286)</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Conscientiousness	Arroyo, S. G. (1981). Effects of a multifaceted study skills program on class performance of Chicano college students. <i>Hispanic Journal of Behavioral Sciences</i> , 3, 161-175.	NA

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Conscientiousness	Bettinger, E., & Baker, R. (2014). The effects of student coaching: An evaluation of a randomized experiment in student advising. <i>Educational evaluation and policy analysis</i> , 36, 3-19.	
Conscientiousness	Duckworth, A. L., White, R. E., Matteucci, A. J., Shearer, A., & Gross, J. J. (2016). A stitch in time: Strategic self-control in high school and college students. <i>Journal of Educational Psychology</i> , 108, 329-341.	<u>Success at achieving goal</u> Treatment favors situation modification group over response modification, $p < .01$, $d = 0.60$ Treatment favors situation modification group over control, $p < .01$, $d = 0.63$ Response mod group did not differ from the control group. <u>Level of temptation students faced over the previous week</u> Treatment favored situation modification group over response modulation group, $p < .01$, $d = 0.61$ Treatment favored situation modification group over control, $p < .01$, $d = 0.50$ Response modulation group did not differ from control.

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Conscientiousness	Fitch, T., Marshall, J., & McCarthy, W. (2012). The effect of solution-focused groups on self-regulated learning. <i>Journal of College Student Development, 53</i> , 586-595.	<p>MSLQ: Motivated Strategies for Learning Questionnaire (Pintrich & De Groot, 1990); 44 of 81 original items. The full version demonstrated predictive validity with a significant positive correlation with class grades for most scales, and an expected negative correlation between grades and the test anxiety scale (Pintrich et al., 1993).</p> <p><u>MLSQ scores</u></p> <p>Intervention group (M = 237.75, SD = 27.44) > control group (M = 218.33, SD = 37.68); $p = .02$, $d = .56$</p> <p><u>Differences between groups re: five scales</u></p> <p>Self-efficacy: $F(1, 67) = 5.80$, $p = .020$</p> <p>Intrinsic value: $F(1, 67) = 9.66$, $p = .003$</p> <p>Test anxiety: $F(1, 67) = .312$, $p = .580$</p> <p>Cognitive strategy use: $F(1, 67) = 2.40$, $p = .126$</p> <p>Self-regulation: $F(1, 67) = 2.67$, $p = .107$</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Conscientiousness	Liu, L., Bridgeman, B., & Adler, R. (2014). Measuring learning outcomes in higher education: Motivation matters. <i>Educational Researcher</i> , 41, 352-362.	Self-report motivation score: alpha ranged from .84 to .85 depending on the type of institution <u>(scores available separately for each type of institution)</u> institutional > control; $p < .01$, $d = .31$ personal > control; $p < .001$, $d = .43$ personal > institutional; ns, $d = .14$

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Conscientiousness	Morisano, D., Hirsh, J., Peterson, J., Pihl, R., & Shore, B. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. <i>Journal of Applied Psychology</i> , 95, 255-264	<u>Concluding questionnaire</u> : 15 feedback items querying participants about their motivation for completing the study, the seriousness with which they took the study, and how they felt as a result of the intervention. EFA using maximum likelihood estimation and varimax rotation was used to group the questions. Two factors: Factor 1 measures negative affect (POST only) -- Treatment - Control: 42.96-34.44=8.62; $p < .05$, $d = 0.46$

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Conscientiousness	Senko, C, Harackiewicz, J.M. (2005). Regulation of achievement goals: The role of competence feedback. <i>Journal of Educational Psychology</i> . 97, 320–336.	Standardized coefficients <u>Change in mastery goal endorsement (Mtime1-Mtime2)</u> Positive feedback: -.14 Negative feedback: -.52 Score only feedback: -.13 Negative versus positive, $p < .05$, $d=.42$ Negative versus score only, $p < .05$, $d=.41$ No other comparisons were significant. <u>Change in performance approach goal endorsement or performance avoidance goal endorsement</u> No comparisons were significant.

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Academic self-efficacy	Betz, N., & Schifano, R. (2000). Evaluation of an intervention to increase realistic self-efficacy and interests in college women. <i>Journal of Vocational Behavior</i> , 56, 35-52.	<p>*From the Skills Confidence Inventory (SCI), a 60-item measure of self-efficacy expectations with regard to the activities and tasks associated with each of the six Holland themes.</p> <p><u>Realistic confidence scale* (change score)</u> Treatment = .72; Control = .24: $p < .01$</p> <p><u>Investigative confidence scale*</u> Treatment = .36; Control = .09: $p < .05$</p> <p><u>Social scale*</u> Treatment = .06; Control = .06: ns</p> <p><u>Realistic interests (change score)</u>: 15-items; developed both to represent Holland's Realistic theme, as defined for example by Harmon, Hansen, Borgen, and Hammer (1994), in the manual for the 1994 revision of the Strong Interest Inventory. Treatment = .14; Control = .07: significance level not provided</p> <p><u>Occupational self-efficacy (change score)</u>: 20-item (OSES; Betz & Hackett, 1981). Measures students' perceptions of self-efficacy with respect to 20 commonly known occupations (10 female, $\alpha=.91$ and 10 male, $\alpha=.92$). Treatment = .08; Control = .15: significance level not provided</p> <p><u>Female dominated occupations (change score)</u>: Treatment = .15; Control = .15: ns</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Academic self-efficacy	Luzzo, D.A., Hasper, P., Albert, K.A., Bibby, M.A., Martinelli, E.A. (1999). Effects of self-efficacy-enhancing interventions on the math/science self-efficacy and career interests, goals, and actions of career undecided college students. <i>Journal of Counseling Psychology</i> , 46, 233-243.	Immediately following treatment <u>Math/science SE – measured three ways</u> 1.M/S Course SE Scale: Based off of Betz & Hackett, 1981; Cooper & Robinson, 1991; Lent et al., 1993. Prior uses have reported alpha's between .92 to .95. The mean alpha for this study was .95. Main effect (performance accomplishment > participants who did not receive this treatment), $p < .01$, $d = 0.51$. No other significant effects. 2.Educational requirements SE: Lent et al.'s (1984). The assessment asks participants to indicate whether they believe they could successfully complete the educational requirements performed in 15 fields. Present study alpha = .90. No significant treatment effects. 3.Occupational SE: Cooper and Robinson (1991). Present study alpha = .95. No significant treatment effects. <u>M/S career interest</u> : Researcher designed. Present study alpha = .95. No significant treatment effects. <u>M/S-relatedness of courses, major, career aspiration</u> : Participants completed a Courses and Major Survey to indicate the courses they planned on taking in the subsequent quarter, the major they had selected, and their current career aspiration. Courses, majors, and aspirations were coded using Goldman and Hewitt's (1976) science-nonscience continuum. Two research assistants coded each course, major, and aspiration. The interrater agreement for all coding was 92%. No significant treatment effects. 4 weeks post-treatment <u>Math/science SE</u> 1.M/S Course SE Scale: Performance accomplishment > those that did not receive treatment, $p < .01$, $d = 0.57$. No other significant main effects. 2.Educational requirements SE: No significant treatment effects. 3.Occupational SE: Performance accomplishment > those that did not receive treatment, $p < .01$, $d = 0.71$. No other significant treatment effects. <u>M/S career interest</u> Combined treatment > other experimental conditions: $p < .01$ No other significant treatment effects. <u>M/S-relatedness of courses, major, career aspiration</u> Performance accomplishment > those that did not receive treatment, $p < .01$, $d = 1.40$. No other significant treatment effect.

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Aronson, J., Fried, C., & Good, C. (2002). Reducing the effects of stereotype threat on african american college students by shaping theories of intelligence. <i>Journal of Experimental Social Psychology</i> . Online publication. Doi: doi:10.1006/jesp.2001.1491	<p>POST only</p> <p><u>Short term malleability beliefs -- one week post-treatment:</u> The index was created from a set of questions (mean). Responses ($r=.84$). Malleable treatment - Pen Pal Control; 4.92-4.24; $p=.05$ Pen pal control - no pen pal control: 4.24-3.93; ns Condition x race: ns</p> <p><u>Long term malleability beliefs (2 items, $r=.85$) -- 9 weeks post-treatment</u> Main effect (malleable versus no malleable condition): $F(2, 72) = 19.638, p<.0001$ Condition x race: ns</p> <p><u>Enjoyment of the educational process (measured on a 7-point scale)</u> Main effect (malleable versus no malleable condition) $F(2, 73) = 3.43, p < .05$ <i>Differences by groups: Black participants</i> Malleability > Control pen pal: 4.38-3.47; $p<.05$ Malleability > No pen pal: 4.38-3.42; $p<.05$ Control pen pal > No pen pal: 3.47-3.42; $p<.05$ <i>Differences by groups: White participants</i> Malleability > Control pen pal: 5.43-4.89; $p<.15$ Malleability < No pen pal: 5.43-5.81; $p<.05$ Control pen pal < No pen pal: 4.89-5.81; $p<.02$</p> <p><u>Identification with academic achievement (measured on a 7-point scale)</u> Main effect (malleable versus no malleable condition), $F(2, 72) = 2.81, p<.07$ <i>Differences by groups: Black participants</i> Malleability > Control pen pal: 4.77-3.89; $p<.05$ Malleability > No pen pal: 4.77-3.45; $p<.001$ Control pen pal > No pen pal: 3.89-3.45; ns <i>Differences by groups: White participants</i> Malleability < Control pen pal: 5.61-5.67; ns Malleability < No pen pal: 5.61-5.71; ns Control pen pal < No pen pal: 5.67-5.71; ns</p> <p><u>Perceptions of stereotype threat:</u> Participants indicated their degree of agreement (7-point Likert scales) with two items past research (e.g., Steele et al., in press) has used to measure students' perceptions of a stereotype threatening environment. These items were highly correlated and thus were averaged to form an index of stereotype threat. Main effect (malleable versus no malleable condition), ns: p-value not reported. <i>Differences by groups: Black participants</i> Malleability > Control pen pal: 5.22-4.70; ns Malleability > No pen pal: 5.22-5.17; ns Control pen pal > No pen pal: 4.79-5.17; ns <i>Differences by groups: White participants</i> Malleability < Control pen pal: 1.62-1.42; ns Malleability < No pen pal: 1.62-1.26; ns</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Boese, G. D., Stewart, T. L., Perry, R. P., & Hamm, J. M. (2013). Assisting failure prone individuals to navigate achievement transitions using a cognitive motivation treatment (attributional retraining). <i>Journal of Applied Social Psychology, 43</i> , 1946–1955.	<p><u>Course grade expectations</u>: Measured using the item “What is your expected grade in your Introductory Psychology course?” For concerns about psychometric issues associated with the use of one-item measures see Ainley & Patrick, 2006; DeSalvo et al., 2006; Menec et al., 1994. Main effect: Means and significance levels not provided. <i>Differences between groups (Low versus high provided)</i> Low failure (Treatment-Control): 4.65-4.54; p=.404 High failure (Treatment-Control): 4.92-3.84; p=.006.</p> <p><u>Judgements of course responsibility</u>: Measured with the item “How responsible do you feel for your performance in your Introductory Psychology course?” Main effect: Means and significance levels not provided. <i>Differences between groups (Control & AR group provided)</i> Control (High-Low): 7.56-9.00; p=.007 AR (High-Low): 8.32-8.28; p=.468</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Cohen, G.L., Steele, C.M., & Ross, L. D. (1999). The mentor's dilemma: Providing critical feedback across the racial divide. <i>Perspectives Social Psychology Bulletin</i> , 25, 1302–1318.	<p>Measures: PCA using varimax rotation was performed on the 6 premanipulation measures of task motivation and identification. The analysis produced two discrete components. .</p> <p><u>Task Motivation (participant's belief in their ability to improve their work)</u></p> <p>Main effect: Motivation was lower in the unbuffered condition (M=-.20) than either the positive buffer condition (M=.07) or wise criticism condition (M=.12); $F(2,84)=2.74$, $p=.07$.</p> <p><i>Differences by group ~ race group</i></p> <p>Unbuffered group (black < white): $-.48 < .09$, $p < .01$</p> <p>Wise group (black > white): $.20 > .05$, $p < .02$</p> <p><u>Identification with writing skills</u></p> <p>Main effect: Identification with writing skills was lower in the unbuffered condition (M=-.10) and positive buffer condition (M=-.06) compared to wise condition (M=.16); $F(2,84)=2.63$, $p < .08$.</p> <p><i>Difference by group ~ race group</i></p> <p>Unbuffered group (black versus white): $-.16$ versus $-.02$, ns</p> <p>Wise group (black versus white): $.18$ versus $.16$, ns</p> <p>Black students (wise > unbuffered): $p=.05$</p>
Growth mindset	Eskreis-Winkler, L., Shulman, E. P., Young, V., Tsukayama, E., Brunwasser, S. M. & Duckworth, A. L. (in press). Using wise interventions to motivate deliberate practice. <i>Journal of Personality and Social Psychology</i> .	NA

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth Mindset	Hall, N., Hladkyj, S., Perry, R., & Ruthig, J. (2004). The role of attributional retraining and elaborative learning in college students' academic development. <i>The Journal of Social Psychology, 144</i> , 591-612.	<p><u>Perceived control</u>: 24 items, including an 8-item measure used by Perry et al. 2001, alpha=.85 Main effect favors AR, $F=3.45^*$: participants in the writing AR ($m=63.42$) and test AR ($m=62.44$) reporting greater control than control participants ($m=61.02$)</p> <p><u>Perceived success</u>: 4 items, alpha=.88 Main effect favors AR, $F=3.07^*$: Students in the test AR ($m=32.89$) reported higher perceptions of success than controls ($m=29.29$), $t(92)=2.36$, $p<.05$ and writing AR participants ($m=29.98$), $t(101)=2.00$, $p<.05$.</p> <p><u>Academic emotions</u>: single item measures derived from Weiner's attribution theory.</p> <p>Hope & Shame Main effect favors AR, $F=3.46^*$ and $F=6.09^{**}$, respectively: writing AR report greater hope ($m=7.17$) and less shame ($m=3.01$) than participants in the control group (hope=6.12; shame=4.51). test AR also report greater hope ($m=6.92$) and shame ($m=2.89$).</p> <p>Pride, guilt: main effect, ns</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Hall, N. C., Perry, R. P., Chipperfield, J. G., Clifton, R. A., & Haynes, T. L. (2006). Enhancing primary and secondary control in achievement settings through writing-based attributional retraining. <i>Journal of Social and Clinical Psychology, 25</i> , 361– 391.	<p>Unsuccessful students; no main effects for successful students .</p> <p><u>Perceived Academic Success (Time2 outcome; Time1 used as a control):</u> A 2–item measure assessing perceptions of participants current and future academic success Main effect: ns; $F(1,44)=0.12$</p> <p><u>Negative Academic Emotions: (Time2 outcome)</u></p> <p>1. Learning–related anxiety; 6–item scale; developed by Pekrun et al. (2000); (Cronbach’s $\alpha = .81$) Main effect: ns; $F(1,43)=3.39$</p> <p>2. Negative attribution–dependent feelings of guilt concerning students’ performance in introductory psychology (Weiner, 1985); single–item measure. Main effect: ns; $F(1,46)=0.63$</p> <p><u>Positive Academic Emotions (Time2 outcome; Time1 used as a control)</u></p> <p>1. Learning–related enjoyment, 6–items ($\alpha = .75$), Time 1 $\alpha = .72$) Main effect: ns; $F=0.19$</p> <p>2. Hope, single-item Main effect: ns; $F=0.45$</p> <p><u>Causal Attributions for failure (Time2 outcome; Time1 used as a control)</u></p> <p>1. Controllable attributions, T2 ($\alpha = .65$), 2–item measure; T1 $\alpha = .63$ Main effect: ns; $F(1,44)=0.00$</p> <p>2. Uncontrollable attributions, T2 ($\alpha = .63$), 4–item measure; T1 $\alpha = .61$) Main effect (Treatment-Control): $14.69-18.71$; $F(1,44) = 7.07$; $p<.05$</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Hamm, J. M., Perry, R. P., Clifton, R. A., Chipperfield, J. G., & Boese, G. D. (2014). Attributional retraining: A motivation treatment with differential psychosocial and performance benefits for failure prone individuals in competitive achievement settings. <i>Basic and Applied Social Psychology</i> , 36, 221– 237.	<p><u>Causal attributions</u>: 1 item; strategy and effort attributions represent causes that are controllable by students, whereas teaching quality and test difficulty represent attributions that are not controllable by students. Reliability measure not provided.</p> <p>Main effect, $p < .001$: No-AR = .24; AR = -.32; $d = .56$. Control group possessed a maladaptive attributional mindset in which they emphasized the two uncontrollable attributions (teaching quality, test difficulty) and slightly deemphasized the strategy attribution. In contrast, the treatment group downplayed the influence of the uncontrollable attributions, whereas they placed a slight emphasis on the strategy attribution.</p> <p><u>Attribution-related emotions</u>: Students rated their hopefulness and helplessness after reading the following stem: “Please indicate the extent to which each of the following emotions describe how you feel about your performance in your Introductory Psychology course to date.” Alpha not provided.</p> <p>Main effect, NS: Treatment and control means not provided.</p> <p><u>Intrinsic motivation</u>: measured using the MAACH Intrinsic Motivation scale (Hall et al., 2007), which was adapted from Pintrich, Smith, and McKeachie (1989). 5-items; $\alpha = .72$.</p> <p>Main effect (T-C): $18.03 - 16.88 = 1.15$; $p = .001$.</p> <p><i>Differences between treatment and control for separate groups (failure-acceptors, failure-ruminators, achievement-oriented, over-striver) available.</i></p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Haynes, T. L., Daniels, L. M., Stupnisky, R. H., Perry, R. P., & Hladkyj, S. (2008). The effect of attributional retraining on mastery and performance motivation among first-year college students. <i>Basic and Applied Social Psychology</i> , 30, 198–207.	<p><u>Mastery motivation</u>: 4-item scale adapted from Pintrich et al.'s (1993) Motivated Strategies for Learning Questionnaire. Alpha not provided. Mean=Time1+Time2/2. Main effect (AR condition -Control): 18.23-16.94=1.29; $p<.01$. AR condition (Time2-Time1): 0.88; $p<.01$ Control (Time2-Time1): -0.4; ns</p> <p><u>Performance motivation</u>: Motivated Strategies for Learning Questionnaire. These items were designed to reflect concern with demonstrating ability, the desire to outperform others, and preoccupation with an objective academic outcome. Alpha not provided. Main effect (AR condition -Control): 20.70-20.06=.64; ns. Mean = Time1+Time2/2. AR condition (Time2-Time1): -0.07; ns Control (Time2-Time1): -0.86; ns</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Menec, V. H., Perry, R.P., Struthers, C.W., & Schonwetter, D.J., Hechter, F.J., & Eichholz, B.L. (1994). Assisting at-risk college students with attributional retraining and effective teaching. <i>Journal of Applied Social Psychology, 24</i> , 675–701.	<u>Expectations -- performance on the next psychology test</u> Main effect, NS: Treatment and control means provided for failure and success students separately. <u>Expectations -- final grade in the psychology course</u> Main effect, NS: Treatment and control means provided for failure and success students separately.
Growth mindset	See row above.	<u>Attributions:</u> measured by asking students to what extent external factors (luck, test difficulty, the professor or internal factors (effort, ability, and their desire to do well) determined their performance on the achievement test. Alpha not provided. Low-expressive instruction: main effect, $p < .05$ High-expressive instruction: main effect, ns <u>Expectations -- performance on the next psychology test</u> Low-expressive instruction: main effect, ns High-expressive instruction: main effect, $p < .05$ <u>Expectations -- final grade in the psychology course</u> Low-expressive instruction: main effect, ns High-expressive instruction: main effect, $p < .05$

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Perry, R.P. & Magnusson, J. (1989). Causal attributions and perceived performance: Consequences for college students' achievement and perceived control in different instructional conditions. <i>Journal of Educational Psychology</i> , 81, 164-172.	<u>Task measures</u> : provided an assessment of the participants' reactions to their performance in terms of their ability, emotions, perceived control, difficulty of test. Main effect, NS. Treatment and control means not provided.

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Perry, R. P., Stupnisky, R. H., Hall, N. C., Chipperfield, J. G., & Weiner, B. (2010). Bad starts and better finishes: Attributional retraining and initial performance in competitive achievement settings. <i>Journal of Social and Clinical Psychology, 29</i> , 668– 700.	<u>Causal attributions (POST-treatment)</u> : strategy, effort, professor quality, test difficulty. Alpha not provided. Main effect condition: $F(4,346)$; $p < .01$ AR encouraged students to emphasize strategy in explaining performance and to downplay professor quality. <u>Achievement emotions (POST-treatment)</u> : (Weiner, 1985) – hope, pride, shame, guilt, helplessness, worry. Alpha not provided. Main effect: $F(6,337) = .830$, $p > .01$

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Ruthig, J. C., Perry, R. P., Hall, N. C., & Hladkyj, S. (2004). Optimism and attributional retraining: Longitudinal effects on academic achievement, test anxiety, and voluntary course withdrawal in college students. <i>Journal of Applied Social Psychology</i> , 34, 709–730.	<u>Test anxiety</u> : 37-item true/false measure of test anxiety adapted from Sarason's (1975) Test Anxiety Scale, a widely used indicator of test anxiety in academic settings (e.g., Hammermaster, 1989; Jain, 1986) alpha = .80. Main effect: ns; $F(1,133) = 0.98$ <i>High versus Low groups</i> Treatment (H-L): 51.6-56.22; p-value not provided. Control (H-L): 56.23-53.96; ns High (T-C): 51.6-56.23 = -4.63; $p < .01$. Low (T-C): 56.22-52.96; ns

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Struthers, C.W., & Perry, R. (1996). Attributional style, attributional retraining, and inoculation against motivational deficits. <i>Social Psychology of Education, 1</i> , 171-187.	<p><u>Treatment and control means not provided; significance test not provided; cannot assess main effect on condition.</u></p> <p><u>Differences between attributional styles</u></p> <p><u>S=stable; US=unstable; C=controllable; UC=uncontrollable</u></p> <p><u>Change in motivation (POST-PRE): 3 items. Time 1 (alpha = .98), Time 2 (alpha = .73)</u></p> <p><u>S-C (Treatment): 17.69; p<.01</u></p> <p><u>S-UC (Treatment): 17.24; p<.01</u></p> <p><u>US-C (Treatment): -2.21; ns</u></p> <p><u>US-UC (Treatment): 11.35; p<.01</u></p> <p><u>Control group: each comparison resulted in an increase in motivation; gains were significant at p<.01, except for US-C.</u></p> <p><u>Guilt: 1 item, reliability measure not provided.</u></p> <p><u>S-C (Treatment): .88; ns</u></p> <p><u>S-UC (Treatment): 2.84; p<.01</u></p> <p><u>US-C (Treatment): .37; ns</u></p> <p><u>US-UC (Treatment): .93; ns</u></p> <p><u>Control group: each comparison resulted in an increase in guilt; gains were significant at p<.01.</u></p> <p><u>Hope: 1 item, reliability measure not provided.</u></p> <p><u>S-C (Treatment): 4.25; p<.01</u></p> <p><u>S-UC (Treatment): 4.51; p<.01</u></p> <p><u>US-C (Treatment): -.67; ns</u></p> <p><u>US-UC (Treatment): 3.64; p<.01</u></p> <p><u>Control group: each comparison resulted in an increase in hope; gains were significant at p<.01, except for US-C.</u></p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	Wilson, T. D., & Linville, P. W. (1982). Improving the academic performance of college freshmen: Attribution therapy revisited. <i>Journal of Personality and Social Psychology</i> , 42, 367– 376.	<u>Expectations about future performance -- short term:</u> (participants' predicted GPA for the current semester - predicted GPA for the following semester = to measure whether participants' think they will improve) Main effect, ns: Means are not provided. <u>Expectations about future performance -- long term:</u> (participants' predicted GPA for the current semester - predicted GPA at graduation = to measure whether participants' think they will improve) Main effect (Treatment - Control): 0.45-0.24 = 0.21; $p < .05$.
Growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	<u>Social and academic integration:</u> (6-month follow up) Participants who received a social belonging intervention were more likely than students who did not to report that they had used academic support services, had joined an extracurricular group, and had chosen to live on campus, $p=0.008$, $d=0.78$.

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Growth mindset	See row above.	<u>Social and academic integration</u> : (6-month follow up) Treatment decreased the percent of disadvantaged students identified as “at risk” on this measure to 7%, $p=0.014$, eliminating the group difference.
Intrinsic goals/values	Hamm et al. (2014)	<u>Intrinsic motivation</u> : measured using the MAACH Intrinsic Motivation scale (Hall et al., 2007), which was adapted from Pintrich, Smith, and McKeachie (1989). 5-items; $\alpha=.72$. Main effect (T-C): $18.03-16.88 = 1.15$; p -value not provided. Differences between treatment and control for separate groups (failure-acceptors, failure-ruminators, achievementoriented, over-striver) available.
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., Lacante, M. (2004). Less is something more: Goal content matters. <i>Journal of Educational Psychology</i> , 96, 755-764.	<u>Experienced stress when reading text</u> : 2 items taken from the Intrinsic Motivation Inventory (Ryan, 1982). Future intrinsic ($m=2.66$), future extrinsic ($m=4.04$), double ($m=3.40$); $F=16.30^{***}$ future intrinsic versus double goal: $t(243)=-2.40$, $p<.05$ future extrinsic versus double goal: $t(243)=-2.09$, $p<.05$ <u>Achievement goals</u> <i>Performance avoidance orientation</i> : 4-items, $\alpha=.93$ Future intrinsic ($m=2.12$), future extrinsic ($m=2.29$), double ($m=2.23$); $F=1.28$ <i>Performance approach orientation</i> : 4-items, $\alpha=.96$ Future intrinsic ($m=2.28$), future extrinsic ($m=3.20$), double ($m=2.87$); $F=48.60^{**}$ future intrinsic versus double goal: $t(243)=-4.41$, $p<.01$ future extrinsic versus double goal: $t(243)=-2.78$, $p<.01$ <i>Mastery orientation</i> : 5-items, $\alpha=.87$ Future intrinsic ($m=3.20$), future extrinsic ($m=2.26$), double ($m=2.70$); $F=50.28^{**}$ future intrinsic versus double goal: $t(243)=4.15$, $p<.01$ future extrinsic versus double goal: $t(243)=3.73$, $p<.01$ <u>Free-choice persistence</u> : measured by library visits to obtain information about recycling and visiting a firm that recycles. <i>Two activities</i> Future intrinsic (72%), future extrinsic (40%), double (55%)

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy support. <i>Journal of Personality and Social Psychology</i> , 87, 246–260	<u>Self-reports of superficial processing and deep processing (post)</u> : 4 items. Alphas for the scales were .84 and .80, respectively. Superficial processing <i>Autonomy-supportive context</i> Intrinsic - extrinsic group: 1.62-2.48; $F(1,196)=80.33$, $p<.001$, $\eta^2=.29$ <i>Controlling context</i> Intrinsic-extrinsic: 2.53-2.89 Deep processing <i>Autonomy-supportive context</i> Intrinsic - extrinsic group: 3.42-2.65; $F(1,196)=140.12$, $p<.001$, $\eta^2=.42$ <i>Controlling context</i> Intrinsic-extrinsic: 2.75-2.24

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Positive future self	Harrison, L.A., Stevens, A.M., Coakley, C.A. (2006). The consequences of stereotype threat on the academic performance of white and non-white lower income college students. <i>Social Psychology of Education, 9</i> , 341-357.	<p><u>Domain Identification Measure (Smith & White, 2001)</u>: 20-item; assessed how closely participants identify with school-related subjects.</p> <p>English Identification index, $\alpha = 0.88$ Main effect (Treatment-Control): 3.57-3.88; $F(1,259)=8.68$; $p=.004$ <i>Differences by groups</i> Low-income (Treatment-Control): 3.07-3.89; $p<.001$ Middle-income (Treatment-Control): 3.65-3.92; $p=0.13$ Upper-income (Treatment-Control): 3.97-3.84; $p=.44$</p> <p>Math Identification index, $\alpha=0.88$ Main effect: Condition means, significance level not provided. <i>Differences by groups</i> Low-income (Treatment-Control): 2.49-3.06; $p=0.02$ Middle-income (Treatment-Control): 2.87-2.66; $p=0.20$ Upper-income (Treatment-Control): 2.91-2.89; $p=0.73$</p> <p><u>Test Anxiety Scale (Sarason, 1978)</u>: 37-item; (Cronbach's $\alpha = 0.92$) Main effect (Treatment-Control): 4.46-4.06; $F(1,259)=8.94$; $p=0.003$ <i>Differences by groups</i> Low-income (Treatment-Control): 5.32-4.18; $p<.001$ Middle-income (Treatment-Control): 4.11-3.91; $p=0.20$ Upper-income (Treatment-Control): 3.95-4.08; $p=0.66$</p> <p><u>State Self-Esteem Scale (Heatherton & Polivy, 1991)</u>: 20 items. $\alpha=0.83$. 6 of the items were combined to form an Appearance Self-Esteem index which measured self-esteem related to participants' physical appearance ($\alpha = 0.78$). 7 of the items were combined to form a Social Self-Esteem index, ($\alpha = 0.81$). Main effect, ns: Condition means and significance level not reported.</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Positive future self	Landau, M. J., Oyserman, D., Keefer, L. A., & Smith, G. C. (2014). The college journey and academic engagement: How metaphor use enhances identity-based motivation. <i>Journal of Personality and Social Psychology, 106</i> , 679-698.	<p><u>Academic intention scores (self-report)</u>: responses measure student interest in attending an academic workshop.</p> <p>Pairwise comparisons: Journey framed academic PI scores (4.82) > nonmetaphoric academic PI (4.03); $p = .05$ Journey framed academic PI scores > Container-framed academic PI (3.82); $p = .01$ Journey framed academic PI scores > Nonmetaphoric social PI (3.68); $p = .005$ No other comparisons reached significance.</p> <p><u>Academic intention (behavioral)</u>: measured by the number of participants who took information related to study guides.</p> <p>Approximately half the participants primed with a journey-framed academic PI took the information, whereas only 13%–17% of participants in the other conditions did so, $p = .02$.</p>
Positive future self	See row above.	<p><u>Academic engagement</u>: measured by effort on academic task (solvable mental math problems). Outcome reported as a percentage of problems solved.</p> <p>Pairwise comparisons: Journey-framed academic PI (50.8) > container-framed academic PI (38.9), $p = .02$ Journey-framed academic PI (50.8) > journey-framed social PI (39.11%), $p = .02$ Journey-framed academic PI (50.8) > journey-framed past academic achievement (35.11%), $p = .002$ No other pairwise comparison reached statistical significance.</p>
Positive future self	See row above.	<p><u>Academic intention (allotted study time)</u>: 3 composite scores were created by summing the total number of hours participants allotted to each of the three activities (coursework, socializing with others, or solitary leisure time).</p> <p>Main effect, condition: $b = .21$, $p = .02$. For each hour that container-primed participants planned to dedicate to coursework, journey-primed participants planned to dedicate 1.23 hours.</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Positive future self	Schwartz, S.J., Kurtines, W.M., & Montgomery, M.J. (2005). Facilitating identity exploration processes in emerging adults: An exploratory study. <i>Journal of Adolescent Research</i> , 20, 309-345.	<p><u>CPSS Generation of alternatives</u>: measured using the Critical Problem Solving Scale: (CPSS; Berman et al., 2001)</p> <p>CF condition (post-pre): 3.8-3.3; $p < .07$</p> <p>EF condition (post-pre): 2.9-3.1; ns</p> <p>CC condition (post-pre): 2.7-2.9; ns</p> <p><u>CPSS Decentering negative alternatives</u>:</p> <p>CF condition (post-pre): 1.6-1.3; ns</p> <p>EF condition (post-pre): 1.2-1.3; ns</p> <p>CC condition (post-pre): 1.1-1.7; $p < .02$</p> <p><u>Self-discovery identity processes</u></p> <p>Personal expressiveness, flow, and self-actualization: The Personal Strivings Inventory (PSI; Waterman, 1998). The PSI requires respondents to list 10 goal strivings that they would use to describe themselves to another person. Personal expressiveness scores $\alpha = .92$; flow $\alpha = .75$.</p> <p>Personal expressiveness results provided only ~</p> <p>CF condition (post-pre): change ns</p> <p>EF condition (post-pre): positive; $t(26)=1.84$; $p < .08$</p> <p>CC condition (post-pre): change ns</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Prosocial or transcendent goals/values	Yaeger, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D' Mello, S., Spitzer, B. J., & Duckworth, A. (2014). Boring but important: A self transcendent purpose for learning fosters academic self-regulation. <i>Journal of Personality and Social Psychology</i> , 107, 559-580	<p><u>DV: Time spent on each review question (measures behavior that could signify an intention to truly learn from review materials)</u></p> <p>Average time per question per person = number of milliseconds that each question was displayed before students submitted a correct answer. These values were summed and then divided by the number of questions attempted.</p> <p>Transformed z score (mean of zero and a standard deviation of 1): Main effect, $p = .038$ Control $M = -0.43$, $SD = 1.11$ Purpose $M = 0.13$, $SD = 0.93$</p> <p>In the untransformed data, this corresponded to spending roughly twice as much time on each question (Control $M = 25s$ vs. Treatment $M = 49s$ per question).</p>

Intervention Study Table

Competency	Reference
Prosocial or transcendent goals/values	See row above.

Outcome & Impact: Competency

DV: Diligence task (Block 2 problems solved minus Block 1 problems solved (change score), by condition)

Main effect:

~decline experienced by the purpose condition was significantly smaller than that experienced by participants in the control condition, $b = 12.45$, $p = .03$, $d = 0.28$ ~self-oriented control group versus control: NS

~self-oriented compared to purpose: $p = .03$, $d = 0.26$, showing that the purpose manipulation was significantly better at warding off a decline in math problems solved across blocks compared to the highly similar self-oriented manipulation.

Main effect for block: by the second block, there was a significant effect of the purpose manipulation compared to the control, $p < .005$, $d = 0.32$, therefore the purpose condition participants completed 36% more boring math problems compared to the control group.

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging	Cohen, G. L., & Garcia, J. (2005). I am us: Negative stereotypes as collective threats. <i>Journal of Personality and Social Psychology</i> , 89, 566– 582.	<p><u>Self-esteem</u>: 5 items, (Heatherton & Polivy, 1991), alpha = .75. Main effect (treatment -- threat condition - control): 27.12-30.53, F=9.43, p < .01</p> <p><u>Stereotype distancing</u>: Students rate the extent to which they enjoy various activities, characterize themselves as having various traits, and like various types of music and sports (Steele & Aronson, 1995). Some of the activities and traits were associated with the stereotypic image of African Americans. Main effect (treatment-control): 58-61.75, F=4.18, p < .05: participants characterized themselves less stereotypically under threat than under no threat.</p> <p><u>Racial stereotype activation</u>: Participants completed a word-fragment completion exercise (Steele & Aronson, 1995). Main effect (treatment-control): 2.00-2.57, F=3.70, ns</p> <p><u>Perceived exposure to evaluative scrutiny</u>: Participants indicated the extent to which they felt that their verbal abilities were being evaluated in the study. Main effect (treatment-control): ns</p>
Sense of belonging	Folger, W.A., Carter, J.A., & Chase, P.B. (2004). Supporting first generation college freshmen with small group intervention. <i>College Student Journal</i> , 38, 472-476	NA

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging	Hausmann, L., Ye, R., Schofield, J., Woods, R. (2009). Sense of belonging and persistence in white and african american first-year students. <i>Research in Higher Education</i> , 50, 649-669.	<u>Sense of belonging (controlling for initial sense of belonging)</u> : post scores did not significantly differ between white and African American students, $z=-0.08$, $p>.05$. <i>Differences by groups</i> White students ESB versus NGC: $z=2.64$, $p>.01$ GC versus NGC: $z=1.97$, $p<.05$ ESB versus GC: $z=.61$, $p>.05$ African American students no differences among groups Perceived social and academic integration Perceived cohesion Goal commitment Intentions to persist Institutional commitment
Sense of belonging	Stephens, N., Hamedani, M., & Destin, M. (2014). Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition. <i>Psychological Science</i> , 25, 943-953.	<u>Tendency to seek college resources</u> : participants were asked how often they e-mailed or met with professors, or sought extra help Main effect: condition means and significance level not provided. Control (FG-CG): 1.45-2.18; $p = .003$ Treatment (FG-CG): 1.89-1.80; $p=.53$ <i>Differences by groups</i> FG students (treatment-control): $p = .087$, $d = 0.43$ CG students (treatment-control): $F(1,69)=1.38$; $p=.24$ <u>Psychosocial measures</u> : Psychological distress (treatment-control): 2.24-2.49; $F(1,126)=3.65$; ns Social-identity threat (treatment-control): 2.80-3.23; $F(1,126)=3.75$; ns Psychological well-being (treatment-control): 3.40-3.16; $F(1,126)=4.73$; $p<.05$ Social fit (treatment-control): 5.63-5.13; $F(1,126)=9.45$; $p<.01$ Perceived preparation (treatment-control): 5.93-5.60; $F(1,126)=3.40$; ns Academic identification (treatment-control): 6.41-6.06; $F(1,126)=5.12$; $p<.05$ Social support (treatment-control): 3.39-3.19; $F(1,126)=3.53$; ns Maintain relationships (treatment-control): 4.76-3.03; $F(1,126)=6.11$; $p<.05$

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging	Walton G.M. & Cohen, G. (2007). A question of belonging: Race, social fit, and achievement. <i>Journal of Personality and Social Psychology</i> , 92, 82-96.	<p><u>Sense of academic fit</u>: 17-item social fit scale (assessing academic identification, enjoyment of academic work, self-efficacy, assessing potential to succeed in college, possible academic selves $\alpha = .84$, and anxiety $\alpha = .79$). Main effect: condition means and significance level not provided. <i>Difference by group</i> Black (treatment - control): positive; $p = .014$, $d = 1.37$ White (treatment-control): negative; $p = .025$, $d = 1.22$</p> <p><u>Sense of academic fit</u>: 7 days after intervention Main effect: condition means and significance level not provided. <i>Difference by group</i> Black (treatment - control): .33-.06; ns White (treatment-control): negative; $p = .009$, $d = 1.32$</p> <p><u>Sense of fit on adverse days</u>: participants reported on each of the 7 days following the intervention the negative and positive events they had experienced and the overall negativity of the day. A composite index of each day's adversity level was created. Main effect: condition means and significance level not provided <i>Differences by group</i> Black participants in treatment group are less affected by adversity level; $p = .039$, $d = 1.02$; no effect for white students.</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging	Walton, G.M., & Cohen, G.L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. <i>Science</i> , 331, 1447-1451.	<u>3 years post intervention</u> <u>Self-Reported Belonging Uncertainty</u> <u>African Americans: positive treatment effect, P = 0.052</u> <u>Accessibility of Negative Racial Stereotypes</u> <u>African Americans: positive treatment effect, P = 0.052</u> <u>Accessibility of Self-Doubt</u> <u>African Americans: positive treatment effect, P = 0.010</u>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging	Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. <i>Journal of Personality and Social Psychology</i> , 102, 513–532.	<p><u>Persistence on the insoluble math puzzle (time)</u> Main effect: $p = .011$, $d = 0.78$. Participants in the relational context condition persisted longer than in the skill-promotive context. Relational context condition > no report condition, $p = .003$, $d = 1.14$ Skill promotive context condition does not differ from the no-report condition.</p> <p><u>Self-reported math motivation</u> Main effect: $p = .038$, $d = 0.58$. Participants reported greater motivation for math in the relational context condition than in the skill-promotive context condition. Relational context > no report, $p = .049$, $d = 0.64$ Skill-promotive and no-report do not differ.</p> <p><u>Composite sense of social connectedness to math</u> Main effect: $p = .001$, $d = 1.43$. Participants felt a greater sense of social connectedness to math in the relational context condition than in the skill promotive context condition. Relational context > no report, $p < .006$, $d = 0.90$ Skill promotive did not differ from no report.</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging	Walton, G.M., Logel, C., Peach, J.M., Spencer, S.J., Zanna, M.P. (2015). Two brief interventions to mitigate a “chilly climate” transform women’s experience, relationships, and achievement in engineering. <i>Journal of Educational Psychology</i> , 107, 468–485.	<p><u>Attitudes toward engineering</u>: immediately following the intervention (a) evaluation of current experience in engineering: sense of belonging in engineering (10 items, $\alpha = 0.87$), self-efficacy in engineering, (2 items, $r = .53$, $p < .001$), enjoyment of engineering, (3 items, $\alpha = 0.87$)</p> <p><i>Women in male-dominated majors</i> Control (m=4.7); Sense of belonging (m=5.2); Affirmation (m=5.0) 2 interventions compared to control: interventions improved women’s felt experience in engineering relative to the control condition; $p = .006$, $d = 0.67$.</p> <p>(b) perception of prospects of succeeding in engineering (possible selves and self-perceived potential in engineering).</p> <p><i>Women in male-dominated majors</i> Control (m=69); Sense of belonging (m=70); Affirmation (m=68)</p> <p><u>Attitudes toward engineering</u>: second semester</p> <p>a) evaluation of current experience in engineering</p> <p><i>Women in male-dominated majors</i> Control (m=4.5); Sense of belonging (m=5.1); Affirmation (m=5.2) 2 interventions compared to control: interventions improved women’s felt experience in engineering relative to the control condition; $p = .060$, $d = 0.67$.</p> <p>(b) perception of their prospects of succeeding in engineering.</p> <p><i>Women in male-dominated majors</i> Control (m=58); Sense of belonging (m=60); Affirmation (m=65) 2 interventions compared to control: improved women’s confidence in their prospects of succeeding in engineering in the second semester; $p = .010$, $d = 0.87$</p> <p><u>Daily adversity</u> Male-dominated majors: in the control group, men experience better outcomes than women ($p < .025$); women in treatment experience better outcomes than control condition.</p> <p><u>Gender identification (second semester)</u> <i>Women in male-dominated majors</i> Affirmation > social belonging; $p < .05$; $1.04 < d < 1.08$. Affirmation > control; $p < .05$; $1.04 < d < 1.08$.</p> <p><u>Social belonging intervention: friendships with male engineers</u> (measured by the representation of male engineers among the 5 closest friends students reported having on campus in the second semester with the baseline controlled). <i>Women in male-dominated majors</i> Social belonging > affirmation; $p < .01$; $1.09 < d < 1.12$ Social belonging > control; $p < .01$; $1.09 < d < 1.12$</p> <p><u>Social belonging intervention: implicit normative evaluations of female engineers</u>, Male-dominated majors: treatment women exhibited more positive norms about female engineers than the other two groups combined, $p = .018$, $d = 1.03$</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging **DUPLICATE: see growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	<u>Social and academic integration</u> : (6-month follow up) Participants who received a social belonging intervention were more likely than students who did not to report that they had used academic support services, had joined an extracurricular group, and had chosen to live on campus, $p=0.008$, $d=0.78$.
Sense of belonging **DUPLICATE: see growth mindset	See row above.	<u>Social and academic integration</u> : (6-month follow up) Treatment decreased the percent of disadvantaged students identified as “at risk” on this measure to 7%, $p=0.014$, eliminating the group difference.

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Sense of belonging	See row above.	NA
Utility goals/values	Brady, S. T., Reeves, S. L., Garcia, J., Purdie-Vaughns, V., Cook, J. E., Taborsky-Barba, S., . . . Cohen, G. L. (2016). The psychology of the affirmed learner: Spontaneous self-affirmation in the face of stress. <i>Journal of Educational Psychology</i> , 108, 353–373	<p><u>Adaptive adequacy</u>: the following 3 measures loaded on one single factor, alpha = .86. 3 scores were averaged to create a single index of adequacy -- Self-integrity, 7 items (alpha = .87); Self esteem, 10-item Rosenberg Self-Esteem scale (alpha = .93); Hope, 8-item Adult Hope Scale (alpha = .82) Main effect: $F=3.84$, $p = .05$, $d = .43$ <i>Differences by groups</i> Latino participants (Treatment-Control): 4.91-4.43; $p = .001$, $d = .94$ White participants (Treatment-Control): 4.54-4.62; $p=.62$; $d=-.14$</p> <p><u>Academic belonging</u>: measured with a 10-item scale, alpha = .82 Main effect: $F=4.49$, $p = .04$, $d = .38$ <i>Differences by groups</i> Latino participants (Treatment-Control): 4.76-4.29; $p = .006$, $d = .79$ White participants (Treatment-Control): 4.79-4.76; $p=.83$; $d=.06$</p>

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Utility goals/values	Durik, A. M., Shechter, O. G., Noh, M., Rozek, C. S., & Harackiewicz, J. M. (2015). What if I can't? Success expectancies moderate the effects of utility value information on situational interest and performance. <i>Motivation and Emotion</i> , 39, 104-118.	<u>Situational interest in math technique</u> : 3 items, alpha = .88 Perceived competence in math (PCM) model Main effect: condition means and significance level not provided. <i>Differences by group</i> Low PCM: treatment < control; 4.5<5.3, p<.05, B=-.36 High PCM: treatment > control; 6>5; p<.01, B=.50 Individual interest in math model Main effect: condition means and significance level not provided. <i>Differences by group</i> Low interest: treatment < control; 4.5<5, ns High interest: treatment > control; 5.7>5.2, ns
Utility goals/values	Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Giffen, C. J., Blair, S. S., Rouse, D. I., & Hyde, J. S. (2014). Closing the social class achievement gap for first-generation students in undergraduate biology. <i>Journal of Educational Psychology</i> . 106, 375-389	NA

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Utility goals/values	Harackiewicz, J. M., Canning, E. A., NA Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2015). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. <i>Journal of Personality and Social Psychology</i> .	

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Utility goals/values	Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. <i>Journal of Educational Psychology, 102</i> , 880-895.	<u>Situational interest</u> : 5 item, alpha = .89 Main effect: $p < .01$, $b = 0.24$, participants in the relevance condition became more interested in the technique than participants in the control condition. <u>Maintained situational interest in the technique</u> : 1 item, yes/no Main effect: $p < .001$, (OR) = 8.29, indicating that participants in the relevance condition were more inclined to use the technique in the future than those in the control condition.

Intervention Study Table

Competency	Reference
Utility goals/values	See row above.

Outcome & Impact: Competency

Situational interest

Main effect, $p < .01$, $b = .16$: participants in the relevance conditions reported more interest in psychology at the end of the course than participants in the control conditions.

Maintained situational interest: single item (e.g., "I am interested in majoring in psychology").

Main effect: ns. Condition means not provided.

Differences by group

Students with lower exam scores in the relevance conditions reported more interest in majoring in psychology than those in the control conditions ($p = .09$, $b = .13$). Students with higher exam scores reported equivalent levels of interest in majoring in psychology in the relevance and control conditions ($p = .24$, $b = -.07$).

Intervention Study Table

Competency	Reference		Outcome & Impact: Competency
Utility goals/values	Kost-Smith, L., Pollock, S.J., Finkelstein, N.D., Cohen, G., Ito, T., Miyake, A. (2011). <i>Physics education research conference</i> , 231-234.	NA	

Intervention Study Table

Competency
Utility goals/values

Reference

Martens, A., Johns, M., Greenberg, J., NA
& Schimel, J. (2006). Combating
stereotype threat: The effect of self-
affirmation on women's intellectual
performance. *Journal of Experimental
Social Psychology, 42*, 236– 243.

Outcome & Impact: Competency

Intervention Study Table

Competency	Reference		Outcome & Impact: Competency
Utility goals/values	See row above.	NA	
Utility goals/values	Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. <i>Science</i> , 330, 1234–1237.	NA	

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Utility goals/values	Schechter, O. G., Durik, A. M., Miyamoto, Y., & Harackiewicz, J. M. (2011). The role of utility value in achievement behavior: The importance of culture. <i>Personality and Social Psychology Bulletin</i> , 36, 303-317.	<u>Utility value</u> All participants in the utility value condition perceived more utility value from the new technique than did those in the control condition; $B=.20$, $p<.01$ <u>Task Interest</u> East Asian Main effect: condition means and significance level not provided. <i>Differences by group</i> Low interest (treatment > control): $B=.36$, $p<.05$ High interest (treatment < control): ns Westerner Main effect: condition means and significance level not provided. <i>Differences by group</i> Low interest (treatment < control): $B=-.36$, $p<.11$ High interest (treatment > control): $B=.11$, $p=.25$ <u>Behavioral effort</u> : Assessed by the number of seconds participants spent working on the practice problems. East Asian Main effect: condition means and significance level not provided. <i>Differences by group</i> Low interest (treatment > control): $B=.43$, $p<.05$ High interest (treatment < control): ns Westerner Main effect: condition means and significance level not provided. <i>Differences by group</i> Low interest (treatment > control): ns High interest (treatment = control): ns

Intervention Study Table

Competency	Reference	NA	Outcome & Impact: Competency
Utility goals/values	Silverman, A., Logel, C., & Cohen, G.L. (2013). Self-affirmation as a deliberate coping strategy: The moderating role of choice. <i>Journal of Experimental Social Psychology</i> , 49, 93– 98.	NA	
Utility goals/values	See row above.	NA	

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Utility goals/values	Taylor V.J., & Walton G.M. (2011). NA Stereotype threat undermines academic learning. <i>Personality and Social Psychology Bulletin</i> . 37, 1055– 67.	

Intervention Study Table

Competency	Reference	Outcome & Impact: Competency
Utility goals/values	Woolf, K., McManus, I.C., Gill, D., Dacre, J. (2009). The effect of a brief social intervention on the examination results of UK medical students: a cluster randomised controlled trial. <i>BMC Medical Education</i> , 9-35.	

Intervention Study Table

Competency

Conscientiousness

Reference

Arroyo, S. G. (1981). Effects of a multifaceted study skills program on class performance of Chicano college students. *Hispanic Journal of Behavioral Sciences*, 3, 161-175.

Abstract

Chicano college students participated in a study skills program based on self-monitoring and self-reinforcement, supplemented with instructions and reinforcement from the program director. One group received this training first, while the other group stayed on baseline. Then the first group (Treatment-maintenance) remained on maintenance while the second group (Control- Treatment) received the training. Reported time spent studying and performance on weekly quizzes, mid-terms, and final examinations improved as a function of training, and the improvement was maintained. Results are discussed in terms of generalizing effects of such training procedures so as to decrease the alarming attrition rate of Chicano students.

Intervention Study Table

Competency	Reference	Abstract
Conscientiousness	Bettinger, E., & Baker, R. (2014). The effects of student coaching: An evaluation of a randomized experiment in student advising. <i>Educational evaluation and policy analysis</i> , 36, 3-19.	College graduation rates often lag behind college attendance rates. One theory as to why students do not complete college is that they lack key information about how to be successful or fail to act on the information that they have. We present evidence from a randomized experiment which tests the effectiveness of individualized student coaching. Over the course of two separate school years, InsideTrack, a student coaching service, provided coaching to students attending public, private, and proprietary universities. Most of the participating students were nontraditional college students enrolled in degree programs. The participating universities and InsideTrack randomly assigned students to be coached. The coach contacted students regularly to develop a clear vision of their goals, to guide them in connecting their daily activities to their long-term goals, and to support them in building skills, including time management, self-advocacy, and study skills. Students who were randomly assigned to a coach were more likely to persist during the treatment period and were more likely to be attending the university 1 year after the coaching had ended. Coaching also proved a more cost-effective method of achieving retention and completion gains when compared with previously studied interventions such as increased financial aid.
Conscientiousness	Duckworth, A. L., White, R. E., Matteucci, A. J., Shearer, A., & Gross, J. J. (2016). A stitch in time: Strategic self-control in high school and college students. <i>Journal of Educational Psychology</i> , 108, 329–341.	A growing body of research indicates that self-control is critical to academic success. Surprisingly little is known, however, about the diverse strategies students use to implement self-control or how well these strategies work. To address these issues, the author conducted a naturalistic investigation of self-control strategies (Study 1) and 2 field experiments (Studies 2 and 3). In Study 1, high school students described the strategies they use to manage interpersonal conflicts, get academic work done, eat healthfully, and manage other everyday self-control challenges. The majority of strategies in these self-nominated incidents as well as in 3 hypothetical academic scenarios (e.g., studying instead of texting friends) were reliably classified using the process model of self-control. As predicted by the process model, students rated strategies deployed early in the impulse-generation process (situation selection, situation modification) as being dramatically more effective than strategies deployed later (attentional deployment, cognitive change, response modulation). In Study 2, high school students randomly assigned to implement situation modification were more likely to meet their academic goals during the following week than students assigned either to implement response modulation or no strategy at all. In Study 3, college students randomly assigned to implement situation modification were also more successful in meeting their academic goals, and this effect was partially mediated by decreased feelings of temptation throughout the week. Collectively, these findings suggest that students might benefit from learning to initiate self-control when their impulses are still nascent.

Intervention Study Table

Competency	Reference	Abstract
Conscientiousness	Fitch, T., Marshall, J., & McCarthy, W. (2012). The effect of solution-focused groups on self-regulated learning. <i>Journal of College Student Development, 53</i> , 586-595.	Student affairs professionals seek innovative methods to enhance academic achievement for students. A recent study highlighted the need to bridge student development work with course curricula (Kilpatrick, Stant, Downes, & Gaither, 2008). This study also linked the importance of nonacademic cognitive variables, such as locus of control, to academic success. Group work in particular has been shown to promote academic achievement (Wegge, 2000). Counselors provide academic support groups and consult to apply group work in these settings. A solution-focused goal-setting group demonstrates a dynamic example of an academic support group that is interactive, student-focused, and useful in improving academic skills related to self-regulated learning.

Intervention Study Table

Competency	Reference	Abstract
Conscientiousness	Liu, L., Bridgeman, B., & Adler, R. (2014). Measuring learning outcomes in higher education: Motivation matters. <i>Educational Researcher</i> , 41, 352-362.	With the pressing need for accountability in higher education, standardized outcomes assessments have been widely used to evaluate learning and inform policy. However, the critical question on how scores are influenced by students' motivation has been insufficiently addressed. Using random assignment, we administered a multiple-choice test and an essay across three motivational conditions. Students' self-report motivation was also collected. Motivation significantly predicted test scores. A substantial performance gap emerged between students in different motivational conditions (effect size as large as .68). Depending on the test format and condition, conclusions about college learning gain (i.e., value added) varied dramatically from substantial gain ($d = 0.72$) to negative gain ($d = -0.23$). The findings have significant implications for higher education stakeholders at many levels.

Intervention Study Table

Competency

Conscientiousness

Reference

Morisano, D., Hirsh, J., Peterson, J., Pihl, R., & Shore, B. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. *Journal of Applied Psychology, 95*, 255-264

Abstract

Of students who enroll in 4-year universities, 25% never finish. Precipitating causes of early departure include poor academic progress and lack of clear goals and motivation. In the present study, we investigated whether an intensive, online, written, goal-setting program for struggling students would have positive effects on academic achievement. Students (N = 85) experiencing academic difficulty were recruited to participate in a randomized, controlled intervention. Participants were randomly assigned to 1 of 2 intervention groups: Half completed the goal-setting program, and half completed a control task with intervention-quality face validity. After a 4-month period, students who completed the goal-setting intervention displayed significant improvements in academic performance compared with the control group. The goal-setting program thus appears to be a quick, effective, and inexpensive intervention for struggling undergraduate students.

Intervention Study Table

Competency	Reference	Abstract
Conscientiousness	Senko, C, Harackiewicz, J.M. (2005). Regulation of achievement goals: The role of competence feedback. <i>Journal of Educational Psychology</i> . 97, 320–336.	Two studies examined the degree to which pursuit of achievement goals is regulated in response to ongoing competence feedback. In Study 1, conducted in a college classroom, goal pursuit remained largely stable throughout the semester, yet poor exam performance predicted a significant decrease in mastery goal and performance-approach goal pursuit and an increase in performance-avoidance goal pursuit. In Study 2, conducted in a laboratory, negative feedback reduced participants' mastery goal pursuit. In addition, both studies showed unique benefits of 2 goals: The performance-approach goal predicted success on exams (Study 1) and a novel activity (Study 2), and the mastery goal predicted higher interest in both studies. Implications of achievement goal regulation for both theory and research methodology are discussed.

Intervention Study Table

Competency	Reference	Abstract
Academic self-efficacy	Betz, N., & Schifano, R. (2000). Evaluation of an intervention to increase realistic self-efficacy and interests in college women. <i>Journal of Vocational Behavior</i> , 56, 35-52.	High self-efficacy expectations in Realistic activities have been related to the pursuit of careers in engineering, science, and technology, where women have been historically underrepresented. Fifty-four college women were studied to determine if interventions based on self-efficacy theory would increase their confidence and interests in "Realistic" (from Holland's theory) activities (e.g., using tools, assembling, building, operating machinery). Interest and confidence levels were measured pre- and posttreatments. Participants were prescreened to identify those with at least moderate interest in Realistic activities, but who were also low in Realistic confidence. At posttreatment, the 24 participants in the treatment group showed a statistically significant increase in Realistic confidence relative to the control group of 30 that received a neutral intervention. Ways to increase women's Realistic confidence, and the relationships of confidence to interests and career pursuits, are discussed.

Intervention Study Table

Competency	Reference	Abstract
Academic self-efficacy	Luzzo, D.A., Hasper, P., Albert, K.A., Bibby, M.A., Martinelli, E.A. (1999). Effects of self-efficacy-enhancing interventions on the math/science self-efficacy and career interests, goals, and actions of career undecided college students. <i>Journal of Counseling Psychology</i> , 46, 233-243.	This investigation evaluated the effects of both performance accomplishment and vicarious learning experiences on the math/science self-efficacy and career interests, goals (i.e., aspirations), and actions (i.e., choice of major and enrollment in courses) of career undecided college students. Undergraduates who possessed at least a moderate level of math ability and who self-reported at least a moderate level of career undecidedness were randomly assigned to 1 of 4 treatment conditions: performance accomplishment only, vicarious learning only, combined treatment (performance accomplishment and vicarious learning), or the control group. Pre- and posttreatment assessments of participants' math/science self-efficacy, vocational interests, career aspirations, and career choice actions (i.e., choice of major and courses) revealed significant effects of the performance accomplishment and combined treatments on several of the dependent variables. Theoretical and counseling implications of the results are discussed.

Intervention Study Table

Competency

Growth mindset

Reference

Aronson, J., Fried, C., & Good, C. (2002). Reducing the effects of stereotype threat on african american college students by shaping theories of intelligence. *Journal of Experimental Social Psychology*. Online publication. Doi: doi:10.1006/jesp.2001.1491

Abstract

African American college students tend to obtain lower grades than their White counterparts, even when they enter college with equivalent test scores. Past research suggests that negative stereotypes impugning Black students' intellectual abilities play a role in this underperformance. Awareness of these stereotypes can psychologically threaten African Americans, a phenomenon known as "stereotype threat" (Steele & Aronson, 1995), which can in turn provoke responses that impair both academic performance and psychological engagement with academics. An experiment was performed to test a method of helping students resist these responses to stereotype threat. Specifically, students in the experimental condition of the experiment were encouraged to see intelligence—the object of the stereotype—as a malleable rather than fixed capacity. This mind-set was predicted to make students' performances less vulnerable to stereotype threat and help them maintain their psychological engagement with academics, both of which could help boost their college grades. Results were consistent with predictions. The African American students (and, to some degree, the White students) encouraged to view intelligence as malleable reported greater enjoyment of the academic process, greater academic engagement, and obtained higher grade point averages than their counterparts in two control groups.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Boese, G. D., Stewart, T. L., Perry, R. P., & Hamm, J. M. (2013). Assisting failure prone individuals to navigate achievement transitions using a cognitive motivation treatment (attributional retraining). <i>Journal of Applied Social Psychology, 43</i> , 1946–1955.	Transitions to novel achievement settings are often accompanied by unfamiliar learning conditions and unanticipated failure that undermine how individuals adapt to such situations. For first-year students, the transition to college is imbued with adverse learning conditions that can result in decreased motivation and academic performance. This study examined the efficacy of a motivation-enhancing treatment, attributional retraining (AR), to assist students who are at risk because of a high-failure avoidance orientation (tendency to maintain self-worth by avoiding failure). For high- (but not low) failure avoidance students, AR fostered an adaptive psychological mindset (course grade expectations, judgments of course responsibility) and better academic performance (course grade, grade point average). Findings suggest the utility of AR to offset the negative effects of a high-failure avoidance selfworth orientation.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Cohen, G.L., Steele, C.M., & Ross, L. D. (1999). The mentor's dilemma: Providing critical feedback across the racial divide. <i>Perspectives Social Psychology Bulletin</i> , 25, 1302–1318.	Two studies examined the response of Black and White students to critical feedback presented either alone or buffered with additional information to ameliorate its negative effects. Black students who received unbuffered critical feedback responded less favorably than White students both in ratings of the evaluator's bias and in measures of task motivation. By contrast, when the feedback was accompanied both by an invocation of high standards and by an assurance of the student's capacity to reach those standards. Black students responded as positively as White students and both groups reported enhanced identification with relevant skills and careers. This "wise," two-faceted intervention proved more effective than buffering criticism either with performance praise (Study 1) or with an invocation of high standards alone (Study 2). The role of stigma in mediating responses to critical feedback, and the implications of our results for mentoring and other teacher-students interactions, are explored.
Growth mindset	Eskreis-Winkler, L., Shulman, E. P., Young, V., Tsukayama, E., Brunwasser, S. M. & Duckworth, A. L. (in press). Using wise interventions to motivate deliberate practice. <i>Journal of Personality and Social Psychology</i> .	Deliberate practice leads to world-class excellence across domains. In the current investigation, we examined whether psychologically "wise" interventions targeting expectancies and values—stock antecedents of ordinary effortful behaviors—could motivate nonexperts to engage in deliberate practice and improve their achievement. As a preliminary, we developed and validated a novel task measure of deliberate practice and confirmed its association with (a) expectancy-value beliefs, and (b) achievement in the nonexpert setting (Study 1). Next, across 4 longitudinal, randomized-controlled, field experiments, we intervened. Among lower-achievers, wise deliberate practice interventions improved math performance for 5th and 6th graders (Study 2), end-of-semester grades for undergraduates (Study 3), and end-of-quarter grades for 6th graders (Study 4); the same pattern of results emerged in end-of-quarter grades for 7th graders (Study 5). Following the intervention, expectancy-value beliefs and deliberate practice improved for 1 month (Study 4), but not 4 (Study 5). Treatment proved beneficial over and above 2 control conditions: 1 that taught standard study skills (Studies 2 and 3), and 1 that discussed deep interests, generalized motivation, and high achievement (Studies 4 and 5). Collectively, these findings provide preliminary support for the heretofore untested hypothesis that deliberate practice submits to the same laws that govern typical forms of effortful behavior, and that wise interventions that tap into these laws can spur short-term gains in adaptive beliefs, deliberate practice, and objectively measured achievement.

Intervention Study Table

Competency

Growth Mindset

Reference

Hall, N., Hladkyj, S., Perry, R., & Ruthig, J. (2004). The role of attributional retraining and elaborative learning in college students' academic development. *The Journal of Social Psychology, 144*, 591-612.

Abstract

In the present longitudinal study, the authors examined the impact of attributional retraining (AR) techniques on academic motivation and achievement for college students who are either frequently or infrequently using elaborative learning strategies. During the 1st semester, 203 students completed an initial questionnaire assessing elaborative learning followed by 1 of 3 treatment conditions (No AR, Writing AR, Aptitude Test AR). Results indicated improvements in students' end-of-year perceptions of control, success, and emotions, as well as course-specific and overall academic performance for those receiving either AR format, with "high elaborators" showing higher levels on these measures than "low elaborators." The authors discussed the importance of elaborative and attributional processes underlying the effectiveness of the AR treatment and the potential utility of individualized AR techniques in the college classroom.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Hall, N. C., Perry, R. P., Chipperfield, J. G., Clifton, R. A., & Haynes, T. L. (2006). Enhancing primary and secondary control in achievement settings through writing-based attributional retraining. <i>Journal of Social and Clinical Psychology, 25</i> , 361– 391.	Attributional retraining (AR) is a psychotherapeutic motivational intervention which consistently produces modest improvements in motivation and performance by encouraging controllable attributions for failure experiences. Research suggests that unsuccessful individuals high in primary control (PC) and low in secondary control (SC) are at risk of failure and may especially benefit from AR techniques. College students' (N = 255) primary and secondary academic control was assessed at the beginning of the first academic semester, after which half of the students received a writing-based AR intervention. Final grades and performance-related perceived success, affect, and attributions were assessed at the end of the academic year. Attributional retraining (No AR, AR) by secondary control (low/high) 2×2 ANCOVA analyses for high-primary-control students revealed significant improvements in performance, coupled with decreased perceived success and increased negative affect for unsuccessful, high-PC/low-SC students. The importance of primary and secondary control for development in achievement settings, and the underlying mechanisms of writing-based AR techniques (i.e., attributions, primary/secondary control) are discussed.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Hamm, J. M., Perry, R. P., Clifton, R. A., Chipperfield, J. G., & Boese, G. D. (2014). Attributional retraining: A motivation treatment with differential psychosocial and performance benefits for failure prone individuals in competitive achievement settings. <i>Basic and Applied Social Psychology</i> , 36, 221–237.	Our quasi-experimental, longitudinal treatment study examined whether Attributional Retraining (AR) facilitated adjustment among young adults (n=324) making the challenging school-to-university transition. An AR by performance orientation group 2 x 4 design showed AR primarily benefited high-risk students: Failure-ruminators (high failure preoccupation, low perceived control) receiving AR reported higher intrinsic motivation and more adaptive attribution-related emotions than their no-AR peers. Failure-acceptors (low failure preoccupation, low perceived control) receiving AR had higher intrinsic motivation, higher grade point averages, and fewer course withdrawals than their no-AR counterparts. Thus, AR had differential benefits (emotions, achievement) for vulnerable students who were psychologically distinct.

Intervention Study Table

Competency

Growth mindset

Reference

Haynes, T. L., Daniels, L. M., Stupnisky, R. H., Perry, R. P., & Hladkyj, S. (2008). The effect of attributional retraining on mastery and performance motivation among first-year college students. *Basic and Applied Social Psychology, 30*, 198–207.

Abstract

Motivation can be undermined among first-year college students as they face a multitude of unanticipated challenges during the transition from high school to college (Compas, Wagner, Slavin, & Vannatta, 1986; Perry, Hall, & Ruthig, 2005). As a consequence, approximately 27% of first-year students do not return for the second year of college (Feldman, 2005). First-year college students (N = 336) participated in a study to examine the efficacy of an Attributional Retraining (AR) treatment designed to increase motivation and enhance academic achievement. Employing a pre–post study design spanning an academic year, we examined the impact of AR on student motivation as operationalized in terms of mastery and performance goals. Findings indicated that AR increased mastery motivation but did not affect performance motivation. Findings also demonstrated that mastery motivation mediated the relationship between AR and grade point average, suggesting that mastery motivation is a key mechanism of AR. Findings are discussed in terms of conceptual contributions to both the AR and achievement motivation literatures, and practical implications are outlined.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Menec, V. H., Perry, R.P., Struthers, C.W., & Schonwetter, D.J., Hechter, F.J., & Eichholz, B.L. (1994). Assisting at-risk college students with attributional retraining and effective teaching. <i>Journal of Applied Social Psychology, 24</i> , 675–701.	Attributional retraining appears to be an effective remedial intervention for college students. However, the potential moderating effects of student and classroom characteristics have not yet been investigated systematically. In two studies, attributional retraining was provided to low- and high-risk students, followed by a videotaped lecture presented by either an ineffective or effective instructor. Attributional retraining enhanced achievement on a lecture-based achievement test only when combined with effective teaching, improving the achievement of students who had previously performed poorly (Experiment 1), and of low-achieving externals (Experiment 2). The intervention provided no advantage for previously successful students and low-achieving internals. Moreover, attributional retraining induced a more internal attribution profile in students with an external locus, and increased expectations of future success in both externals and internals, but again only when students also received effective instruction. These results suggest that contextual factors related to the classroom, such as quality of instruction, and individual differences have to be considered when developing attributional retraining programs.
Growth mindset	See row above.	Attributional retraining appears to be an effective remedial intervention for college students. However, the potential moderating effects of student and classroom characteristics have not yet been investigated systematically. In two studies, attributional retraining was provided to low- and high-risk students, followed by a videotaped lecture presented by either an ineffective or effective instructor. Attributional retraining enhanced achievement on a lecture-based achievement test only when combined with effective teaching, improving the achievement of students who had previously performed poorly (Experiment 1), and of low-achieving externals (Experiment 2). The intervention provided no advantage for previously successful students and low-achieving internals. Moreover, attributional retraining induced a more internal attribution profile in students with an external locus, and increased expectations of future success in both externals and internals, but again only when students also received effective instruction. These results suggest that contextual factors related to the classroom, such as quality of instruction, and individual differences have to be considered when developing attributional retraining programs.

Intervention Study Table

Competency

Growth mindset

Reference

Perry, R.P. & Magnusson, J. (1989). Causal attributions and perceived performance: Consequences for college students' achievement and perceived control in different instructional conditions. *Journal of Educational Psychology*, 81, 164-172.

Abstract

Recent developments in control theory suggest that causal attributions are instrumental to the regulation of control and to achievement behavior. This process is relevant to college classroom settings in which academic failure repeatedly threatens students with loss of control. Three causal attributions were examined in relation to perceived performance and the quality of instruction. Following failure feedback attributed to ability, effort, or test difficulty, university students (N = 223) observed a half-hour videotaped lecture presented by either a low or a high expressive instructor. The three causal attributions affected postlecture control and achievement, depending on the quality of instruction and on students' interpretation (distortion, nondistortion) of the failure feedback prior to the lecture. When instruction was poor, the effort attribution generated the best achievement in those students who distorted failure as success. In contrast, ability produced the best achievement, and effort, the most control, in nondistortion students. When instruction was good, the causal attributions produced less variability in achievement and control, although ability continued to facilitate achievement in nondistortion students. One of the benefits of good teaching appears to be that it compensates to some extent for the deleterious effects of some causal attributions.

Intervention Study Table

Competency

Growth mindset

Reference

Perry, R. P., Stupnisky, R. H., Hall, N. C., Chipperfield, J. G., & Weiner, B. (2010). Bad starts and better finishes: Attributional retraining and initial performance in competitive achievement settings. *Journal of Social and Clinical Psychology, 29*, 668– 700.

Abstract

Transitions to new achievement settings are often accompanied by unfamiliar learning conditions wherein individuals experience unanticipated failures and engage in dysfunctional explanatory thinking. To counter these developments, attributional retraining (AR) was presented to 457 first-year students following an initial test in a two-semester course. A Semester 1 AR treatment (no, yes) and initial-test-performance (low, average, high) 2×3 quasi-experimental design was used to assess Semester 2 attributions, emotions, and performance outcomes. AR encouraged all students to endorse controllable attributions and de-emphasize uncontrollable attributions in explaining achievement outcomes in Semester 2. For low- and average-initial-performance students, AR improved subsequent in-class tests, final course grades, and first-year GPAs. Higher initial-test-performance was related to positive emotions and better achievement in Semester 2. The discussion focused on the implications of AR for attributional thinking in unfamiliar achievement settings.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Ruthig, J. C., Perry, R. P., Hall, N. C., & Hladkyj, S. (2004). Optimism and attributional retraining: Longitudinal effects on academic achievement, test anxiety, and voluntary course withdrawal in college students. <i>Journal of Applied Social Psychology, 34</i> , 709–730.	A longitudinal study examined how optimism and attributional retraining (AR) influenced 256 first-year college students' test anxiety, cumulative academic achievement, and course persistence in college over an academic year. Students' optimism was assessed at the start of the academic year and they were assigned to either an AR or no-AR (control) condition. Measures of students' test anxiety, cumulative grade point average, and voluntary course withdrawal were obtained at the end of the academic year. Results suggest that although high optimism was an academic risk factor among students who did not receive AR, high-optimism students who did receive the AR cognitive intervention benefited from its effects to a greater extent than did low-optimism students.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Struthers, C.W., & Perry, R. (1996). Attributional style, attributional retraining, and inoculation against motivational deficits. <i>Social Psychology of Education, 1</i> , 171-187.	College students periodically experience many challenges in pursuit of their educational goals. Such experiences can have deleterious effects on subsequent motivation and performance when they are perceived as negative. Research shows that some students who experience negative events are buffered against motivational deficits, whereas others are motivationally at-risk. Several individual difference variables have been proposed to account for such diverse reactions. A longitudinal field study that involved three phases was conducted to extend this research. Phase I examined the motivational buffering effects of academic attributional style on students' performance, motivation, and emotions. Results indicated that attributional style related to students' performance, motivation, and emotions. Specifically, students who routinely made unstable and controllable attributions for negative academic events exhibited the greatest performance and motivation compared to students who typically made stable and uncontrollable attributions. Phases II and III were designed to examine the remedial benefits of attributional retraining for different attributional styles. Findings indicated that attributional retraining influenced motivation, emotions, and course grade. These results were qualified by the interaction between attributional style, attributional retraining, and time. Findings are discussed within Weiner's (1985, 1986) attribution theory.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	Wilson, T. D., & Linville, P. W. (1982). Improving the academic performance of college freshmen: Attribution therapy revisited. <i>Journal of Personality and Social Psychology</i> , 42, 367–376.	An attributional intervention was devised to help college freshmen who were concerned about their academic performance. Unlike most previous attribution therapy attempts, an effort was made to change subjects' attributions for their problems from stable to unstable causes, rather than from internal to external causes. Freshmen were given information indicating that on the average, college students improve their grades from the freshman to the upperclass years, plus they were shown videotaped interviews of upperclassmen who reported that their grade point averages (GPA) had improved since their freshman year. The effect of this GPA information was dramatic. Subjects who received the information as compared to subjects who did not: (a) were significantly less apt to leave college by the end of the sophomore year, (b) had a significantly greater increase in GPA 1 year after the study, and (c) performed significantly better on sample items from the Graduate Record Exam. As in many self-attribution studies, the self-report evidence for the cognitive processes mediating these behavioral changes was weak. None of the self-report measures of attitudes, expectancies, or mood correlated with the behavioral results. In addition, the GPA information had no effect on self-reports of mood. A more positive mood was reported only by subjects who performed a reasons analysis (i.e., who were asked to list reasons why their grades might improve). This divergent pattern of behavioral and self-report results is discussed in terms of the hypothesis that the determinants of behavioral results differ from the determinants of self-report results in self-attribution studies.
Growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	Previous experiments have shown that it is helpful to teach college students that ongoing challenges are common and improvable. Could such an approach—called a lay-theory intervention—be effective as preparation before college matriculation? Could this strategy reduce a portion of racial, ethnic, and socioeconomic achievement gaps at institutional scale? We conducted the first test of these possibilities. In three double-blind experiments, 90% of first-year college students from three institutions were randomly assigned to complete single-session, online, lay-theory or control materials prior to matriculation (N>9,500). The lay-theory interventions raised first-year full-time college enrollment among students from socially and economically disadvantaged backgrounds exiting a public high school system (Experiment 1); increased disadvantaged students' first-year full-time enrollment at a flagship public university (Experiment 2); and increased disadvantaged students' cumulative first-year grade-point-average at a selective private university (Experiment 3). These effects correspond to 31-40% reductions of the raw (unadjusted) institutional gaps between students from disadvantaged backgrounds and those who were not. Analyses of survey data furthermore suggested the disadvantaged students' overall college experiences improved as a result of the interventions—at 6-12 month follow-up, students were more likely to report joining activities, using student support services, having friends, and more. Discussion explores the potential of preparatory psychological interventions to reduce social inequality and to address problems in other major life transitions.

Intervention Study Table

Competency	Reference	Abstract
Growth mindset	See row above.	See row above.
Intrinsic goals/values	Hamm et al. (2014)	see Hamm et al. (2014)
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., Lacante, M. (2004). Less is something more: Goal content matters. <i>Journal of Educational Psychology</i> , 96, 755-764.	According to expectancy-value theories, increasing the utility value of a learning activity should result in higher motivation and better learning. In contrast, self-determination theory posits that the content of the future goals (intrinsic vs. extrinsic) that enhance the utility value of the learning activity needs to be considered as well. Contrast-cell analyses of an experimental study showed that double goal framing (intrinsic plus extrinsic) facilitated a mastery orientation, performance, and persistence and decreased a performance-approach orientation compared with extrinsic goal framing. However, double goal framing resulted in a less optimal pattern of outcomes compared with intrinsic goal framing, suggesting that the content of the provided goals matters. Goal content effects on both performance and persistence were fully mediated by mastery orientation.

Intervention Study Table

Competency	Reference	Abstract
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy support. <i>Journal of Personality and Social Psychology</i> , 87, 246–260	Three field experiments with high school and college students tested the self-determination theory (E. L. Deci & R. M. Ryan, 2000) hypotheses that intrinsic (vs. extrinsic) goals and autonomy-supportive (vs. controlling) learning climates would improve students' learning, performance, and persistence. The learning of text material or physical exercises was framed in terms of intrinsic (community, personal growth, health) versus extrinsic (money, image) goals, which were presented in an autonomy-supportive versus controlling manner. Analyses of variance confirmed that both experimentally manipulated variables yielded main effects on depth of processing, test performance, and persistence (all p s $< .001$), and an interaction resulted in synergistically high deep processing and test performance (but not persistence) when both intrinsic goals and autonomy support were present. Effects were significantly mediated by autonomous motivation.

Intervention Study Table

Competency
Positive future self

Reference

Harrison, L.A., Stevens, A.M., Coakley, C.A. (2006). The consequences of stereotype threat on the academic performance of white and non-white lower income college students. *Social Psychology of Education, 9*, 341-357.

Abstract

This research examined whether socioeconomic stereotypes produce stereotype threat among lower, middle, or upper income college students who are either White or non-White. Before completing an academic test, participants were either told that the purpose of the research was to understand why lower income students generally perform worse on academic tests or to examine problem-solving processes. Results showed that lower income students exposed to stereotype threat experienced greater test anxiety and performed worse on the academic test than their middle income and higher income counterparts. However, lower income students who experienced stereotype threat exerted as much effort on the test as lower income students who did not experience stereotype threat. Nonetheless, they were less likely to identify with school-related subjects. Stereotype threat and reduced performance did not influence lower income students' self-esteem. Participant race did not influence these findings. The research is discussed in light of cognitive dissonance theory.

Intervention Study Table

Competency	Reference	Abstract
Positive future self	Landau, M. J., Oyserman, D., Keefer, L. A., & Smith, G. C. (2014). The college journey and academic engagement: How metaphor use enhances identity-based motivation. <i>Journal of Personality and Social Psychology, 106</i> , 679-698.	People commonly talk about goals metaphorically as destinations on physical paths extending into the future or as contained in future periods. Does metaphor use have consequences for people's motivation to engage in goal-directed action? Three experiments examine the effect of metaphor use on students' engagement with their academic possible identity: their image of themselves as academically successful graduates. Students primed to frame their academic possible identity using the goal-as-journey metaphor reported stronger academic intention, and displayed increased effort on academic tasks, compared to students primed with a nonacademic possible identity, a different metaphoric framing (goal-as-contained identity), and past academic achievements (Studies 1-2). This motivating effect persisted up to a week later as reflected in final exam performance (Study 3). Four experiments examine the cognitive processes underlying this effect. Conceptual metaphor theory posits that an accessible metaphor transfers knowledge between dissimilar concepts. As predicted in this paradigm, a journey-metaphoric framing of a possible academic identity transferred confidence in the procedure, or action sequence, required to attain that possible identity, which in turn led participants to perceive that possible identity as more connected to their current identity (Study 4). Drawing on identity-based motivation theory, we hypothesized that strengthened current/possible identity connection would mediate the journey framing's motivating effect. This mediational process predicted students' academic engagement (Study 5) and an online sample's engagement with possible identities in other domains (Study 6). Also as predicted, journey framing increased academic engagement particularly among students reporting a weak connection to their academic possible identity (Study 7).
Positive future self	See row above.	SEE ROW ABOVE.
Positive future self	See row above.	SEEE ROW ABOVE.

Intervention Study Table

Competency
Positive future self

Reference

Schwartz, S.J., Kurtines, W.M., & Montgomery, M.J. (2005). Facilitating identity exploration processes in emerging adults: An exploratory study. *Journal of Adolescent Research, 20*, 309-345.

Abstract

This article, using a controlled design, reports the results of an exploratory study to investigate the impact of two types of intervention strategies (cognitively vs. emotionally focused) on two types of identity processes (self-construction and self-discovery) in a culturally diverse sample of 90 emerging adult university students. A quasi experimental design was used to evaluate the relative impact of the cognitively focused self-construction and emotionally focused self-discovery strategies. Quantitative and qualitative results indicated that cognitively focused intervention strategies were most efficacious in affecting self-constructive identity processes, whereas emotionally focused intervention strategies were most efficacious in affecting self-discovery identity processes. This pattern of differential effects suggests that programs intended to broadly affect identity development should include both types of intervention strategies and should target both self-constructive and self-discovery processes.

Intervention Study Table

Competency	Reference	Abstract
Prosocial or transcendent goals/values	Yaeger, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D' Mello, S., Spitzer, B. J., & Duckworth, A. (2014). Boring but important: A self transcendent purpose for leaning fosters academic self-regulation. <i>Journal of Personality and Social Psychology</i> , 107, 559-580	Many important learning tasks feel uninteresting and tedious to learners. This research proposed that promoting a prosocial, self-transcendent purpose could improve academic self-regulation on such tasks. This proposal was supported in 4 studies with over 2,000 adolescents and young adults. Study 1 documented a correlation between a self-transcendent purpose for learning and self-reported trait measures of academic self-regulation. Those with more of a purpose for learning also persisted longer on a boring task rather than giving in to a tempting alternative and, many months later, were less likely to drop out of college. Study 2 addressed causality. It showed that a brief, one-time psychological intervention promoting a self-transcendent purpose for learning could improve high school science and math grade point average (GPA) over several months. Studies 3 and 4 were short-term experiments that explored possible mechanisms. They showed that the self-transcendent purpose manipulation could increase deeper learning behavior on tedious test review materials (Study 3), and sustain self-regulation over the course of an increasingly boring task (Study 4). More self-oriented motives for learning—such as the desire to have an interesting or enjoyable career—did not, on their own, consistently produce these benefits (Studies 1 and 4).

Intervention Study Table

Competency	Reference		Abstract
Prosocial or transcendent goals/values	See row above.	SEE ROW ABOVE	

Intervention Study Table

Competency	Reference	Abstract
Sense of belonging	Cohen, G. L., & Garcia, J. (2005). I am us: Negative stereotypes as collective threats. <i>Journal of Personality and Social Psychology</i> , 89, 566– 582.	Collective threat is the fear that an ingroup member's behavior might reinforce a negative stereotype of one's group. In a field study, self-reported collective threat was higher in stereotyped minorities than in Whites and was linked to lower self-esteem in both groups. In 3 experimental studies, a potentially poor performance by an ingroup member on a stereotype-relevant task proved threatening, as evidenced by lower self-esteem among minority students in 2 experiments and women in a 3rd experiment. The latter study demonstrated the generality of collective threat. Collective threat also undermined academic performance and affected selfstereotyping, stereotype activation, and physical distancing from the ingroup member. Results further suggest that group identification plays a role in whether people use an avoidance or challenge strategy in coping with collective threat. Implications for theories of social identity and stigmatization are discussed.
Sense of belonging	Folger, W.A., Carter, J.A., & Chase, P.B. (2004). Supporting first generation college freshmen with small group intervention. <i>College Student Journal</i> , 38, 472-476	The Freshman Empowerment Program is a group process designed to support first generation freshmen. This article discusses the research compiled regarding the success of this program following its initial implementation. Results indicate that GPA was significantly higher for those students involved in the program compared to similar students who chose not to be involved.

Intervention Study Table

Competency	Reference	Abstract
Sense of belonging	Hausmann, L., Ye, R., Schofield, J., Woods, R. (2009). Sense of belonging and persistence in white and african american first-year students. <i>Research in Higher Education</i> , 50, 649-669.	The authors argue for the inclusion of students' subjective sense of belonging in an integrated model of student persistence (Cabrera et al., J Higher Educ 64:123-139, 1993). The effects of sense of belonging and a simple intervention designed to increase sense of belonging are tested in the context of this model. The intervention increased sense of belonging for white students, but not for African American students. However, sense of belonging had direct effects on institutional commitment and indirect effects on intentions to persist and actual persistence behavior for both white and African American students.
Sense of belonging	Stephens, N., Hamedani, M., & Destin, M. (2014). Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition. <i>Psychological Science</i> , 25, 943-953.	College students who do not have parents with 4-year degrees (first-generation students) earn lower grades and encounter more obstacles to success than do students who have at least one parent with a 4-year degree (continuing generation students). In the study reported here, we tested a novel intervention designed to reduce this social-class achievement gap with a randomized controlled trial (N = 168). Using senior college students' real-life stories, we conducted a difference-education intervention with incoming students about how their diverse backgrounds can shape what they experience in college. Compared with a standard intervention that provided similar stories of college adjustment without highlighting students' different backgrounds, the difference-education intervention eliminated the social-class achievement gap by increasing first-generation students' tendency to seek out college resources (e.g., meeting with professors) and, in turn, improving their end-of-year grade point averages. The difference-education intervention also improved the college transition for all students on numerous psychosocial outcomes (e.g., mental health and engagement).

Intervention Study Table

Competency
Sense of belonging

Reference

Walton G.M. & Cohen, G. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, 92, 82-96.

Abstract

Stigmatization can give rise to belonging uncertainty. In this state, people are sensitive to information diagnostic of the quality of their social connections. Two experiments tested how belonging uncertainty undermines the motivation and achievement of people whose group is negatively characterized in academic settings. In Experiment 1, students were led to believe that they might have few friends in an intellectual domain. Whereas White students were unaffected, Black students (stigmatized in academics) displayed a drop in their sense of belonging and potential. In Experiment 2, an intervention that mitigated doubts about social belonging in college raised the academic achievement (e.g., college grades) of Black students but not of White students. Implications for theories of achievement motivation and intervention are discussed.

Intervention Study Table

Competency	Reference	Abstract
Sense of belonging	Walton, G.M., & Cohen, G.L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. <i>Science</i> , 331, 1447-1451.	A brief intervention aimed at buttressing college freshmen's sense of social belonging in school was tested in a randomized controlled trial (N = 92), and its academic and health-related consequences over 3 years are reported. The intervention aimed to lessen psychological perceptions of threat on campus by framing social adversity as common and transient. It used subtle attitude-change strategies to lead participants to self-generate the intervention message. The intervention was expected to be particularly beneficial to African-American students (N = 49), a stereotyped and socially marginalized group of academics, and less so to European-American students (N = 43). Consistent with these expectations, over the 3-year observation period the intervention raised African Americans' grade-point average (GPA) relative to multiple control groups and halved the minority achievement gap. This performance boost was mediated by the effect of the intervention on subjective construal: It prevented students from seeing adversity on campus as an indictment of their belonging. Additionally, the intervention improved African Americans' self-reported health and well-being and reduced their reported number of doctor visits 3 years postintervention. Senior-year surveys indicated no awareness among participants of the intervention's impact. The results suggest that social belonging is a psychological lever where targeted intervention can have broad consequences that lessen inequalities in achievement and health.

Intervention Study Table

Competency
Sense of belonging

Reference
Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. *Journal of Personality and Social Psychology*, *102*, 513–532.

Abstract

Four experiments examined the effect on achievement motivation of mere belonging, a minimal social connection to another person or group in a performance domain. Mere belonging was expected to increase motivation by creating socially shared goals around a performance task. Participants were led to believe that an endeavor provided opportunities for positive social interactions (Experiment 1), that they shared a birthday with a student majoring in an academic field (Experiment 2), that they belonged to a minimal group arbitrarily identified with a performance domain (Experiment 3), or that they had task-irrelevant preferences similar to a peer who pursued a series of goals (Experiment 4). Relative to control conditions that held constant other sources of motivation, each social-link manipulation raised motivation, including persistence on domain-relevant tasks (Experiments 1–3) and the accessibility of relevant goals (Experiment 4). The results suggest that even minimal cues of social connectedness affect important aspects of self.

Intervention Study Table

Competency	Reference	Abstract
Sense of belonging	Walton, G.M., Logel, C., Peach, J.M., Spencer, S.J., Zanna, M.P. (2015). Two brief interventions to mitigate a “chilly climate” transform women’s experience, relationships, and achievement in engineering. <i>Journal of Educational Psychology</i> , 107, 468–485.	In a randomized-controlled trial, we tested 2 brief interventions designed to mitigate the effects of a “chilly climate” women may experience in engineering, especially in male-dominated fields. Participants were students entering a selective university engineering program. The social-belonging intervention aimed to protect students’ sense of belonging in engineering by providing a nonthreatening narrative with which to interpret instances of adversity. The affirmation-training intervention aimed to help students manage stress that can arise from social marginalization by incorporating diverse aspects of their self-identity in their daily academic lives. As expected, gender differences and intervention effects were concentrated in male-dominated majors (20% women). In these majors, compared with control conditions, both interventions raised women’s school-reported engineering grade-point-average (GPA) over the full academic year, eliminating gender differences. Both also led women to view daily adversities as more manageable and improved women’s academic attitudes. However, the 2 interventions had divergent effects on women’s social experiences. The social-belonging intervention helped women integrate into engineering, for instance, increasing friendships with male engineers. Affirmation-training helped women develop external resources, deepening their identification with their gender group. The results highlight how social marginalization contributes to gender inequality in quantitative fields and 2 potential remedies.

Intervention Study Table

Competency	Reference	Abstract
Sense of belonging **DUPLICATE: see growth mindset	Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i> ,	Previous experiments have shown that it is helpful to teach college students that ongoing challenges are common and improvable. Could such an approach—called a lay-theory intervention—be effective as preparation before college matriculation? Could this strategy reduce a portion of racial, ethnic, and socioeconomic achievement gaps at institutional scale? We conduct the first test of these possibilities. In three double-blind experiments, 90% of first-year college students from three institutions were randomly assigned to complete single-session, online, lay-theory or control materials prior to matriculation (N>9,500). The lay-theory interventions raised first-year full-time college enrollment among students from socially and economically disadvantaged backgrounds exiting a public high school system (Experiment 1); increased disadvantaged students' first-year full-time enrollment at a flagship public university (Experiment 2); and increased disadvantaged students' cumulative first-year grade-point-average at a selective private university (Experiment 3). These effects correspond to 31-40% reductions of the raw (unadjusted) institutional gaps between students from disadvantaged backgrounds and those who were not. Analyses of survey data furthermore suggested the disadvantaged students' overall college experiences improved as a result of the interventions—at 6-12 month follow-up, students were more likely to report joining activities, using student support services, having friends, and more. Discussion explores the potential of preparatory psychological interventions to reduce social inequality and to address problems in other major life transitions.
Sense of belonging **DUPLICATE: see growth mindset	See row above.	Previous experiments have shown that it is helpful to teach college students that ongoing challenges are common and improvable. Could such an approach—called a lay-theory intervention—be effective as preparation before college matriculation? Could this strategy reduce a portion of racial, ethnic, and socioeconomic achievement gaps at institutional scale? We conduct the first test of these possibilities. In three double-blind experiments, 90% of first-year college students from three institutions were randomly assigned to complete single-session, online, lay-theory or control materials prior to matriculation (N>9,500). The lay-theory interventions raised first-year full-time college enrollment among students from socially and economically disadvantaged backgrounds exiting a public high school system (Experiment 1); increased disadvantaged students' first-year full-time enrollment at a flagship public university (Experiment 2); and increased disadvantaged students' cumulative first-year grade-point-average at a selective private university (Experiment 3). These effects correspond to 31-40% reductions of the raw (unadjusted) institutional gaps between students from disadvantaged backgrounds and those who were not. Analyses of survey data furthermore suggested the disadvantaged students' overall college experiences improved as a result of the interventions—at 6-12 month follow-up, students were more likely to report joining activities, using student support services, having friends, and more. Discussion explores the potential of preparatory psychological interventions to reduce social inequality and to address problems in other major life transitions.

Intervention Study Table

Competency	Reference	Abstract
Sense of belonging	See row above.	See row above.
Utility goals/values	Brady, S. T., Reeves, S. L., Garcia, J., Purdie-Vaughns, V., Cook, J. E., Taborsky-Barba, S., . . . Cohen, G. L. (2016). The psychology of the affirmed learner: Spontaneous self-affirmation in the face of stress. <i>Journal of Educational Psychology, 108</i> , 353–373	A key question about achievement motivation is how to maintain it over time and in the face of stress and adversity. The present research examines how a motivational process triggered by a social psychological intervention propagates benefits over a long period of time and creates an enduring shift in the way people interpret subsequent adversity. During their first or second year of college, 183 Latino and White students completed either a values affirmation intervention or control exercise as part of a laboratory study. In the affirmation intervention, students wrote about a core personal value, an exercise that has been found in previous research to buffer minority students against the stress of being negatively stereotyped in school. This single affirmation improved the college grade point average (GPA) of Latino students over 2 years. Students were re-recruited for a follow-up session near the end of those 2 years. Results indicated that GPA benefits occurred, in part, because the affirmation shifted the way Latino students spontaneously responded to subsequent stressors. In particular, in response to an academic stressor salience task about their end-of-semester requirements, affirmed Latino students spontaneously generated more self-affirming and less self-threatening thoughts and feelings as assessed by an open ended writing prompt. They also reported having a greater sense of their adequacy as assessed by measures of self-integrity, self-esteem, and hope, as well as higher academic belonging. Discussion centers on how and why motivational processes can trigger effects that persist over surprisingly long periods of time.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Durik, A. M., Shechter, O. G., Noh, M., Rozek, C. S., & Harackiewicz, J. M. (2015). What if I can't? Success expectancies moderate the effects of utility value information on situational interest and performance. <i>Motivation and Emotion</i> , 39, 104-118.	Two studies tested how the effects of a utility value manipulation on interest and performance were moderated by expectations for success. College students learned a new technique for mentally solving multiplication problems with instructions containing task utility information or not. In Study 1 (N = 62), the effect of the utility value information was positive for individuals with high success expectancies, but negative for individuals with low success expectancies. Study 2 (N = 148) examined the causal role of success expectancies by manipulating whether participants received an expectancy boost before receiving the utility manipulation. The results showed further support for the importance of success expectancies in moderating the effect of directly-communicated utility value. The results are discussed in relation to other research on utility value, interest, and expectancy-value models of achievement behavior.
Utility goals/values	Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Giffen, C. J., Blair, S. S., Rouse, D. I., & Hyde, J. S. (2014). Closing the social class achievement gap for first-generation students in undergraduate biology. <i>Journal of Educational Psychology</i> , 106, 375-389	Many students start college intending to pursue a career in the biosciences, but too many abandon this goal because they struggle in introductory biology. Interventions have been developed to close achievement gaps for underrepresented minority students and women, but no prior research has attempted to close the gap for 1st-generation students, a population that accounts for nearly a 5th of college students. We report a values affirmation intervention conducted with 798 U.S. students (154 first-generation) in an introductory biology course for majors. For 1st-generation students, values affirmation significantly improved final course grades and retention in the 2nd course in the biology sequence, as well as overall grade point average for the semester. This brief intervention narrowed the achievement gap between 1st-generation and continuing-generation students for course grades by 50% and increased retention in a critical gateway course by 20%. Our results suggest that educators can expand the pipeline for 1st-generation students to continue studying in the biosciences with psychological interventions.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2015). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. <i>Journal of Personality and Social Psychology</i> .	Many college students abandon their goal of completing a degree in science, technology, engineering, or math (STEM) when confronted with challenging introductory-level science courses. In the U.S., this trend is more pronounced for underrepresented minority (URM) and first-generation (FG) students, and contributes to persisting racial and social-class achievement gaps in higher education. Previous intervention studies have focused exclusively on race or social class, but have not examined how the 2 may be confounded and interact. This research therefore investigates the independent and interactive effects of race and social class as moderators of an intervention designed to promote performance, measured by grade in the course. In a double-blind randomized experiment conducted over 4 semesters of an introductory biology course (N = 1,040), we tested the effectiveness of a utility-value intervention in which students wrote about the personal relevance of course material. The utility-value intervention was successful in reducing the achievement gap for FG-URM students by 61%: the performance gap for FG-URM students, relative to continuing generation (CG)-Majority students, was large in the control condition, .84 grade points (d = .98), and the treatment effect for FG-URM students was .51 grade points (d = 0.55). The UV intervention helped students from all groups find utility value in the course content, and mediation analyses showed that the process of writing about utility value was particularly powerful for FG-URM students. Results highlight the importance of intersectionality in examining the independent and interactive effects of race and social class when evaluating interventions to close achievement gaps and the mechanisms through which they may operate.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. <i>Journal of Educational Psychology, 102</i> , 880-895.	We tested whether a utility value intervention (via manipulated relevance) influenced interest and performance on a task and whether this intervention had different effects depending on an individual's performance expectations or prior performance. Interest was defined as triggered situational interest (i.e., affective and emotional task reactions) and maintained situational interest (i.e., inclination to engage in the task in the future). In 2 randomized experiments, 1 conducted in the laboratory and the other in a college classroom, utility value was manipulated through a writing task in which participants were asked to explain how the material they were learning (math or psychology) was relevant to their lives (or not). The intervention increased perceptions of utility value and interest, especially for students who were low in expected (laboratory) or actual (classroom) performance. Mediation analyses revealed that perceptions of utility value explained the effects of the intervention on interest and predicted performance. Theoretical and practical implications are discussed.

Intervention Study Table

Competency	Reference
Utility goals/values	See row above.

Abstract

We tested whether a utility value intervention (via manipulated relevance) influenced interest and performance on a task and whether this intervention had different effects depending on an individual's performance expectations or prior performance. Interest was defined as triggered situational interest (i.e., affective and emotional task reactions) and maintained situational interest (i.e., inclination to engage in the task in the future). In 2 randomized experiments, 1 conducted in the laboratory and the other in a college classroom, utility value was manipulated through a writing task in which participants were asked to explain how the material they were learning (math or psychology) was relevant to their lives (or not). The intervention increased perceptions of utility value and interest, especially for students who were low in expected (laboratory) or actual (classroom) performance. Mediation analyses revealed that perceptions of utility value explained the effects of the intervention on interest and predicted performance. Theoretical and practical implications are discussed.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Kost-Smith, L., Pollock, S.J., Finkelstein, N.D., Cohen, G., Ito, T., Miyake, A. (2011). <i>Physics education research conference</i> , 231-234.	We previously reported on the success of a psychological intervention implemented to reduce gender differences in achievement in an introductory college physics course. In this prior study, we found that the gender gap on exams and the FMCE among students who completed two 15-minute self-affirmation writing exercises was significantly reduced compared to the gender gap among students who completed neutral writing exercises. In a follow-up study we replicated the self-affirmation intervention in a later semester of the same course, with the same instructor. In this paper, we report the details and preliminary results of the replication study, where we find similar patterns along exams and course grades, but do not observe these patterns along the FMCE. We begin to investigate the critical features of replicating educational interventions, finding that replicating educational interventions is challenging, complex, and involves potentially subtle factors, some of which we explore and others that require further research.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Martens, A., Johns, M., Greenberg, J., & Schimel, J. (2006). Combating stereotype threat: The effect of self-affirmation on women's intellectual performance. <i>Journal of Experimental Social Psychology, 42</i> , 236–243.	The present studies were designed to investigate the effects of self-affirmation on the performance of women under stereotype threat. In Study 1, women performed worse on a difficult math test when it was described as diagnostic of math intelligence (stereotype threat condition) than in a non-diagnostic control condition. However, when women under stereotype threat affirmed a valued attribute, they performed at levels comparable to men and to women in the no-threat control condition. In Study 2, men and women worked on a spatial rotation test and were told that women were stereotyped as inferior on such tasks. Approximately half the women and men self-affirmed before beginning the test. Self-affirmation improved the performance of women under threat, but did not affect men's performance.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	See row above.	See row above.
Utility goals/values	Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. <i>Science</i> , 330, 1234–1237.	In many science, technology, engineering, and mathematics disciplines, women are outperformed by men in test scores, jeopardizing their success in science-oriented courses and careers. The current study tested the effectiveness of a psychological intervention, called values affirmation, in reducing the gender achievement gap in a college-level introductory physics class. In this randomized double-blind study, 399 students either wrote about their most important values or not, twice at the beginning of the 15-week course. Values affirmation reduced the male-female performance and learning difference substantially and elevated women's modal grades from the C to B range. Benefits were strongest for women who tended to endorse the stereotype that men do better than women in physics. A brief psychological intervention may be a promising way to address the gender gap in science performance and learning.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Schechter, O. G., Durik, A. M., Miyamoto, Y., & Harackiewicz, J. M. (2011). The role of utility value in achievement behavior: The importance of culture. <i>Personality and Social Psychology Bulletin</i> , 36, 303-317.	Two studies tested how participants' responses to utility value interventions and subsequent interest in a math technique vary by culture (Westerners vs. East Asians) and levels of initial math interest. Participants in Study 1 were provided with information about the utility value of the technique or not. The manipulation was particularly effective for East Asian learners with initially lower math interest, who showed more interest in the technique relative to low-interest Westerners. Study 2 compared the effects of two types of utility value (proximal or distal) and examined the effects on interest, effort, performance, and process variables. Whereas East Asian participants reaped the most motivational benefits from a distal value manipulation, Westerners benefited the most from a proximal value manipulation. These findings have implications for how to promote motivation for learners with different cultural backgrounds and interests.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Silverman, A., Logel, C., & Cohen, G.L. (2013). Self-affirmation as a deliberate coping strategy: The moderating role of choice. <i>Journal of Experimental Social Psychology</i> , 49, 93– 98.	Self-affirmation interventions, in which people write about personal values, show promise as a technique to help people cope with psychological threat. However, recent research shows that awareness of self-affirmation effects undermines them. We hypothesized that awareness attenuates self-affirmation effects only when completion of the affirmation is externally imposed, rather than personally chosen. In two experiments, self-affirmation effects reemerged when “affirmation-aware” participants were given a choice about either whether to affirm or not (Study 1) or simply which value to write about (Study 2). These results suggest that people can learn to actively apply self-affirmation as a tool for coping with everyday threats.
Utility goals/values	See row above.	See row above.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Taylor V.J., & Walton G.M. (2011). Stereotype threat undermines academic learning. <i>Personality and Social Psychology Bulletin</i> . 37, 1055–67.	Two experiments tested whether stereotype threat can undermine the acquisition of academic knowledge and thus harm performance even in nonthreatening settings. In Experiment 1, Black and White students studied rare words in either nonthreatening or threatening conditions. One to two weeks later, participants recalled word definitions, half in a nonthreatening “warm-up” and half in a threatening “test.” Replicating past research, Black students performed worse on the test than on the warm-up. But importantly, Black students who had studied in the threatening rather than nonthreatening environment performed worse even on the warm-up. White students were unaffected. In Experiment 2, a value affirmation eliminated the learning-threat effect and provided evidence of psychological process. The results suggest that stereotype threat causes a form of “double jeopardy” whereby threat can undermine both learning and performance. The discussion addresses implications for the interpretation of group differences and for understanding how brief threat-reducing interventions can produce long-lasting benefits.

Intervention Study Table

Competency	Reference	Abstract
Utility goals/values	Woolf, K., McManus, I.C., Gill, D., Dacre, J. (2009). The effect of a brief social intervention on the examination results of UK medical students: a cluster randomised controlled trial. <i>BMC Medical Education</i> , 9-35.	Ethnic minority (EM) medical students and doctors underperform academically, but little evidence exists on how to ameliorate the problem. Psychologists Cohen et al. recently demonstrated that a written self-affirmation intervention substantially improved EM adolescents' school grades several months later. Cohen et al.'s methods were replicated in the different setting of UK undergraduate medical education.

Competency	Total # of studies	Achievement outcomes	Competency outcomes
Conscientiousness	7	4	5
Academic self-efficacy	2	1	2
Growth mindset	17	16	16
Intrinsic goals/values	3	2	3
Positive future self	5	2	5
Prosocial or transcendent goals/values	2	0	2
Sense of belonging	10	7	8
Utility goals/values	15	15	5
Total	61	47	46
Studies	61		
Repeats	12		
Papers	49		

Intervention Study Table

Competency	Reference	Intervention & Population
Conscientiousness	Arroyo, S. G. (1981). Effects of a multifaceted study skills program on class performance of Chicano college students. <i>Hispanic Journal of Behavioral Sciences</i> , 3, 161-175.	<p>A study skills intervention</p> <p>Random assignment</p> <p>Chicano studies department, Washington State University: 18 Chicano participants & 14 non-Chicano participants completed training (10 females and 4 males).</p> <p><u>15 week semester intervention</u></p> <p>Baseline period (Weeks 1,2): participants recorded detailed study habits. Social reinforcement was given or withheld depending on whether participants completed their data sheets. 2 groups: training-maintenance (T-M) and control-training (C-T).</p> <p>Training (Weeks 3-13): The T-M group received 5 weeks of training (T), while the C-T group remained on baseline (served as C). During the second 5-week period, the C-T group received training in the same manner that the T-M group had during treatment, while the T-M group received no further training (i.e., they were returned to baseline procedures and were observed for maintenance).</p> <p>Training: The experimenter and the participant analyzed participants studying behavior, explored ways in which the participant could manipulate the environment to encourage productivity. Shaping and self-reinforcement procedures were initiated by the experimenter.</p> <p>Shaping instructions (Fox, 1962): participants were encouraged to pick a specific quiet place to study and to bring only the material to be studied for this class. If unable to concentrate, the participants were told to stop studying and instead engage in an activity that they found to be reinforcing (but to increase the number of pages read each day before engaging in the reinforcing activity).</p>

Table 2-1

Conscientiousness

Bettinger, E., & Baker, R. (2014). The effects of student coaching: An evaluation of a randomized experiment in student advising. *Educational evaluation and policy analysis*, 36, 3-19.

A student coaching intervention.

Random assignment
n=13,555

Two semester intervention

Treatment (n=8049) "Coached group": Participants were contacted by a coach regularly to develop a clear vision of participants goals, to guide them in connecting their daily activities to their long-term goals, and to support them in building skills, including time management, self-advocacy, and study skills.

Control (n=5506)

Conscientiousness

Duckworth, A. L., White, R. E., Matteucci, A. J., Shearer, A., & Gross, J. J. (2016). A stitch in time: Strategic self-control in high school and college students. *Journal of Educational Psychology*, 108, 329-341.

A self-control intervention.

Study 3

Random assignment

N=159, undergraduate psychology courses, UPenn

Participants were asked to set a study goal that they would like to accomplish over the coming week.

Situation modification condition: participants were instructed to remove temptations that might distract them from reaching an academic goal. They were also asked to modify their environment to minimize temptations.

Response modulation condition: participants were instructed to exert willpower when faced with temptation.

Control group: participants were instructed to set a study goal.

One week later, all participants were asked to report progress toward their goal. Participants were also asked to provide a checklist of five strategies that they used to resist temptation.

Conscientiousness

Fitch, T., Marshall, J., & McCarthy, W. (2012). The effect of solution-focused groups on self-regulated learning. *Journal of College Student Development, 53*, 586-595.

A goal setting intervention with outcome measures related to self-regulated learning.

Participants came from two campuses (6 classes total). Sections were randomly selected so that 3 sections were control groups and 3 were experimental: 69 participants (50 female and 18 male), undergraduate students enrolled in first- and second-year psychology courses.

Intervention:

Treatment group -- participated in a series of goal-setting meetings during which the steps to solution-focused counseling were applied. Each group of 5 to 6 met at least 6 times for at least 20 minutes to discuss and track goals. Participants completed the modified MSLQ during the regularly scheduled class times at the beginning (prior to first group meeting) and end of the semester (after last group meeting).

Conscientiousness

Liu, L., Bridgeman, B., & Adler, R. (2014). Measuring learning outcomes in higher education: Motivation matters. *Educational Researcher, 41*, 352-362.

A motivation intervention, main outcome measures college-level skills. 757 students recruited from three higher education institutions (one research institution, one master's institution, and one community college) in three states.

Students were randomly assigned to 1 of 3 motivation conditions: Control (c), personal (p), and institutional (i). All prompts read: Your answers on the tests and the survey will be used only for research purposes and will not be disclosed to anyone except the research team. Personal condition - your test scores may be released to faculty in your college or to potential employers to evaluate your academic ability. Institutional condition - your test scores will be averaged with all other students taking the test at your college. After completing the tests, students filled out the SOS (Sundre, 1997, 1999; Sundre & Wise, 2003), a 10-item survey that measures students' motivation in test taking. The survey has been widely used in contexts of outcomes assessment similar to this study.

Table 2-1

Conscientiousness

Morisano, D., Hirsh, J., Peterson, J., Pihl, R., & Shore, B. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. *Journal of Applied Psychology, 95*, 255-264

A goal setting intervention.

Random assignment

Recruitment (N=85, 60 female): McGill University. Inclusion criteria -- Students must have planned to take a full-time course load (nine credits) each semester and be having academic difficulty.

Stage 1: 2-3 hours

Group 1 (goal group = 45) participated in a web-based, intensive, goal-setting program. The program led participants through a series of eight steps that facilitated the setting of specific personal goals along with detailed strategies for achievement.

Group 2 (control group = 40) participated in 3 different web based tasks in lieu of the goal-setting intervention. In the second task, control group students wrote about positive past experiences.

Stage 2 (16 weeks later)

All participants completed the Concluding Questionnaire.

Conscientiousness

Senko, C, Harackiewicz, J.M. (2005). Regulation of achievement goals: The role of competence feedback. *Journal of Educational Psychology*. 97, 320–336.

A goal theory intervention.
Study 2

Random assignment: N = 101 male and 106 female students in an introductory psychology course.

Intervention: Participants solved multiplication problems using the traditional technique and completed a measure of their confidence in solving multiplication. Participants also reported their achievement goals for the session. Participants were taught a new technique for multiplying two-digit numbers and then solved 2 sets of problems. After the first set, participants completed a measure of their performance expectations.

Participants then received feedback about their performance.

Score-only feedback condition: received no other information.

Negative Feedback and Positive Feedback conditions: received feedback that their score represented “below average” or “above average” performance.

Participants then reported their achievement goals for the second problem set.

2 used in Table 2-1

Outcome & Impact: Achievement

Percentage (mean) of material studied

T-M group (Post-Pre): 84-48.9; $F(1,24)=14.9$, $p<.01$

C-T group (Post-Pre): 45.1-46.5

C-T group -- after receiving treatment (Post-Pre): 85.2-45.1; $F(1,24)=19.4$, $p<.01$

Quiz scores (average of 4 quizzes)

T-M group (Post-Pre): 7.6-5.2; $F(1,24)=19.2$, $p<.01$

C-T group (Post-Pre): 5.1-5.1

C-T group -- after receiving treatment (Post-Pre): 7.7-5.1; $F(1,24)=21.5$, $p<.01$

The percentage of material reviewed for mid-term and final examinations

T-M group (Post-Pre): 81.4-91.4; $F(1,24)=1.3$, $p>.05$

C-T group -- after receiving treatment (Post-Pre): 93.6-43.6; $F(1,24)=32.3$, $p<.01$

Scores on two examinations

T-M group (Post-Pre): 42.7-40.9; $F(1,12)=2.08$, $p>.05$

C-T group -- after receiving treatment (Post-Pre): 40.1-31.3; $F(1,12)=45.2$, $p<.01$

NA

Outcome & Impact: Competency

College persistence: measured in 6-month increments from the start of treatment (ITT).

NA

Main effect --

6 month retention: .051*** (the difference, in percentage points, between treatment and control group persistence rates).

12 month retention: .052***

18 month retention: .042***

24 month retention: .033**

Completed degree (n=1346): .040*

Students who were randomly assigned to a coach were more likely to persist during the treatment period (two semesters) and were more likely to be attending the university 1 year after the coaching had ended.

NA

Success at achieving goal

Treatment favors situation modification group over response modification, $p < .01$, $d = 0.60$

Treatment favors situation modification group over control, $p < .01$, $d = 0.63$

Response mod group did not differ from the control group.

Level of temptation students faced over the previous week

Treatment favored situation modification group over response modulation group, $p < .01$, $d = 0.61$

Treatment favored situation modification group over control, $p < .01$, $d = 0.50$

Response modulation group did not differ from control.

NA

MSLQ: Motivated Strategies for Learning Questionnaire (Pintrich & De Groot, 1990); 44 of 81 original items. The full version demonstrated predictive validity with a significant positive correlation with class grades for most scales, and an expected negative correlation between grades and the test anxiety scale (Pintrich et al., 1993).

MLSQ scores

Intervention group (M = 237.75, SD = 27.44) > control group (M = 218.33, SD = 37.68); $p = .02$, $d = .56$

Differences between groups re: five scales

Self-efficacy: $F(1, 67) = 5.80$, $p = .020$

Intrinsic value: $F(1, 67) = 9.66$, $p = .003$

Test anxiety: $F(1, 67) = .312$, $p = .580$

Cognitive strategy use: $F(1, 67) = 2.40$, $p = .126$

Self-regulation: $F(1, 67) = 2.67$, $p = .107$

ETS Proficiency profile scores (alpha ranged from .83 to .86 depending on the institution):

Measures college-level skills in critical thinking, reading, writing, and mathematics and has been used by over 500 institutions as an outcomes assessment for the past 5 years (Klein et al., 2009).

Total mean score (also available separately for each type of institution)

institutional > control; $p < .05$, $d = .26$

personal > control; $p < .001$, $d = .41$

personal > institutional; ns, $d = .16$

Essay score (also available separately for each type of institution)

institutional > control; $p < .05$, $d = .23$

personal > control; $p < .001$, $d = .41$

personal > institutional; ns, $d = .18$

Self-report motivation score: alpha ranged from .84 to .85 depending on the type of institution

(scores available separately for each type of institution)

institutional > control; $p < .01$, $d = .31$

personal > control; $p < .001$, $d = .43$

personal > institutional; ns, $d = .14$

Change in GPA (GPA2-GPA1)

Treatment: $2.91-2.25=0.66$; $p < .01$; $d = .65$

Control: $2.46-2.26=0.2$; $p = .28$; $d = 0.17$

Retention Rates: measured by the number of students whose course load dropped below that of full-time status (nine credits or more) in the postintervention semester.

The retention-rate difference between groups was significant at $p < .005$. Post-treatment retention rates not provided, only significance level; pre-treatment retentions are provided.

Concluding questionnaire: 15 feedback items querying participants about their motivation for completing the study, the seriousness with which they took the study, and how they felt as a result of the intervention. EFA using maximum likelihood estimation and varimax rotation was used to group the questions.

Two factors:

Factor 1 measures negative affect (POST only) --

Treatment - Control: $42.96-34.44=8.62$; $p < .05$, $d = 0.46$

NA

Standardized coefficients

Change in mastery goal endorsement (Mtime1-Mtime2)

Positive feedback: -.14

Negative feedback: -.52

Score only feedback: -.13

Negative versus positive, $p < .05$, $d = .42$

Negative versus score only, $p < .05$, $d = .41$

No other comparisons were significant.

Change in performance approach goal endorsement or performance avoidance goal endorsement

No comparisons were significant.

4 report academic outcomes

Intervention Study Table

Competency	Reference	Intervention & Population
Academic self-efficacy	Betz, N., & Schifano, R. (2000). Evaluation of an intervention to increase realistic self-efficacy and interests in college women. <i>Journal of Vocational Behavior</i> , 56, 35-52.	Random assignment: 54 female psychology students Criteria: participants with at least moderate Realistic interests and low Realistic confidence. Realistic skills are those that are taught in high school "shop" classes and trade courses. Treatment group (n = 24) received the Realistic intervention, 7 hours, 3 sessions. Session 1: Lecture on architectural design and construction techniques. Session 2: Participants learned how to use tools and then asked to assemble metal shelving units. Session 3: Participants asked to use tools to perform a variety of tasks. Control group (n=30): participants discussed their opinions of recent films.

Table 2-1

Academic self-efficacy

Luzzo, D.A., Hasper, P., Albert, K.A., Bibby, M.A., Martinelli, E.A. (1999). Effects of self-efficacy-enhancing interventions on the math/science self-efficacy and career interests, goals, and actions of career undecided college students. *Journal of Counseling Psychology, 46*, 233-243.

Random assignment/pre-post measures: N=55 women and 39 men, large public university in the South, student orientation course (Spring quarter); inclusion criteria: ACT-M scores above the regional mean and career undecided status.

Intervention

No treatment (n = 24): 30 minute orientation to the university's career center.

Vicarious-learning (n = 22): Participants viewed a 15 minute presentation of 2 university graduates who described how they were undeclared majors early in their collegiate career but—after several successful experiences in math and science endeavors—went on to major in math- and science-related fields and became successful in their respective careers.

Performance-accomplishment (n = 22): Participants were informed that the number series task was a test of their mathematical abilities and that they needed to successfully solve at least half in order to pass the test.

Vicarious learning + performance accomplishment (n = 26) Immediately following treatment and 4 weeks later – post measures collected.

1 used in 2-1

NA

Outcome & Impact: Achievement

Outcome & Impact: Competency

*From the Skills Confidence Inventory (SCI), a 60-item measure of self-efficacy expectations with regard to the activities and tasks associated with each of the six Holland themes.

Realistic confidence scale* (change score)

Treatment = .72; Control = .24; $p < .01$

Investigative confidence scale*

Treatment = .36; Control = .09; $p < .05$

Social scale*

Treatment = .06; Control = .06: ns

Realistic interests (change score): 15-items; developed both to represent Holland's Realistic theme, as defined for example by Harmon, Hansen, Borgen, and Hammer (1994), in the manual for the 1994 revision of the Strong Interest Inventory.

Treatment = .14; Control = .07: significance level not provided

Occupational self-efficacy (change score): 20-item (OSES; Betz & Hackett, 1981). Measures students' perceptions of self-efficacy with respect to

20 commonly known occupations (10 female, $\alpha=.91$ and 10 male, $\alpha=.92$).

Treatment = .08; Control = .15: significance level not provided

Female dominated occupations (change score):

Treatment = .15; Control = .15: ns

Enrolled in math- and/or science-related courses for the following quarter

Main effect, performance accomplishment only (relative to those who did not receive this treatment), $p < .01$, $d = .90$

Selected math- and/or science related majors

Main effect, performance accomplishment only (relative to those who did not receive this treatment), $p < .01$, $d = .42$

Immediately following treatment

Math/science SE – measured three ways

1.M/S Course SE Scale: Based off of Betz & Hackett, 1981; Cooper & Robinson, 1991; Lent et al., 1993. Prior uses have reported alpha's between .92 to .95. The mean alpha for this study was .95.

Main effect (performance accomplishment > participants who did not receive this treatment), $p < .01$, $d = 0.51$.

No other significant effects.

2.Educational requirements SE: Lent et al.'s (1984). The assessment asks participants to indicate whether they believe they could successfully complete the educational requirements performed in 15 fields. Present study alpha = .90.

No significant treatment effects.

3.Occupational SE: Cooper and Robinson (1991). Present study alpha = .95.

No significant treatment effects.

M/S career interest: Researcher designed. Present study alpha = .95.

No significant treatment effects.

M/S-relatedness of courses, major, career aspiration: Participants completed a Courses and Major Survey to indicate the courses they planned on taking in the subsequent quarter, the major they had selected, and their current career aspiration. Courses, majors, and aspirations were coded using Goldman and Hewitt's (1976) science-nonscience continuum. Two research assistants coded each course, major, and aspiration. The interrater agreement for all coding was 92%.

No significant treatment effects.

4 weeks post-treatment

Math/science SE

1.M/S Course SE Scale:

Performance accomplishment > those that did not receive treatment, $p < .01$, $d = 0.57$.

No other significant main effects.

2.Educational requirements SE: No significant treatment effects.

3.Occupational SE:

Performance accomplishment > those that did not receive treatment, $p < .01$, $d = 0.71$.

No other significant treatment effects.

M/S career interest

Combined treatment > other experimental conditions: $p < .01$

No other significant treatment effects.

M/S-relatedness of courses, major, career aspiration

Performance accomplishment > those that did not receive treatment, $p < .01$, $d = 1.40$.

No other significant treatment effect.

1 report achievement outcome

Intervention Study Table

	Competency	Reference	Intervention & Population
Table 2-1	Growth mindset	Aronson, J., Fried, C., & Good, C. (2002). Reducing the effects of stereotype threat on african american college students by shaping theories of intelligence. <i>Journal of Experimental Social Psychology</i> . Online publication. Doi: doi:10.1006/jesp.2001.1491	79 male and female participants (42 Black, 37 White) recruited by phone (Stanford) GPA 0.516 Random assignment to one of six conditions, a 2 x 3 design yielded by crossing race with treatment. 1. T - malleable pen pal condition, intervention employed numerous attitude change techniques designed to teach and internalize the notion that intelligence is expandable. 2. C - pen pal condition, intervention is the same as group 1 but with a different intelligence orientation. 3. C - non pen pal condition (completed post intervention measures) Group 1 and 2 intervention took place in a lab (1 hour) at three different time points (spaced 10 days apart) Post-intervention - belief measures collected, the remaining measures were given several months later

Growth mindset

Boese, G. D., Stewart, T. L., Perry, R. P., & Hamm, J. M. (2013). Assisting failure prone individuals to navigate achievement transitions using a cognitive motivation treatment (attributional retraining). *Journal of Applied Social Psychology, 43*, 1946–1955.

126 Introductory Psychology students (77 female, 36 male):
1993–1994 academic year
October - Time 1 questionnaire measuring self-worth, causal attributions, and achievement related cognitions.
January – Intervention
AR treatment: students watched a brief video depicting two university students discussing the reasons for performing poorly at the university. Small discussion groups were held where participants discussed the 3 most important reasons for poor performance. They then participated in a brief activity - note-taking training. Note-taking training was selected because it indirectly teaches students that expending effort to take careful notes can lead to better performance, thereby reinforcing the importance and functionality of effort attributions.
March -- students in both conditions completed a Time 2 follow-up questionnaire (similar to the Time 1 questionnaire).
May -- Consenting students' (N not provided) grades were obtained from course instructors and institutional records.

GPA 0.740
Final grade 0.768

Growth mindset	Cohen, G.L., Steele, C.M., & Ross, L. D. (1999). The mentor's dilemma: Providing critical feedback across the racial divide. <i>Perspectives Social Psychology Bulletin</i> , 25, 1302–1318.	<u>Study 1</u> Random assignment: Students (45 Black & 48 White) recruited by telephone from a registrar's list of Stanford undergraduates. Pre & Post measures assess task motivation & identification with academic skills Session 1: Students wrote a letter of commendation for their favorite teacher Session 2 (1 wk. later): Students received critical feedback, depending on condition. Unbuffered criticism condition -- students received feedback. Wise criticism condition -- students received feedback with an explicit invocation of high standards and an assurance of the particular student's capacity to reach those standards. Positive buffer -- students received feedback buffered by general praise of their performance.	Final grade 0.38
Growth mindset	Eskreis-Winkler, L., Shulman, E. P., Young, V., Tsukayama, E., Brunwasser, S. M. & Duckworth, A. L. (in press). Using wise interventions to motivate deliberate practice. <i>Journal of Personality and Social Psychology</i> .	<u>Study 3</u> N=60 (liberal arts college); N=60 (research university); female (69.2%) Intervention: Participants completed a short math pretest. Treatment condition: Participants learned the tenets of deliberate practice. The treatment module taught that talent and effort both contribute to success but stressed the importance of effort (particularly effort that is invested in deliberate practice). Each module ended with a saying-is-believing exercise in which the participant wrote a letter to another student endorsing deliberate practice. Control condition: Participants were taught standard study advice. They also ended with students writing a letter to another student, endorsing what they had learned. One week later, students were instructed to master college math content in Khan Academy.	Final grade 0.38

Growth Mindset

Hall, N., Hladkyj, S., Perry, R., & Ruthig, J. (2004). The role of attributional retraining and elaborative learning in college students' academic development. *The Journal of Social Psychology, 144*, 591-612.

Random assignment: n=203, introductory psychology course.

GPA ns

Final course grade 0.407

Participants (AR treatment and Aptitude test AR treatment) watched a videotape that showed graduate students having a conversation about maintaining a controllable, malleable set of causal attributions following an exam (same as Menec 1994 and Struthers & Perry 1996).

AR Treatment: participants completed a writing exercise consisting of summarizing, considering other related reason for academic difficulties, and personal relevance.

Aptitude test AR treatment: participants were given an aptitude test (ARAT).

Control: participants did not receive any experimental intervention.

Growth mindset

Hall, N. C., Perry, R. P., Chipperfield, J. G., Clifton, R. A., & Haynes, T. L. (2006). Enhancing primary and secondary control in achievement settings through writing-based attributional retraining. *Journal of Social and Clinical Psychology, 25*, 361–391.

N= 225 (172 females and 79 males, 4 students did not indicate their gender), two-semester introductory psychology course at a Midwestern university; attrition = 17%.

Final grade ns

Students selected a study session to attend from those allotted for their course section, and either the AR (attribution retraining) or No AR treatment condition was administered during a given session.

Time 1 (October): Questionnaire (pre-assessment measures). AR was presented in one of two ways:

1. Handout -- summarized the benefits of changing dysfunctional causal attributions to functional attributions.
2. Videotape presentation (see Menec et al. 1994)

Writing assignment: Participants summarized the main points of the videotape, and then listed a number of important reasons for why first-year students may not perform as well as they could in their courses.

Time 2 (February to March): post-AR follow-up questionnaire.

Time 3 (May): scores and final grades obtained.

Growth mindset

Hamm, J. M., Perry, R. P., Clifton, R. A., Chipperfield, J. G., & Boese, G. D. (2014). Attributional retraining: A motivation treatment with differential psychosocial and performance benefits for failure prone individuals in competitive achievement settings. *Basic and Applied Social Psychology*, 36, 221– 237.

Sample was drawn from the Manitoba Motivation and Academic Achievement (MAACH) database. 2001–02 cohort: n=324 (women 67%); freshmen; intro psych course.

Time 1 (September), students completed an exam.

Time 2 (October), participants selected study sessions that were randomly assigned to treatment conditions and subsequently completed the first questionnaire.

Intervention: Students rated the importance of various causal attributions to achievement failure. Next, students viewed a video of two students discussing potential ways in which academic performance can improve. Students were then asked to summarize the video and provide their own reasons why students may perform poorly in their courses, and write about how they could apply the main points of the video to their own lives.

Time 3 (March), participants completed post intervention questionnaire.

Time 4 (May), achievement data from consenting students was collected from institutional records.

GPA 0.46

Growth mindset

Haynes, T. L., Daniels, L. M., Stupnisky, R. H., Perry, R. P., & Hladkyj, S. (2008). The effect of attributional retraining on mastery and performance motivation among first-year college students. *Basic and Applied Social Psychology, 30*, 198–207.

First year college students (intro psychology course)
Canadian university, 1992 and 2005

GPA ns

Random assignment of course section to AR or no-AR condition: Students selected a day/time to participate in the study without knowledge of the treatment/control conditions.

Intervention:

Time 1 pretest completed early in the academic year (October) to assess baseline levels of mastery and performance motivation.

AR treatment immediately following Time 1 assessment administered (AR. 159, no-AR. 177).

Students watched a video portraying 2 undergraduate students discussing how first year academic performance can be affected by causal attributions. Following the video, participants were given a one-page handout that consisted of two lists of possible attributions for poor academic performance (uncontrollable attributions and controllable attributions). The experimenter then gave a brief presentation detailing how attributions can be changed from one list to the other (i.e., maladaptive to adaptive). Students completed a writing assignment: (a) summarizing the main points of the video (b) listing important reasons why students may underperform, (c) citing examples of how the main points of the video could apply to their own studies, and (d) recalling an academic instance in which they performed poorly and how this made them feel.

Time 2 posttest assessment (March) to reassess mastery and performance motivation. Academic achievement data obtained at year's end from institutional records (high school averages; first year GPAs).

Growth mindset	<p>Menec, V. H., Perry, R.P., Struthers, C.W., & Schonwetter, D.J., Hechter, F.J., & Eichholz, B.L. (1994). Assisting at-risk college students with attributional retraining and effective teaching. <i>Journal of Applied Social Psychology, 24</i>, 675–701.</p>	<p><u>Study 1</u> 156 (77 female and 78 male) introductory psychology students at a midwestern Canadian university.</p> <p>Subjects participated in three sessions, with sessions being scheduled at one-week intervals. Control: 1. GRE type test, expectations 2. Lecture 3. achievement test. 1AR: 1. AR training, GRE type test, expectations 2. Lecture 3. achievement test. 2AR: 1. AR training, GRE type test 2.AR training, expectations, Lecture 3. achievement test.</p> <p>AR training: videotapes depicting students discussing the way in which effort and strategies are controllable.</p>	performance test
Growth mindset	See row above.	<p><u>Study 2: Low-achieving participants only</u> 257 participants (122 female and 129 male, with 6 individuals failing to report their gender), introductory psychology students at a midwestern Canadian university</p> <p>Intervention: see study 1.</p>	performance test

Growth mindset

Perry, R.P. & Magnusson, J. (1989). Causal attributions and perceived performance: Consequences for college students' achievement and perceived control in different instructional conditions. *Journal of Educational Psychology*, 81, 164-172.

N= 223, introductory psychology students, the University of Manitoba

Subjects selected a session time, and experimental conditions were assigned to sessions.

Intervention: A two-stage procedure was used that involved (a) the contingency task (aptitude test) feedback and (b) the classroom lecture simulation. In the first stage, participants were given general instructions, attributions were induced by specifying that performance on the subsequent aptitude test would be determined primarily by ability, effort, OR test difficulty (3 treatment groups). In the second stage, videotaped lectures were presented to each group. Following the low or high expressive lecture, each group took the achievement test and responded to the post lecture questionnaire.

performance test

Growth mindset

Perry, R. P., Stupnisky, R. H., Hall, N. C., Chipperfield, J. G., & Weiner, B. (2010). Bad starts and better finishes: Attributional retraining and initial performance in competitive achievement settings. *Journal of Social and Clinical Psychology, 29*, 668– 700.

Introductory Psychology, first year students (N = 459) (285 females; 172 males).

Random assignment: Students selected one of several session times to complete a Time 1 questionnaire without knowing which treatment condition (AR--attribution retraining or No-AR) would occur in a given session.

Intervention:

October -- Students completed Time 1 questionnaire (demographic information), and then received AR (N=200). In the No AR condition (N=259), students responded to the Time 1 questionnaire and left immediately after completing it.

AR: Students watched a videotape depicting 2 students discussing how poor performance can improve. The dialogue focused on controllable attributions which were summarized at the end by a male professor. Students completed a GRE-type aptitude test after which they rated their performance on the test and their perceived success.

March -- 78% (n = 359). Time 2 questionnaire containing the attribution and emotion measures.

June -- 98% (n = 451) After the course was completed, test results and final course grades were obtained from course instructors, and cumulative GPAs were provided by OIR.

GPA 0.39

Course grade 0.37-0.43

Test performance .96

Growth mindset

Ruthig, J. C., Perry, R. P., Hall, N. C., & Hladkyj, S. (2004). Optimism and attributional retraining: Longitudinal effects on academic achievement, test anxiety, and voluntary course withdrawal in college students. *Journal of Applied Social Psychology*, 34, 709–730.

n=236 (156 female, 57 male, first-year students, midwestern university, intro Psychology course)

GPA 0.528

Phase 1

Participants complete questionnaire.

Phase 2 (approximately 1 month later)

Intervention: AR condition (n = 184) and no-AR control condition (n = 52). **Random Assignment of course sections.**

1. AR condition, (videotape; n=70): viewed a brief film depicting two students discussing their academic failure experiences. One student explained to the other that after performing poorly in his courses, he began to put more effort into studying and his grades improved accordingly.

2. AR condition (video-and-discussion; n = 44): same film as group 1. Film was followed by a 20-min discussion (students discuss their own success and failure experiences, the experimenter explained the importance of using adaptive attributions).

3. AR group (handout only; n = 56): participants reviewed a single page handout summarizing the benefits of changing dysfunctional causal attributions for failure (i.e., lack of ability) to functional attributions (i.e., lack of effort).

4. Control – completed a filler questionnaire.

Phase 3 (end of the academic year)

Participants completed a questionnaire that included a measure of students' test anxiety. Participants' cumulative GPA and VW (voluntary course withdrawal) were obtained from institutional records.

Growth mindset	<p>Struthers, C.W., & Perry, R. (1996). Attributional style, attributional retraining, and inoculation against motivational deficits. <i>Social Psychology of Education, 1</i>, 171-187.</p>	<p>Random assignment n=433; final sample = 257 (67%) <u>Treatment</u>: beginning of second semester. Videotape plus discussion; participants were told about the complexities of college life and how students adjusted to such experiences. They were also told that students' beliefs about poor performances could influence subsequent tests and what they could do to have such beliefs work for them rather than against them. <u>Control</u>: similar to treatment except attribution information was omitted from the video and discussion. End of semester grades obtained.</p>	Course grade 0.687
Growth mindset	<p>Wilson, T. D., & Linville, P. W. (1982). Improving the academic performance of college freshmen: Attribution therapy revisited. <i>Journal of Personality and Social Psychology, 42</i>, 367– 376.</p>	<p>Random assignment N=40. College freshmen were selected only if they were concerned about their academic performance. GPA information condition: participants reviewed statistical data and viewed interviews with upperclassmen indicating that most freshmen improve their GPA over time. Half of the participants in both the GPA and no-information conditions were randomly assigned to a reasons analysis condition where they listed reasons why freshmen might improve their GPA and factors that currently affected them.</p>	GPA 0.651

Growth mindset	<p>Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. <i>Psychological and Cognitive Sciences</i>,</p>	<p>Random assignment: Web-based intervention, taking approximately 25 to 35 minutes to complete. Participants completed single-session, online, intervention or control materials prior to matriculation. <u>Study 1 (n=584)</u> Social belonging: students read results of a survey conducted with older students and conveyed two key ideas, 1. in the transition to college most students worry about whether they belong and 2. that these worries subside with time when students take active steps to create social ties to other college students. After, participants engage in a writing exercise. Growth mindset: Participants read an article summarizing scientific research supporting the idea that intelligence is malleable and can be developed with effort. Participants were predominantly African American or first-generation students.</p>
Growth mindset	See row above.	<p><u>Study 2</u> Extended study 1 with incoming students at a 4-year public institution, instead of outgoing students at a high school. Also, the interventions came from the university instead of the high school. N=7335</p>

Outcome & Impact: Achievement

Spring quarter GPA

Main effect (malleable versus no malleable) $F(2, 72) = 4.93, p < .01$

Differences by groups: Black participants

Malleability > Control pen pal: 3.32-3.05; $p < .05$

Malleability > No pen pal: 3.32-3.10; $p < .05$

Control pen pal < No pen pal: 3.05-3.10; $p < .05$

Differences by groups: White participants

Malleability > Control pen pal: 3.55-3.34; $p < .05$

Malleability > No pen pal: 3.55-3.35; ns

Control pen pal < No pen pal: 3.34-3.35; ns

Outcome & Impact: Competency

POST only

Short term malleability beliefs -- one week post-treatment: The index was created from a set of questions (mean). Responses ($r = .84$).

Malleable treatment - Pen Pal Control; 4.92-4.24; $p = .05$

Pen pal control - no pen pal control: 4.24-3.93; ns

Condition x race: ns

Long term malleability beliefs (2 items, $r = .85$) -- 9 weeks post-treatment

Main effect (malleable versus no malleable condition): $F(2, 72) = 19.638, p < .0001$

Condition x race: ns

Enjoyment of the educational process (measured on a 7-point scale)

Main effect (malleable versus no malleable condition) $F(2, 73) = 3.43, p < .05$

Differences by groups: Black participants

Malleability > Control pen pal: 4.38-3.47; $p < .05$

Malleability > No pen pal: 4.38-3.42; $p < .05$

Control pen pal > No pen pal: 3.47-3.42; $p < .05$

Differences by groups: White participants

Malleability > Control pen pal: 5.43-4.89; $p < .15$

Malleability < No pen pal: 5.43-5.81; $p < .05$

Control pen pal < No pen pal: 4.89-5.81; $p < .02$

Identification with academic achievement (measured on a 7-point scale)

Main effect (malleable versus no malleable condition), $F(2, 72) = 2.81, p < .07$

Differences by groups: Black participants

Malleability > Control pen pal: 4.77-3.89; $p < .05$

Malleability > No pen pal: 4.77-3.45; $p < .001$

Control pen pal > No pen pal: 3.89-3.45; ns

Differences by groups: White participants

Malleability < Control pen pal: 5.61-5.67; ns

Malleability < No pen pal: 5.61-5.71; ns

Control pen pal < No pen pal: 5.67-5.71; ns

Perceptions of stereotype threat: Participants indicated their degree of agreement (7-point Likert scales) with two items past research (e.g., Steele et al., in press) has used to measure students' perceptions of a stereotype threatening environment. These items were highly correlated and thus were averaged to form an index of stereotype threat.

Main effect (malleable versus no malleable condition), ns: p-value not reported.

Differences by groups: Black participants

Malleability > Control pen pal: 5.22-4.70; ns

Malleability > No pen pal: 5.22-5.17; ns

Control pen pal > No pen pal: 4.79-5.17; ns

Differences by groups: White participants

Malleability < Control pen pal: 1.62-1.42; ns

Malleability < No pen pal: 1.62-1.26; ns

Grade in course (measured as a percentage)

Main effect: Conditions means not provided; main effect significance level not provided.

Differences between groups

Low failure (treatment-control): 67.97-69.47; $p=.276$

High failure (treatment-control): 69.40-63.02; $p=.010$

Control group (high<low): $p=.011$.

AR group (high vs. low): $p=.278$

GPA (all courses taken in the second semester)

Main effect: Conditions means not provided; main effect significance level not provided.

Differences between groups

Low failure (treatment-control): 2.37-2.56; $p = .200$

High failure (treatment-control): 2.70-2.18; $p=.008$

Control group (high<low): $p = .044$

AR group (high vs. low): $p = .061$

Course grade expectations: Measured using the item“What is your expected grade in your Introductory Psychology course?” For concerns about psychometric issues associated with the use of one-item measures see Ainley & Patrick, 2006; DeSalvo et al., 2006; Menec et al., 1994.

Main effect: Means and significance levels not provided.

Differences between groups (Low versus high provided)

Low failure (Treatment-Control): 4.65-4.54; $p=.404$

High failure (Treatment-Control): 4.92-3.84; $p=.006$.

Judgements of course responsibility: Measured with the item“How responsible do you feel for your performance in your Introductory Psychology course?”

Main effect: Means and significance levels not provided.

Differences between groups (Control & AR group provided)

Control (High-Low): 7.56-9.00; $p=.007$

AR (High-Low): 8.32-8.28; $p=.468$

NA

Measures: PCA using varimax rotation was performed on the 6 premanipulation measures of task motivation and identification. The analysis produced two discrete components.

Task Motivation (participant's belief in their ability to improve their work)

Main effect: Motivation was lower in the unbuffered condition ($M = -.20$) than either the positive buffer condition ($M = .07$) or wise criticism condition ($M = .12$); $F(2,84) = 2.74$, $p = .07$.

Differences by group ~ race group

Unbuffered group (black < white): $-.48 < .09$, $p < .01$

Wise group (black > white): $.20 > .05$, $p < .02$

Identification with writing skills

Main effect: Identification with writing skills was lower in the unbuffered condition ($M = -.10$) and positive buffer condition ($M = -.06$) compared to wise condition ($M = .16$); $F(2,84) = 2.63$, $p < .08$.

Difference by group ~ race group

Unbuffered group (black versus white): $-.16$ versus $-.02$, ns

Wise group (black versus white): $.18$ versus $.16$, ns

Black students (wise > unbuffered): $p = .05$

Academic achievement: end of semester grades

Liberal arts college measured by fall and spring semester GPA

Research university measured by final grade in psychology course

Main effect: $p = .04$, $d = .38$

NA

Final course grade

Main effect favors AR group, $F=5.41^{**}$

Differences by groups, high versus low elaborative learning

Low elaborators

Writing AR ($m=70.18$) versus control ($m=64.27$): $t(115)=3.05$, $p<.01$

Test AR ($m=69.85$) versus control: $t(110)=2.82$, $p<.01$

High elaborators

Writing AR ($m=70$) versus control ($m=65$)

Test AR ($m=71$) versus control

Parallel a priori contrasts for low and high elaborators separately were also significant at $p<.05$.

Both low and high elaborators experienced significant improvements in their final grades, relative to controls, after either AR technique.

GPA

Main effect for AR group, ns, $F=0.62$

Differences by groups, high versus low elaborative learning

Low elaborators

Writing AR ($m=2.55$) versus control ($m=2.5$): ns

Test AR ($m=2.45$) versus control: ns

High elaborators

Writing AR ($m=2.8$) versus control ($m=2.59$): $t(114)=1.33$, $p<.10$

Test AR ($m=2.81$) versus control: $t(112)=1.35$, $p<.10$

Perceived control: 24 items, including an 8-item measure used by Perry et al. 2001, $\alpha=.85$

Main effect favors AR, $F=3.45^{*}$: participants in the writing AR ($m=63.42$) and test AR ($m=62.44$) reporting greater control than control participants ($m=61.02$)

Perceived success: 4 items, $\alpha=.88$

Main effect favors AR, $F=3.07^{*}$: Students in the test AR ($m=32.89$) reported higher perceptions of success than controls ($m=29.29$), $t(92)=2.36$, $p<.05$ and writing AR participants ($m=29.98$), $t(101)=2.00$, $p<.05$.

Academic emotions: single item measures derived from Weiner's attribution theory.

Hope & Shame

Main effect favors AR, $F=3.46^{*}$ and $F=6.09^{**}$, respectively: writing AR report greater hope ($m=7.17$) and less shame ($m=3.01$) than participants in the control group (hope= 6.12 ; shame= 4.51). test AR also report greater hope ($m=6.92$) and shame ($m=2.89$).

Pride, guilt: main effect, ns

Unsuccessful students; no main effects for successful students
Final course grade (a percentage based off of exams)
Main effect: ns; $F(1,66)=1.63$

Unsuccessful students; no main effects for successful students
Perceived Academic Success (Time2 outcome; Time1 used as a control): A 2-item measure assessing perceptions of participants current and future academic success
Main effect: ns; $F(1,44)=0.12$
Negative Academic Emotions: (Time2 outcome)
1. Learning-related anxiety; 6-item scale; developed by Pekrun et al. (2000); (Cronbach's $\alpha = .81$)
Main effect: ns; $F(1,43)=3.39$
2. Negative attribution-dependent feelings of guilt concerning students' performance in introductory psychology (Weiner, 1985); single-item measure.
Main effect: ns; $F(1,46)=0.63$
Positive Academic Emotions (Time2 outcome; Time1 used as a control)
1. Learning-related enjoyment, 6-items ($\alpha = .75$), Time 1 $\alpha = .72$)
Main effect: ns; $F=0.19$
2. Hope, single-item
Main effect: ns; $F=0.45$
Causal Attributions for failure (Time2 outcome; Time1 used as a control)
1. Controllable attributions, T2 ($\alpha = .65$), 2-item measure; T1 $\alpha = .63$
Main effect: ns; $F(1,44)=0.00$
2. Uncontrollable attributions, T2 ($\alpha = .63$), 4-item measure; T1 $\alpha = .61$)
Main effect (Treatment-Control): 14.69-18.71; $F(1,44) = 7.07$; $p < .05$

Cumulative first-year GPA

Main effect: $F(1, 309) = 1.18$; $p = .140$. Treatment and control group means not provided.

Differences between groups: only one significant difference

Failure-acceptor (T-C): 0.33; $p = .03$; $d = .46$

Voluntary course withdrawals: represent the cumulative credit hours students dropped in the first and second semesters in their 1st year

Main effect: not provided.

Differences between groups: only one significant difference

Failure-acceptor: AR (vs. no-AR) resulted in fewer dropped classes, $p = .040$, odds ratio = 0.39.

Failure-acceptors in the AR condition were 61 % less likely to drop a class than their peers in the no-AR condition.

Causal attributions: 1 item; strategy and effort attributions represent causes that are controllable by students, whereas teaching quality and test difficulty represent attributions that are not controllable by students. Reliability measure not provided.

Main effect, $p < .001$: No-AR = .24; AR = -.32; $d = .56$. Control group possessed a maladaptive attributional mindset in which they emphasized the two uncontrollable attributions (teaching quality, test difficulty) and slightly deemphasized the strategy attribution. In contrast, the treatment group downplayed the influence of the uncontrollable attributions, whereas they placed a slight emphasis on the strategy attribution.

Attribution-related emotions: Students rated their hopefulness and helplessness after reading the following stem: "Please indicate the extent to which each of the following emotions describe how you feel about your performance in your Introductory Psychology course to date." Alpha not provided.

Main effect, NS: Treatment and control means not provided.

Intrinsic motivation: measured using the MAACH Intrinsic Motivation scale (Hall et al., 2007), which was adapted from Pintrich, Smith, and McKeachie (1989). 5-items; $\alpha = .72$.

Main effect (T-C): $18.03 - 16.88 = 1.15$; $p = .001$.

Differences between treatment and control for separate groups (failure-acceptors, failure-ruminators, achievement-oriented, over-striver) available.

GPA (all courses)

AR on GPA ($b=.13$, $p<.01$) was no longer significant with the inclusion of mastery motivation in the model ($b=.08$, $p>.05$). The relationship between AR and GPA is mediated by mastery motivation. No evidence emerged to suggest that performance motivation mediates the relationship between AR and GPA.

Mastery motivation: 4-item scale adapted from Pintrich et al.'s (1993) Motivated Strategies for Learning Questionnaire. Alpha not provided. Mean= $\text{Time1}+\text{Time2}/2$.

Main effect (AR condition -Control): $18.23-16.94=1.29$; $p<.01$.

AR condition (Time2-Time1): 0.88 ; $p<.01$

Control (Time2-Time1): -0.4 ; ns

Performance motivation: Motivated Strategies for Learning Questionnaire. These items were designed to reflect concern with demonstrating ability, the desire to outperform others, and preoccupation with an objective academic outcome. Alpha not provided.

Main effect (AR condition -Control): $20.70-20.06=.64$; ns. Mean = $\text{Time1}+\text{Time2}/2$.

AR condition (Time2-Time1): -0.07 ; ns

Control (Time2-Time1): -0.86 ; ns

Student achievement: Assessed with a 30-item, multiple-choice test based on the lecture.

Low-expressive instruction

Main effect: ns; $F(2,75) = 1.24$. Treatment and control means not provided.

High-expressive instruction

Main effect: ns; $F(2,69) = 2.09$. Treatment and control means not provided.

Differences between groups: failure versus success students

Failure students --

1AR - control: 15.25-11.00; $p < .05$

2AR - control: 16.26-11.00; $p < .05$

1AR - 2AR: ns

Success students -- treatment versus control, ns.

Expectations -- performance on the next psychology test

Main effect, NS: Treatment and control means provided for failure and success students separately.

Expectations -- final grade in the psychology course

Main effect, NS: Treatment and control means provided for failure and success students separately.

Student achievement: Assessed with a 30-item, multiple-choice test based on the lecture.

Low-expressive instruction: $F(2,114) = 3.64$; $p < .05$. Treatment and control means not provided.

High-expressive instruction: $F(2,116) = 0.82$; $p > .05$. Treatment and control means not provided.

Attributions: measured by asking students to what extent external factors (luck, test difficulty, the professor or internal factors (effort, ability, and their desire to do well) determined their performance on the achievement test. Alpha not provided.

Low-expressive instruction: main effect, $p < .05$

High-expressive instruction: main effect, ns

Expectations -- performance on the next psychology test

Low-expressive instruction: main effect, ns

High-expressive instruction: main effect, $p < .05$

Expectations -- final grade in the psychology course

Low-expressive instruction: main effect, ns

High-expressive instruction: main effect, $p < .05$

Student achievement (measured with a 30-item multiple-choice test based on the lecture)
Main effect, attribution groups: $F(2,211)=9.37$; $p < .001$. Treatment and control means not provided.

Differences by groups

Low expressive instruction/Distortion students:

Effort group - test difficulty group = 4.77 ($t=3.25$)

Effort group - ability group = 2.04, ns ($t=1.48$)

Ability group - test difficulty group = 2.73, ns

Low expressive instruction/Non-distortion students:

Effort group - test difficulty group = -0.27, ns

Effort group - ability group = -3.03, ($t = 2.49$)

Ability group - test difficulty = 2.76, ($t = 2.46$)

High expressive instruction/Distortion students: group differences were not significantly different.

Task measures: provided an assessment of the participants' reactions to their performance in terms of their ability, emotions, perceived control, difficulty of test.

Main effect, NS. Treatment and control means not provided.

Test performance (POST-intervention class test)

Main effect (Treatment-Control): $74.98-65.33=9.65$; $p < .01$

Differences by groups

Low-performance: AR > control, $p < .01$, $d = .96$

Average-performance: AR > control, $p < .01$, $d = .92$

High-performance: ns

Course grade (cumulative percentage based on all tests completed in the course)

Main effect (Treatment-Control): $70.53-67.36=3.17$, $p < .01$

Differences by groups

Low-performance: AR > control, $p = .02$, $d = .37$

Average-performance: AR > control, $p < .01$, $d = .43$

High-performance: ns

GPA (first-year)

Main effect (Treatment - Control): $2.88-2.62=0.26$; $p < .01$

Differences by groups

Low-performance: AR > control, $p < .01$, $d = .39$

Average-performance: AR > control, $p < .01$, $d = .51$

High-performance: ns

Causal attributions (POST-treatment): strategy, effort, professor quality, test difficulty. Alpha not provided.

Main effect condition: $F(4,346)$; $p < .01$

AR encouraged students to emphasize strategy in explaining performance and to downplay professor quality.

Achievement emotions (POST-treatment): (Weiner, 1985) – hope, pride, shame, guilt, helplessness, worry. Alpha not provided.

Main effect: $F(6,337) = .830$, $p > .01$

Cumulative grade point average (GPA) for the school year

Main effect, condition: $F(1,180)=3.19$; $p = .08$. Treatment and control means not provided.

High versus Low groups

Treatment (H-L): $2.00-3.1 = -1.1$; p-value not provided.

Control (H-L): $2.22-2.72 = -.5$; $p = .08$

High (T-C): $2.82-2.22 = .6$; $p < .05$.

Low (T-C): $2.67-2.72$; ns

Voluntary course withdrawal (VW): assessed by the number of credit hours students dropped during the year, where 3 credit hours were equivalent to a one-semester course and 6 credit hours were equivalent to a two semester course.

Main effect: $F(1,189) = 6.53$; $p < .05$. Participants who received AR dropped fewer credit hours than did those who did not receive AR. Means are not provided.

High versus Low groups

Treatment (H-L): $2.1-3.26 = -1.16$; p-value not provided.

Control (H-L): $7.26-3.24$; ns

High (T-C): $2.1-7.26 = -5.16$; $p < .01$

Low (T-C) $3.26-3.24$; ns

Test anxiety: 37-item true/false measure of test anxiety adapted from Sarason's (1975) Test

Anxiety Scale, a widely used indicator of test anxiety in academic settings (e.g.,

Hammermaster, 1989; Jain, 1986) $\alpha = .80$.

Main effect: ns; $F(1,133) = 0.98$

High versus Low groups

Treatment (H-L): $51.6-56.22$; p-value not provided.

Control (H-L): $56.23-53.96$; ns

High (T-C): $51.6-56.23 = -4.63$; $p < .01$.

Low (T-C): $56.22-52.96$; ns

Letter grade in course (mean)

Treatment and control means not provided; significance test not provided; cannot assess main effect on condition.

Differences between attributional styles

S=stable; US=unstable; C=controllable; UC=uncontrollable

S-C (T-C): 0.70; ns

S-UC (T-C): -0.50; ns

US-C (T-C): -0.16; ns

US-UC (T-C): 0.85; $p < .05$

Treatment and control means not provided; significance test not provided; cannot assess main effect on condition.

Differences between attributional styles

S=stable; US=unstable; C=controllable; UC=uncontrollable

Change in motivation (POST-PRE): 3 items. Time 1 (alpha = .98), Time 2 (alpha = .73)

S-C (Treatment): 17.69; $p < .01$

S-UC (Treatment): 17.24; $p < .01$

US-C (Treatment): -2.21; ns

US-UC (Treatment): 11.35; $p < .01$

Control group: each comparison resulted in an increase in motivation; gains were significant at $p < .01$, except for US-C.

Guilt: 1 item, reliability measure not provided.

S-C (Treatment): .88; ns

S-UC (Treatment): 2.84; $p < .01$

US-C (Treatment): .37; ns

US-UC (Treatment): .93; ns

Control group: each comparison resulted in an increase in guilt; gains were significant at $p < .01$.

Hope: 1 item, reliability measure not provided.

S-C (Treatment): 4.25; $p < .01$

S-UC (Treatment): 4.51; $p < .01$

US-C (Treatment): -.67; ns

US-UC (Treatment): 3.64; $p < .01$

Control group: each comparison resulted in an increase in hope; gains were significant at $p < .01$, except for US-C.

GRE items: Average number of sample GRE questions answered correctly, averaged over Weeks 1 and 2.

Main effect (Treatment-Control): $4.18 - 3.50 = .68$; $p < .05$

College dropout: Percent no longer enrolled as of the second semester of the sophomore year.

Main effect (Treatment-Control): $5 - 25 = -20$; $p = .059$. The GPA information reduced the percentage of subjects who left Duke by 80%.

GPA: Average increase in GPA between the second semester of the sophomore year (1 year after treatment) and the first semester of the freshman year (pre-treatment). These figures do not include those who dropped out by the second semester of their sophomore year.

Treatment (GPA2-GPA1): $2.92 - 2.58 = .11$

Control (GPA2-GPA1): $2.82 - 2.87 = -0.05$

Treatment vs. control; $F(1,26) = 4.27$; $p < .05$

Expectations about future performance -- short term: (participants' predicted GPA for the current semester - predicted GPA for the following semester = to measure whether participants' think they will improve)

Main effect, ns: Means are not provided.

Expectations about future performance -- long term: (participants' predicted GPA for the current semester - predicted GPA at graduation = to measure whether participants' think they will improve)

Main effect (Treatment - Control): $0.45 - 0.24 = 0.21$; $p < .05$.

Full-time enrollment -- both semesters first year in college

Treatment group (social belonging + growth mindset) = 41%; growth mindset only = 36%, social belonging only = 45%; Control group = 32%.

Growth mindset only condition showed poorer outcomes compared with the two social belonging conditions ($p=.046$) and did not differ from active controls ($p>.50$). The two social belonging interventions did not differ on the basis of whether students also received a growth mindset component ($p=.26$). Both social belonging interventions combined differed from the active control ($p=.007$).

The intervention increased full-time enrollment among disadvantaged students over the next academic year by 34%, $p=.004$.

Social and academic integration: (6-month follow up)

Participants who received a social belonging intervention were more likely than students who did not to report that they had used academic support services, had joined an extracurricular group, and had chosen to live on campus, $p=0.008$, $d=0.78$.

First-year full-time enrollment

Randomized group:

Disadvantaged students in the control condition were 10 percentage points less likely to complete the first-year full-time enrolled in both terms compared with advantaged students (69% versus 79%; $p<0.001$). The treatment reduces this inequality by 40%, increasing the percentage of full-time enrolled disadvantaged students to 73%; $p=0.024$. Interventions were equally effective.

No effect of interventions among advantaged students.

Social and academic integration: (6-month follow up)

Treatment decreased the percent of disadvantaged students identified as “at risk” on this measure to 7%, $p=0.014$, eliminating the group difference.

16 achievement outcomes

8 GPA: 6 of 8 studies report... (0.39 to 0.740)

Grade: 5 of 6... (0.37 to 0.77)

Test performance 1/1 0.96

Intervention Study Table

Competency	Reference	Intervention & Population
Intrinsic goals/values	Hamm et al. (2014)	see Hamm et al. (2014)
Intrinsic goals/values	Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., Lacante, M. (2004). Less is something more: Goal content matters. <i>Journal of Educational Psychology</i> , 96, 755-764.	Random assignment: n=245 1st year students enrolled at a Belgian teacher training college. 3 types of conditions regarding goal content for recycling, intervention embedded in instructions: future intrinsic goal - focused on contributing to the community. future extrinsic goal - focused on receiving financial benefits for recycling double goal condition - focused on both

Intrinsic goals/values

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy support. *Journal of Personality and Social Psychology*, 87, 246–260

Study 1

N=200, first-year Belgian college students studying to become preschool teachers.

Instruction sheets with different experimental manipulations were randomly distributed within each class.

Target activity: read a text about recycling.

Intrinsic goal conditions: instructions stated that “reading the text could help you know how to teach your future toddlers that they can do something to help the environment,” which was intended to represent the intrinsic goal of contributing to the community.

Extrinsic goal conditions: instructions stated that “reading the text could teach you how to save money by reusing materials,” which was intended to represent the extrinsic goal of attaining monetary benefit.

Autonomy-supportive climate vs. Controlling learning climate – these two manipulations were also contained within the instruction sheet by differences in the wording of seven phrases.

After reading the text, participants completed a series of questionnaires. A week later, students were placed in randomly formed groups of 6 members to discuss the issue of recycling.

All students were graded individually by their teachers regarding the quality of their personal contribution to the group discussion.

Outcome & Impact: Achievement

see Hamm et al. (2014)

Test performance: performance on the written test of comprehension and contribution to the collective presentation, graded by instructor on a scale from 1-10.
Future intrinsic (m=6.58), future extrinsic (m=5.57), double goal (m=6.07)
future intrinsic versus double goal: $t(243)=2.51$, $p<.05$, $d=0.39$
future extrinsic versus double goal: $t(243)=2.29$, $p<.05$

Outcome & Impact: Competency

Intrinsic motivation: measured using the MAACH Intrinsic Motivation scale (Hall et al., 2007), which was adapted from Pintrich, Smith, and McKeachie (1989). 5-items; $\alpha=.72$.
Main effect (T-C): $18.03-16.88 = 1.15$; p-value not provided.
Differences between treatment and control for separate groups (failure-acceptors, failure-ruminators, achievement-oriented, over-striver) available.

Experienced stress when reading text: 2 items taken from the Intrinsic Motivation Inventory (Ryan, 1982).
Future intrinsic (m=2.66), future extrinsic (m=4.04), double (m=3.40); $F=16.30^{***}$
future intrinsic versus double goal: $t(243)=-2.40$, $p<.05$
future extrinsic versus double goal: $t(243)=-2.09$, $p<.05$

Achievement goals

Performance avoidance orientation: 4-items, $\alpha=.93$

Future intrinsic (m=2.12), future extrinsic (m=2.29), double (m=2.23); $F=1.28$

Performance approach orientation: 4-items, $\alpha=.96$

Future intrinsic (m=2.28), future extrinsic (m=3.20), double (m=2.87); $F=48.60^{**}$

future intrinsic versus double goal: $t(243)=-4.41$, $p<.01$

future extrinsic versus double goal: $t(243)=-2.78$, $p<.01$

Mastery orientation: 5-items, $\alpha=.87$

Future intrinsic (m=3.20), future extrinsic (m=2.26), double (m=2.70); $F=50.28^{**}$

future intrinsic versus double goal: $t(243)=4.15$, $p<.01$

future extrinsic versus double goal: $t(243)=3.73$, $p<.01$

Free-choice persistence: measured by library visits to obtain information about recycling and visiting a firm that recycles.

Two activities

Future intrinsic (72%), future extrinsic (40%), double (55%)

Test performance (post): measured by student performance on a written test of comprehension and student contribution to the group discussion (graded by instructors). The correlation between the two scores = .92.

Autonomy-supportive context

Intrinsic - extrinsic group: 7.38-6.04; $F(1,196)=53.87$, $p<.001$, $\eta^2=.21$, $d=1.25$

Controlling context

Intrinsic-extrinsic: 5.75-5.14, $d=0.71$

Persistence (post): an electronic swipe card recorded who went to the library during the days following the learning session on recycling (to learn more about recycling and ecology).

Autonomy-supportive context

Intrinsic - extrinsic group: 1.94-1.16; $F(1,196)=27.61$, $p<.001$, $\eta^2=.12$

Controlling context

Intrinsic-extrinsic: 0.94-0.48

Self-reports of superficial processing and deep processing (post): 4 items. Alphas for the scales were .84 and .80, respectively.

Superficial processing

Autonomy-supportive context

Intrinsic - extrinsic group: 1.62-2.48; $F(1,196)=80.33$, $p<.001$, $\eta^2=.29$

Controlling context

Intrinsic-extrinsic: 2.53-2.89

Deep processing

Autonomy-supportive context

Intrinsic - extrinsic group: 3.42-2.65; $F(1,196)=140.12$, $p<.001$, $\eta^2=.42$

Controlling context

Intrinsic-extrinsic: 2.75-2.24

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Positive future self	Harrison, L.A., Stevens, A.M., Coakley, C.A. (2006). The consequences of stereotype threat on the academic performance of white and non-white lower income college students. <i>Social Psychology of Education, 9</i> , 341-357.	<p>Random assignment; N= 260 students, northern California university, undergraduate psychology course (205 women)</p> <p><u>Intervention</u></p> <p>Diagnostic condition: instructions stated that middle and upper income students consistently performed better than lower income students on standardized tests. The instructions also stated that this test would provide a valid assessment of abilities and limitations, and that participants' performance would be compared to other students from across the nation in order to determine why lower income students generally perform worse than higher income students.</p> <p>Non-diagnostic condition: instructions stated that the purpose was to understand the psychological factors involved in completing standardized tests. The participants were further informed that their performance would not be graded or used to evaluate their math and verbal abilities.</p> <p>Participants completed a math and verbal test.</p> <p>Participants completed questionnaires (outcome measures and demographic information).</p>	ANOVA: condition (diagnostic vs. non-diagnostic) x socioeconomic status (lower income vs. middle income vs. upper income) x participant race (White vs. non-White)

Positive future self

Landau, M. J., Oyserman, D., Keefe, L. A., & Smith, G. C. (2014). The college journey and academic engagement: How metaphor use enhances identity-based motivation. *Journal of Personality and Social Psychology, 106*, 679-698.

Random assignment: Participants recruited from an introductory psychology course.
Study 1
92 KU freshmen, (54% female, 82% White) random assignment to: journey-framed academic possible identity (PI), nonmetaphoric academic PI, container-framed academic PI, and nonmetaphoric social PI.

Baseline equivalence established.

Academic intention (self-report):
ANOVA

Academic intention (behavioral):
Chi-square test

Participants completed a packet, the first three pages of which constitute the priming manipulation.
Academic intention measure collected.

Positive future self

See row above.

Study 2
82 KU freshmen, random assignment to: journey-framed academic PI, container-framed academic PI, journey-framed social PI, journey-framed past academic achievement.

One-way ANOVA

Materials same as study 1: Participants completed numerical addition problems designed to be relatively simple, thereby ensuring that academic effort could be measured as percentage of problems solved.

Positive future self

See row above.

Study 3
90 KU undergraduates, random assignment to: journey framed academic PI or container-framed academic PI

Poisson regression analysis to regress scores (hours allotted to each activity) onto priming condition.

One week before final exams participants were asked to make a study/nonacademic schedule for the upcoming weekend.

Positive future self

Schwartz, S.J., Kurtines, W.M., & Montgomery, M.J. (2005). Facilitating identity exploration processes in emerging adults: An exploratory study. *Journal of Adolescent Research, 20*, 309-345.

Random assignment (after pretest)
N = 114 (98 females, 16 males), undergraduate psychology course; 79% completed all phases of the intervention.
Intervention: Workshop participants met weekly for 6 to 8 weeks.
CF (cognitively focused) condition (n=45): each participant brought an identity-related life choice or dilemma to the workshop. Life dilemmas were analyzed and groups discussed problem resolutions.
EF (emotionally focused) condition (n=36): Each participant brought goals to the workshop. For each goal, the participant, with help from fellow group members, followed a series of steps.
No-intervention (CC): (n=32)
Pretest and posttest (10 week interval):
Posttest assessments for the CF and EF conditions were administered during the last intervention session.

RMANOVA

Outcome & Impact: Achievement

Math and verbal performance: An index = correct math items/number of math items attempted.

Math

Main effect, condition: Not reported.

Differences by groups

Low-income (Treatment-Control): 0.27-0.44=-0.17; $p<.001$

Middle-income (Treatment-Control): 0.41-0.38; $p=0.76$

Upper-income (Treatment-Control): 0.71-0.40=0.31; $p=.003$

Verbal performance

Main effect, condition: Not reported.

Differences by groups

Low-income (Treatment-Control): 0.51-0.60; $p=0.03$

Middle-income (Treatment-Control): 0.60-0.60; $p=0.99$

Upper-income (Treatment-Control): 0.69-0.57; $p<.001$

Outcome & Impact: Competency

Domain Identification Measure (Smith & White, 2001): 20-item; assessed how closely participants identify with school-related subjects.

English Identification index, $\alpha=0.88$

Main effect (Treatment-Control): 3.57-3.88; $F(1,259)=8.68$; $p=.004$

Differences by groups

Low-income (Treatment-Control): 3.07-3.89; $p<.001$

Middle-income (Treatment-Control): 3.65-3.92; $p=0.13$

Upper-income (Treatment-Control): 3.97-3.84; $p=.44$

Math Identification index, $\alpha=0.88$

Main effect: Condition means, significance level not provided.

Differences by groups

Low-income (Treatment-Control): 2.49-3.06; $p=0.02$

Middle-income (Treatment-Control): 2.87-2.66; $p=0.20$

Upper-income (Treatment-Control): 2.91-2.89; $p=0.73$

Test Anxiety Scale (Sarason, 1978): 37-item; (Cronbach's $\alpha=0.92$)

Main effect (Treatment-Control): 4.46-4.06; $F(1,259)=8.94$; $p=0.003$

Differences by groups

Low-income (Treatment-Control): 5.32-4.18; $p<.001$

Middle-income (Treatment-Control): 4.11-3.91; $p=0.20$

Upper-income (Treatment-Control): 3.95-4.08; $p=0.66$

State Self-Esteem Scale (Heatheron & Polivy, 1991): 20 items. $\alpha=0.83$. 6 of the items were combined to form an Appearance Self-Esteem index which measured self-esteem related to participants' physical appearance ($\alpha=0.78$). 7 of the items were combined to form a Social Self-Esteem index, ($\alpha=0.81$).

Main effect, ns: Condition means and significance level not reported.

NA

Academic intention scores (self-report): responses measure student interest in attending an academic workshop.

Pairwise comparisons:

Journey framed academic PI scores (4.82) > nonmetaphoric academic PI (4.03); $p = .05$

Journey framed academic PI scores > Container-framed academic PI (3.82); $p = .01$

Journey framed academic PI scores > Nonmetaphoric social PI (3.68); $p = .005$

No other comparisons reached significance.

Academic intention (behavioral): measured by the number of participants who took information related to study guides.

Approximately half the participants primed with a journey-framed academic PI took the information, whereas only 13%–17% of participants in the other conditions did so, $p = .02$.

NA

Academic engagement: measured by effort on academic task (solvable mental math problems). Outcome reported as a percentage of problems solved.

Pairwise comparisons:

Journey-framed academic PI (50.8) > container-framed academic PI (38.9), $p = .02$

Journey-framed academic PI (50.8) > journey-framed social PI (39.11%), $p = .02$

Journey-framed academic PI (50.8) > journey-framed past academic achievement (35.11%), $p = .002$

No other pairwise comparison reached statistical significance.

Academic effort: measured with final exam score (1 week after treatment).

Main effect, $p = .05$

Journey-framed academic PI: $M = 92.08$, $SD = 4.73$

Container-framed academic PI: $M = 88.6$, $SD = 7.34$

$d = 0.56$

Academic intention (allotted study time): 3 composite scores were created by summing the total number of hours participants allotted to each of the three activities (coursework, socializing with others, or solitary leisure time).

Main effect, condition: $b = .21$, $p = .02$. For each hour that container-primed participants planned to dedicate to coursework, journey-primed participants planned to dedicate 1.23 hours.

NA

CPSS Generation of alternatives: measured using the Critical Problem Solving Scale: (CPSS; Berman et al., 2001)

CF condition (post-pre): 3.8-3.3; $p < .07$

EF condition (post-pre): 2.9-3.1; ns

CC condition (post-pre): 2.7-2.9; ns

CPSS Decentering negative alternatives:

CF condition (post-pre): 1.6-1.3; ns

EF condition (post-pre): 1.2-1.3; ns

CC condition (post-pre): 1.1-1.7; $p < .02$

Self-discovery identity processes

Personal expressiveness, flow, and self-actualization: The Personal Strivings Inventory (PSI; Waterman, 1998). The PSI requires respondents to list 10 goal strivings that they would use to describe themselves to another person. Personal expressiveness scores $\alpha = .92$; flow $\alpha = .75$.

Personal expressiveness results provided only ~

CF condition (post-pre): change ns

EF condition (post-pre): positive; $t(26)=1.84$; $p < .08$

CC condition (post-pre): change ns

Abstract

This research examined whether socioeconomic stereotypes produce stereotype threat among lower, middle, or upper income college students who are either White or non-White. Before completing an academic test, participants were either told that the purpose of the research was to understand why lower income students generally perform worse on academic tests or to examine problem-solving processes. Results showed that lower income students exposed to stereotype threat experienced greater test anxiety and performed worse on the academic test than their middle income and higher income counterparts. However, lower income students who experienced stereotype threat exerted as much effort on the test as lower income students who did not experience stereotype threat. Nonetheless, they were less likely to identify with school-related subjects. Stereotype threat and reduced performance did not influence lower income students' self-esteem. Participant race did not influence these findings. The research is discussed in light of cognitive dissonance theory.

People commonly talk about goals metaphorically as destinations on physical paths extending into the future or as contained in future periods. Does metaphor use have consequences for people's motivation to engage in goal-directed action? Three experiments examine the effect of metaphor use on students' engagement with their academic possible identity: their image of themselves as academically successful graduates. Students primed to frame their academic possible identity using the goal-as-journey metaphor reported stronger academic intention, and displayed increased effort on academic tasks, compared to students primed with a nonacademic possible identity, a different metaphoric framing (goal-as-contained identity), and past academic achievements (Studies 1–2). This motivating effect persisted up to a week later as reflected in final exam performance (Study 3). Four experiments examine the cognitive processes underlying this effect. Conceptual metaphor theory posits that an accessible metaphor transfers knowledge between dissimilar concepts. As predicted in this paradigm, a journey-metaphoric framing of a possible academic identity transferred confidence in the procedure, or action sequence, required to attain that possible identity, which in turn led participants to perceive that possible identity as more connected to their current identity (Study 4). Drawing on identity-based motivation theory, we hypothesized that strengthened current/possible identity connection would mediate the journey framing's motivating effect. This mediational process predicted students' academic engagement (Study 5) and an online sample's engagement with possible identities in other domains (Study 6). Also as predicted, journey framing increased academic engagement particularly among students reporting a weak connection to their academic possible identity (Study 7).

SEE ROW ABOVE.

SEEE ROW ABOVE.

This article, using a controlled design, reports the results of an exploratory study to investigate the impact of two types of intervention strategies (cognitively vs. emotionally focused) on two types of identity processes (self-construction and self-discovery) in a culturally diverse sample of 90 emerging adult university students. A quasi experimental design was used to evaluate the relative impact of the cognitively focused self-construction and emotionally focused self-discovery strategies. Quantitative and qualitative results indicated that cognitively focused intervention strategies were most efficacious in affecting self-constructive identity processes, whereas emotionally focused intervention strategies were most efficacious in affecting self-discovery identity processes. This pattern of differential effects suggests that programs intended to broadly affect identity development should include both types of intervention strategies and should target both self-constructive and self-discovery processes.

Intervention Study Table

Competency	Reference	Intervention & Population	Evaluation
Prosocial or transcendent goals/values	Yaeger, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D' Mello, S., Spitzer, B. J., & Duckworth, A. (2014). Boring but important: A self transcendent purpose for learning fosters academic self-regulation. <i>Journal of Personality and Social Psychology</i> , 107, 559-580	<p><u>Study 3</u></p> <p>Random assignment: n=89, undergraduate psychology course; 71 (80%; 78% were women) completed the intervention materials and provided any data on dependent measures.</p> <p>End of term (prior to final exam): students completed the online purpose intervention or control and then participated in an online exam review activity (answering over 100 multiple-choice questions, instructions guided students on how to actually learn from the questions). During the review activity, the survey software tracked students' behavior (e.g., time spent on each practice problem), and this constituted the primary dependent measure.</p> <p>Purpose intervention: Students review self-transcendent purpose materials -- participants saw summary statistics, read messages from former psych students and wrote essays about how their lives were different now compared to when they were in high school -- all materials related to reasons for learning psychology, learning to gain skills and for prosocial ends.</p> <p>Control: Same materials but completely devoid of the focus on motives for learning.</p>	<p>Baseline equivalence addressed: Treatment versus control students did not differ in terms of the number of questions students completed ($p = .38$).</p> <p>All analyses are from regressions that control for prior test performance.</p>

Prosocial or transcendent goals/values

See row above.

Study 4

N = 429, introductory psychology at the University of Texas at Austin (48% male, 52% were female).

Intervention materials

Purpose and control conditions: see Study 3.

Self-oriented control condition: Similar to the purpose manipulation in nearly every way except for the elimination of self-transcendent prompts in the stimuli. It was future oriented, goal-directed (self-interested), and highly focused on learning and on developing skills. This group was designed to rule out the alternative explanation that any manipulation involving reading and writing about intrinsic personal motives for learning would be sufficient to lead to greater self-regulation on an uninteresting task.

Students proceed to the diligence task.

Diligence task: measures academic self-regulation. This task involves the choice of completing boring math problems (single-digit subtraction) or consuming captivating but time-wasting media (watching videos or playing video games). Problems divided into three blocks. Block 1 and 2 involve choices; block 2 more boring than block 1. Participants were told that successfully completing the tasks could possibly help them sharpen their math skills and stay prepared for their future careers. Participants were presented with summaries of actual scientific studies showing that increasingly as people rely on technology to do simple tasks, their grasp of basic skills can atrophy.

Baseline equivalence: There were no differences across conditions in terms of the word count on the open-ended essay prompts or ratings of boredom (at the end of the diligence task).

OLS regression analysis comparing difference scores (Block 2 problems solved minus Block 1 problems solved, by condition).

NA

Outcome & Impact: Achievement

Outcome & Impact: Competency

DV: Time spent on each review question (measures behavior that could signify an intention to truly learn from review materials)

Average time per question per person = number of milliseconds that each question was displayed before students submitted a correct answer. These values were summed and then divided by the number of questions attempted.

Transformed z score (mean of zero and a standard deviation of 1):

Main effect, $p = .038$

Control M = -0.43, SD = 1.11

Purpose M = 0.13, SD = 0.93

In the untransformed data, this corresponded to spending roughly twice as much time on each question (Control M = 25s vs. Treatment M = 49s per question).

NA

DV: Diligence task (Block 2 problems solved minus Block 1 problems solved (change score), by condition)

Main effect:

~decline experienced by the purpose condition was significantly smaller than that experienced by participants in the control condition, $b = 12.45$, $p = .03$, $d = 0.28$ ~self-oriented control

group versus control: NS

~self-oriented compared to purpose: $p = .03$, $d = 0.26$, showing that the purpose manipulation was significantly better at warding off a decline in math problems solved across blocks compared to the highly similar self-oriented manipulation.

Main effect for block: by the second block, there was a significant effect of the purpose manipulation compared to the control, $p < .005$, $d = 0.32$, therefore the purpose condition participants completed 36% more boring math problems compared to the control group.

Abstract

Many important learning tasks feel uninteresting and tedious to learners. This research proposed that promoting a prosocial, self-transcendent purpose could improve academic self-regulation on such tasks. This proposal was supported in 4 studies with over 2,000 adolescents and young adults. Study 1 documented a correlation between a self-transcendent purpose for learning and self-reported trait measures of academic self-regulation. Those with more of a purpose for learning also persisted longer on a boring task rather than giving in to a tempting alternative and, many months later, were less likely to drop out of college. Study 2 addressed causality. It showed that a brief, one-time psychological intervention promoting a self-transcendent purpose for learning could improve high school science and math grade point average (GPA) over several months. Studies 3 and 4 were short-term experiments that explored possible mechanisms. They showed that the self-transcendent purpose manipulation could increase deeper learning behavior on tedious test review materials (Study 3), and sustain self-regulation over the course of an increasingly boring task (Study 4). More self-oriented motives for learning—such as the desire to have an interesting or enjoyable career—did not, on their own, consistently produce these benefits (Studies 1 and 4).

SEE ROW ABOVE

Intervention Study Table

Competency	Reference	Intervention & Population
Sense of belonging	Cohen, G. L., & Garcia, J. (2005). I am us: Negative stereotypes as collective threats. <i>Journal of Personality and Social Psychology</i> , 89, 566– 582.	Random assignment: 63 Black undergraduates at Yale University (44 women, 19 men) 2 conditions: threat condition or no-threat condition. Threat condition: Participants were placed into a threat inducing situation where they took a standardized test purportedly testing their ability. No threat: identical to that of the threat condition except the experimenter did not mention ability. Participants were told to expend their best effort. Participants then completed the dependent measure questionnaire assessing state self-esteem, stereotype distancing, and racial stereotype activation.
Sense of belonging	Folger, W.A., Carter, J.A., & Chase, P.B. (2004). Supporting first generation college freshmen with small group intervention. <i>College Student Journal</i> , 38, 472-476	Fall-semester, first-generation college freshmen. Participants were selected based on their responses to the College Student Inventory (CSI); students low on academic motivation, social motivation, and general coping measures were considered. A random sample of 200 students was taken from a list of those expressing interest in the Freshmen Empowerment Program (FEP). 53 were randomly selected and placed in FEP groups (14 males and 39 females). The control group (n=53) was drawn from the 147 students remaining from the original random sample of 200. Intervention: Groups met for 6 weeks. The groups were facilitated by FEP staff. Topics discussed included academics, college resources, adjustment, relationships, and other issues of concern to the students.

Sense of belonging

Hausmann, L., Ye, R., Schofield, J., Woods, R. (2009). Sense of belonging and persistence in white and african american first-year students. *Research in Higher Education*, 50, 649-669.

Random assignment: large, public mid-atlantic university. African American students, n=254; white students, n=291. Participants received three surveys throughout their first year of college. Participants were randomly assigned after the first survey.
Enhanced sense of belonging group (ESB): participants received several written communications from university administrators emphasizing that they were valued members of the community, and free university apparel.
One control group received similar apparel without university logos (GC), and the other control group received nothing (NGC).

Sense of belonging

Stephens, N., Hamedani, M., & Destin, M. (2014). Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition. *Psychological Science*, 25, 943-953.

Study 1

Random assignment: incoming first year students at a private university (N=147; 81 CG, 66 FG)

Intervention takes place at the start of college year.
Difference education panel (Treatment): participants sit in on a one hour-long student discussion panel about college adjustment. Panelists' responses across conditions highlighted how they adjusted to and found success in college. The key difference between the two conditions was whether the panelists' stories highlighted how their social class backgrounds mattered for their college experience. The study also included a campus-wide control group of all other CG and FG nonparticipants in the same academic cohort as the intervention participants (n=1697).

Participants completed a short survey and created a short video testimonial that would allegedly be used to share the panel's main teachings with next year's students.

Sense of belonging

Walton G.M. & Cohen, G. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, 92, 82-96.

Study 2 (end of freshmen year)

Random assignment

Stage 1: 25 Black & 30 white first year students enrolled in an intro psychology course.

Students complete a 5-minute questionnaire -

1. Academic identification survey
2. Report on pre-manipulation covariates (e.g. the average number of hours studied)
3. Sensitivity to Race-Based Rejection Questionnaire

Stage 2: 3-10 days after stage 1; 18 Black and 19 white students -- 12 men and 25 women

Intervention

Treatment: read survey responses from upperclassmen indicating that most upperclassmen at their school worried about being accepted during their first year, but that these concerns lessened with time. Students then wrote an essay and gave a videotaped speech indicating how they, too, had worried about being accepted but that these concerns lessened with time.

Control: informed that students' social and political beliefs tend to become more sophisticated over time, and wrote essays to support this position.

Post intervention measures and student demographic information collected.

Stage 3:

Post intervention (each of the 7 days following the intervention) students reported how much adversity they had experienced that day and their sense of fit in college.

Sense of belonging

Walton, G.M., & Cohen, G.L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science, 331*, 1447-1451.

Random assignment

2 cohorts: African-American (N = 49) and European-American (N = 43) students, selective college
2 groups: Belonging-treatment condition or control

Plus, an additional campus-wide control group.

Intervention:

Participants were provided with the results of a survey (by upperclassmen) indicating that most students had worried about whether they belonged in college during the first year but grew confident in their belonging with time. Participants were asked to write an essay describing how their own experiences in college echoed the experiences summarized in the survey. They then turned their essay into a speech. In the control condition, the procedure was the same but the survey addressed topics unrelated to belonging.

Completed daily surveys in the first week after the intervention.

End of college survey, 3 years later (completion rate 78.26%).

Sense of belonging

Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. *Journal of Personality and Social Psychology, 102*, 513–532.

Study 1

Random assignment: 72 (43 females and 29 males) European American undergraduates; students who scored at or above the midpoint on a prestudy math identification measure. Random assignment to skill promotive context condition or to the relational context condition. In addition, one-third of women were randomly assigned to the no report condition.

“Context” conditions: students read a fabricated report written by a recent graduate of the math department. In both conditions, the author had qualities that made him or her a positive role model. The author’s gender also matched participants’ gender.

The reports in the two context conditions were parallel and varied only in their characterization of the social climate of the math department. In the skill-promotive context condition, the report portrayed the department as providing students opportunities to develop their personal ability and interests in math. In the relational context condition, the report portrayed opportunities for positive, collaborative social interactions. No report condition (women only): read no report and proceeded immediately to the dependent measures.

Participants completed the dependent measures -- first, a puzzle and then participants in the context conditions were tested on their recall of the report.

Sense of belonging

Walton, G.M., Logel, C., Peach, J.M., Spencer, S.J., Zanna, M.P. (2015). Two brief interventions to mitigate a “chilly climate” transform women’s experience, relationships, and achievement in engineering. *Journal of Educational Psychology, 107*, 468–485.

Random assignment: First-year engineering students, the University of Waterloo; N=228 (92 women and 136 men)

Intervention: Students listened to audio recordings of senior engineering students (and viewed each student’s quotation, name, year, and major, photographs of campus engineering buildings).

3 groups:

Social-belonging: the materials emphasized that both men and women worry about their social belonging at first in engineering but that these concerns dissipate with time and eventually most students come to feel at home.

Affirmation-training: emphasized that upper year students, both men and women, learn to incorporate broader aspects of their self-identity in their daily lives to manage stress and find “balance” in engineering.

Study skills control condition: materials addressed an unrelated topic, study skills.

Following audio recordings, students completed 2 writing activities (saying is believing exercises) meant to internalize the message.

Daily adversities: students completed surveys every other evening (online) over the next 12 days. Each survey assessed students’ construals of daily adversities and stressors as well as daily functioning (i.e., daily self-esteem).

Sense of belonging
**DUPLICATE: see growth
mindset

Yeager, D., Walton, G., Brady, S., Akcinar, E., Paunesku, D., Keane, D., Ritter, G... Dweck, C. (2016). Teaching a lay theory before college narrows achievement gaps at scale. *Psychological and Cognitive Sciences*,

Random assignment: Web-based intervention, taking approximately 25 to 35 minutes to complete. Participants completed single-session, online, intervention or control materials **prior to matriculation** (N>9,500).
Study 1
Social belonging: students read results of a survey conducted with older students and conveyed two key ideas, 1. in the transition to college most students worry about whether they belong and 2. that these worries subside with time when students take active steps to create social ties to other college students. After, participants engage in a writing exercise. Growth mindset: Participants read an article summarizing scientific research supporting the idea that intelligence is malleable and can be developed with effort. Participants were predominantly African American or first-generation students.

Sense of belonging
**DUPLICATE: see growth
mindset

See row above.

Study 2
Extended study 1 with incoming students at a 4-year public institution, instead of outgoing students at a high school. Also, the interventions came from the university instead of the high school.
N=7335

Sense of belonging

See row above.

Study 3

Extended study 2's results by testing interventions at a private university (n=1592) and by testing social belongingness and two other interventions, not growth mindset interventions.

Outcome & Impact: Achievement

NA

NA

GPA 1.023

GPA

First semester:

Main effect (Treatment-Control): 2.26-1.51; $p=0.0002$

Second semester:

Main effect (Treatment-Control): 2.70-1.70; $p=0.0001$

Cumulative GPA:

Main effect (Treatment-Control): 2.56-1.64; $p=0.0001$

NS

See figures 3 & 4: no direct impacts on achievement outcomes.

GPA 0.49

End of year GPA

Main effect, intervention condition, $F(1,125) = 7.75$; $p = .006$

Control (FG-CG): 3.16-3.46; $p=.01$

Treatment (FG-CG): 3.40-3.51; $p=.95$

Differences by groups

FG students (treatment-control): $p=.0004$; $d=0.70$

FG students versus campus wide control: $p=.02$; $d=0.49$

CG students (treatment-control): $p=.66$; $d=0.66$

CG versus campus wide control: $F(1, 1726)=2.69$; $p=.10$

GPA 1.10

Index of challenge-seeking in course selection: number of difficult but educational courses each participant selected divided by the total number of courses he or she selected.

Main effect favors treatment group in full sample, $p=.003$, $d=.95$

Differences by groups

Black students experience treatment effect, $p=.014$, $d=1.11$

White students, no differences between conditions, $p=.068$, $d=.77$

Achievement behavior: attending review sessions, making office hour appointments, or study group meetings; how many e-mail queries they had sent to professors, questions they had asked in class, and hours they had studied.

Main effect: condition means and significance level not provided.

Differences by groups

Black (treatment-control): $.30-(-.30)$; $p=.009$; $d=1.47$

White (treatment-control): $-.20-.05$; ns

GPA: the difference between students' actual post-GPA and expected GPA based off of prior grades; a change score (cs).

Main effect: condition means and significance level not provided.

Differences by group

Black (treatment cs-control cs): $0.12-(-0.22)$; $p=0.22$; $d=1.10$

White students (treatment cs - control cs): $-0.14-0.23$; $p=.050$, $d=.88$.

GPA significant

Change in GPA: measured by mean postintervention GPA(sophomore through senior years)
minus mean preintervention GPA (fall term, first year)

African Americans: treatment versus control, $B = 0.30$, $P = 0.014$

European Americans: no difference between groups

3-year post-intervention GPA:

Treatment (minority gap): .14 grade points

Control (minority gap): .29 grade points

The intervention closed the minority gap by 52%.

NA

NA

GPA 1.07

First-year cumulative engineering GPA (scale of 0 to 100)

Women in male dominated majors

Social belonging > control: B = 11.66, p = .017, d = 1.07

Affirmation > control: B = 11.13, p = .023, d = 1.02

Social belong versus affirmation: ns; social belonging = 77; affirmation = 76

Women in gender-diverse majors

Social belonging > control: ns; social belonging = 75; control = 77

Affirmation < control: B = -7.56, p = .043, d = -0.69

Social belong versus affirmation: ns; social belonging = 75; affirmation = 74

Enrollment

Full-time enrollment -- both semesters first year in college

Treatment group (social belonging + growth mindset) = 41%; growth mindset only = 36%, social belonging only = 45%; Control group = 32%.

Growth mindset only condition showed poorer outcomes compared with the two social belonging conditions ($p=.046$) and did not differ from active controls ($p>.50$). The two social belonging interventions did not differ on the basis of whether students also received a growth mindset component ($p=.26$). Both social belonging interventions combined differed from the active control ($p=.007$).

The intervention increased full-time enrollment among disadvantaged students over the next academic year by 34%, $p=.004$.

Growth mindset: Full-time enrollment - both semesters first year in college

Main effect, ns. Treatment and control group means not provided.

Enrollment

First-year full-time enrollment

Randomized group:

Disadvantaged students in the control condition were 10 percentage points less likely to complete the first-year full-time enrolled in both terms compared with advantaged students (69% versus 79%; $p<0.001$). The treatment reduces this inequality by 40%, increasing the percentage of full-time enrolled disadvantaged students to 73%; $p=0.024$. Interventions were equally effective.

No effect of interventions among advantaged students.

GPA 0.25

First-year GPA

Control: disadvantaged students ($m=3.33$) earned lower GPAs than advantaged students ($m=3.62$); $t(1591) = 6.99$, $p < .001$, $d = .80$

Treatment: raised disadvantaged students gpa by .09 grade points to 3.42, $t(1591) = 2.16$, $p = .031$, $d = .25$

Interventions were equally effective.

No intervention effect for advantaged students.

9 achievement outcomes

GPA: 6 of 7...0.25 - 1.10

Outcome & Impact: Competency

Self-esteem: 5 items, (Heatherton & Polivy, 1991), $\alpha = .75$.

Main effect (treatment -- threat condition - control): 27.12-30.53, $F=9.43$, $p < .01$

Stereotype distancing: Students rate the extent to which they enjoy various activities, characterize themselves as having various traits, and like various types of music and sports (Steele & Aronson, 1995). Some of the activities and traits were associated with the stereotypic image of African Americans.

Main effect (treatment-control): 58-61.75, $F=4.18$, $p < .05$: participants characterized themselves less stereotypically under threat than under no threat.

Racial stereotype activation: Participants completed a word-fragment completion exercise (Steele & Aronson, 1995).

Main effect (treatment-control): 2.00-2.57, $F=3.70$, ns

Perceived exposure to evaluative scrutiny: Participants indicated the extent to which they felt that their verbal abilities were being evaluated in the study.

Main effect (treatment-control): ns

NA

Sense of belonging (controlling for initial sense of belonging): post scores did not significantly differ between white and African American students, $z=-0.08$, $p>.05$.

Differences by groups

White students

ESB versus NGC: $z=2.64$, $p>.01$

GC versus NGC: $z=1.97$, $p<.05$

ESB versus GC: $z=.61$, $p>.05$

African American students

no differences among groups

Perceived social and academic integration

Perceived cohesion

Goal commitment

Intentions to persist

Institutional commitment

Tendency to seek college resources: participants were asked how often they e-mailed or met with professors, or sought extra help

Main effect: condition means and significance level not provided.

Control (FG-CG): 1.45-2.18; $p = .003$

Treatment (FG-CG): 1.89-1.80; $p=.53$

Differences by groups

FG students (treatment-control): $p = .087$, $d = 0.43$

CG students (treatment-control): $F(1,69)=1.38$; $p=.24$

Psychosocial measures:

Psychological distress (treatment-control): 2.24-2.49; $F(1,126)=3.65$; ns

Social-identity threat (treatment-control): 2.80-3.23; $F(1,126)=3.75$; ns

Psychological well-being (treatment-control): 3.40-3.16; $F(1,126)=4.73$; $p<.05$

Social fit (treatment-control): 5.63-5.13; $F(1,126)=9.45$; $p<.01$

Perceived preparation (treatment-control): 5.93-5.60; $F(1,126)=3.40$; ns

Academic identification (treatment-control): 6.41-6.06; $F(1,126)=5.12$; $p<.05$

Social support (treatment-control): 3.39-3.19; $F(1,126)=3.53$; ns

Maintain relationships (treatment-control): 4.76-3.03; $F(1,126)=6.11$; $p<.05$

Sense of academic fit: 17-item social fit scale (assessing academic identification, enjoyment of academic work, self-efficacy, assessing potential to succeed in college, possible academic selves $\alpha = .84$, and anxiety $\alpha = .79$).

Main effect: condition means and significance level not provided.

Difference by group

Black (treatment - control): positive; $p = .014$, $d = 1.37$

White (treatment-control): negative; $p = .025$, $d = 1.22$

Sense of academic fit: 7 days after intervention

Main effect: condition means and significance level not provided.

Difference by group

Black (treatment - control): $.33-.06$; ns

White (treatment-control): negative; $p = .009$, $d = 1.32$

Sense of fit on adverse days: participants reported on each of the 7 days following the intervention the negative and positive events they had experienced and the overall negativity of the day. A composite index of each day's adversity level was created.

Main effect: condition means and significance level not provided

Differences by group

Black participants in treatment group are less affected by adversity level; $p = .039$, $d = 1.02$; no effect for white students.

3 years post intervention

Self-Reported Belonging Uncertainty

African Americans: positive treatment effect, $P = 0.052$

Accessibility of Negative Racial Stereotypes

African Americans: positive treatment effect, $P = 0.052$

Accessibility of Self-Doubt

African Americans: positive treatment effect, $P = 0.010$

Persistence on the insoluble math puzzle (time)

Main effect: $p = .011$, $d = 0.78$. Participants in the relational context condition persisted longer than in the skill-promotive context.

Relational context condition > no report condition, $p = .003$, $d = 1.14$

Skill promotive context condition does not differ from the no-report condition.

Self-reported math motivation

Main effect: $p = .038$, $d = 0.58$. Participants reported greater motivation for math in the relational context condition than in the skill-promotive context condition.

Relational context > no report, $p = .049$, $d = 0.64$

Skill-promotive and no-report do not differ.

Composite sense of social connectedness to math

Main effect: $p = .001$, $d = 1.43$. Participants felt a greater sense of social connectedness to math in the relational context condition than in the skill promotive context condition.

Relational context > no report, $p < .006$, $d = 0.90$

Skill promotive did not differ from no report.

Attitudes toward engineering: immediately following the intervention

(a) evaluation of current experience in engineering: sense of belonging in engineering (10 items, $\alpha = 0.87$), self-efficacy in engineering, (2 items, $r = .53$, $p < .001$), enjoyment of engineering, (3 items, $\alpha = 0.87$)

Women in male-dominated majors

Control ($m=4.7$); Sense of belonging ($m=5.2$); Affirmation ($m=5.0$)

2 interventions compared to control: interventions improved women's felt experience in engineering relative to the control condition; $p = .006$, $d = 0.67$.

(b) perception of prospects of succeeding in engineering (possible selves and self-perceived potential in engineering).

Women in male-dominated majors

Control ($m=69$); Sense of belonging ($m=70$); Affirmation ($m=68$)

Attitudes toward engineering: second semester

a) evaluation of current experience in engineering

Women in male-dominated majors

Control ($m=4.5$); Sense of belonging ($m=5.1$); Affirmation ($m=5.2$)

2 interventions compared to control: interventions improved women's felt experience in engineering relative to the control condition; $p = .060$, $d = 0.67$.

(b) perception of their prospects of succeeding in engineering.

Women in male-dominated majors

Control ($m=58$); Sense of belonging ($m=60$); Affirmation ($m=65$)

2 interventions compared to control: improved women's confidence in their prospects of succeeding in engineering in the second semester; $p = .010$, $d = 0.87$

Daily adversity

Male-dominated majors: in the control group, men experience better outcomes than women ($p < .025$); women in treatment experience better outcomes than control condition.

Gender identification (second semester)

Women in male-dominated majors

Affirmation > social belonging; $p < .05$; $1.04 < d < 1.08$

Affirmation > control; $p < .05$; $1.04 < d < 1.08$

Social belonging intervention: friendships with male engineers (measured by the representation of male engineers among the 5 closest friends students reported having on campus in the second semester with the baseline controlled).

Women in male-dominated majors

Social belonging > affirmation; $p < .01$; $1.09 < d < 1.12$

Social belonging > control; $p < .01$; $1.09 < d < 1.12$

Social belonging intervention: implicit normative evaluations of female engineers,

Male-dominated majors: treatment women exhibited more positive norms about female engineers than the other two groups combined, $p = .018$, $d = 1.03$

Social and academic integration: (6-month follow up)

Participants who received a social belonging intervention were more likely than students who did not to report that they had used academic support services, had joined an extracurricular group, and had chosen to live on campus, $p=0.008$, $d=0.78$.

Social and academic integration: (6-month follow up)

Treatment decreased the percent of disadvantaged students identified as “at risk” on this measure to 7%, $p=0.014$, eliminating the group difference.

NA

Intervention Study Table

Competency	Reference	Intervention & Population
Utility goals/values	<p>Brady, S. T., Reeves, S. L., Garcia, J., Purdie-Vaughns, V., Cook, J. E., Taborsky-Barba, S., . . . Cohen, G. L. (2016). The psychology of the affirmed learner: Spontaneous self-affirmation in the face of stress. <i>Journal of Educational Psychology, 108</i>, 353–373</p>	<p>N=183 (Latino and white students, 62% female) Part 1, spring year 1 Experimental manipulations; participants ranked the personal importance of 11 values. Affirmation condition: wrote about their most important value and why it was important to them. Control: wrote about their 9th ranked value and why it may be important to someone else. Manipulations were crossed with expectation manipulations -- Positive expectation condition: participants were led to believe that the activity (the affirmation exercise in the affirmation condition, the control exercise in the control condition) would be beneficial. Students read a report about how writing about values can reduce stress and boost long-term performance. No expectation condition: participants read a report about a new paper-manufacturing technique. Part 2, 3 semesters (72% retention): transcripts collected. Part 3, Spring year 3 (101 of the 183): Measures collected; transcripts collected.</p>
Utility goals/values	<p>Durik, A. M., Shechter, O. G., Noh, M., Rozek, C. S., & Harackiewicz, J. M. (2015). What if I can't? Success expectancies moderate the effects of utility value information on situational interest and performance. <i>Motivation and Emotion, 39</i>, 104-118.</p>	<p><u>Study 1</u> Random assignment: 62 participants, (50% women) from a Midwestern university. Intervention: 1. Participants solved multiplication problems using traditional methods (2 min.) and reported initial interest and PCM (perceived competence in math). 2. Participants learned a new technique to solve problems. The utility value information was embedded in the beginning, middle, and end of the instructions. The control condition did not contain utility information. 3. Participants solved two 4-min problem sets using the new technique, then reported their situational interest. Baseline performance in math and individual interest in math (assessed with four items) were collected.</p>

Utility goals/values

Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Giffen, C. J., Blair, S. S., Rouse, D. I., & Hyde, J. S. (2014). Closing the social class achievement gap for first-generation students in undergraduate biology. *Journal of Educational Psychology*, 106, 375-389

Random assignment within lab sections. Introductory biology sequence (2 semesters) at a large midwestern university; 798 students (320 M and 478 W; 644 continuing generation (CG) and 154 first generation (FG) students.
T: 325 CG & 77 FG/C: 319 CG & 77 FG
Intervention
Wk 2: Baseline measures collected.
Brief writing assignment administered week 3 and week 8.
The assignment required students to select two or three values from a list of 12 that were the most important to them and then write an essay describing why their selected values were important. Control condition were directed to circle two or three values that were least important to them and then write an essay describing why those values might be important to someone else.
Wk 14: Post-intervention questionnaires collected.

Utility goals/values

Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2015). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. *Journal of Personality and Social Psychology*.

Random assignment; Biology course (one semester), large Midwestern university; N=1040 (423 CG-majority, 427 FG-majority, 126 CG-URM and 64 FG-URM).
UV intervention
Students completed either three UV or three control assignments. The UV assignment asked students to answer a question using course material and discuss the relevance of the concept or issue to their own life or to the lives of others. Control assignment instructed students to address a question by summarizing course material.
VA intervention
Administered in laboratory sessions early in the semester, and students wrote about personal values. Students in the VA condition were instructed to write about why two or three values, selected from a list, were important to them. Students in the control condition were instructed to choose the two or three values that were least important to them, and to write about why other people might hold those values.

Utility goals/values

Hulleman, C. S., Godes, O.,
Hendricks, B. L., & Harackiewicz, J.
M. (2010). Enhancing interest and
performance with a utility value
intervention. *Journal of Educational
Psychology, 102*,
880-895.

Study 1

Random assignment: 107 (50 men, 57 women, 92% white)
students, intro psychology class at University of Wisconsin-
Madison

Intervention

Relevance: participants wrote a short essay describing how the
math activity could relate to their lives or to the lives of
college students in general.

Control: participants completed a writing task unrelated to the
math activity.

After completing a measure of initial interest in math,
participants learned a four-step method for solving two-digit
multiplication problems in their head. Next, participants were
given 3 min to practice the technique on a problem set.
Following this practice period, they reported their performance
expectations for the experimental session. Next, participants
were given instructions for writing either a relevance or
control essay.

After writing the essay, participants worked on the official
problem set while using the new technique. They then
completed measures of utility value and situational interest.
They were then assessed as to whether they would use the
technique in the future (maintained situational interest).

Utility goals/values

See row above.

Study 2

Random assignment, intro psychology class (15-week semester at a large Midwestern university)

N = 318; 91% of the students in the course

237 students (74%) had complete data on all three waves.

Time 1 (day 2): assessed interest in the course topic and inclination to major in psychology

Time 2 (2 weeks, prior to first exam): assessed initial perceptions of utility value for the course

Weeks 9-12: intervention. Students were asked to complete their assigned essays once in the 10th week and again in the 12th week. In each condition, students were asked to select a topic that was currently being covered in class and write an essay.

Relevance condition (letter, N = 78): write a letter to a significant person, relating the relevance of this topic to your significant person.

Relevance condition (media, N = 82): find a media report related to the topic and discuss the relevance of the media report to information from class.

Preliminary testing of these conditions showed no differences on outcomes, these 2 conditions were combined into one relevance condition.

Control condition (outline, N = 78): write an outlined summary of the topic.

Control condition (PsycINFO, N = 80): search the PsycINFO database for two abstracts relating to the topic, discuss how the abstracts expanded upon the class material.

Control conditions were combined.

Time 3 (week 13): assessed final measures of utility value, interest in the course, and inclination to major in psychology.

Utility goals/values

Kost-Smith, L., Pollock, S.J.,
Finkelstein, N.D., Cohen, G., Ito, T.,
Miyake, A. (2011). *Physics education
research conference*, 231-234.

Study 2 (follow up to Miyake et al. 2010)
Random experiment: N = 363 (T = 168 males and 74 females,
C = 86 males and 35 females).

Two conditions: writing exercises took place in the first and
fourth weeks of the course and took about 15 minutes to
complete.

Self-affirmation – students wrote about values that were
important to them.

Control – students wrote about values that were important to
others.

Utility goals/values

Martens, A., Johns, M., Greenberg, J., & Schimel, J. (2006). Combating stereotype threat: The effect of self-affirmation on women's intellectual performance. *Journal of Experimental Social Psychology*, 42, 236–243.

Study 1

Random assignment: females only.

77 female and 70 male, introductory psychology

3 conditions:

Non-diagnostic test control condition: participants worked on reasoning problems.

Stereotype threat condition: participants were informed that they would work on some reasoning problems and that the study was concerned with “math and reasoning abilities.” They were told that the test was described as a direct measure of math intelligence. They were randomly assigned to two conditions within the threat condition: self-affirmation or non-affirmation control.

Self-affirmation: Participants rank order a list of 11 “characteristics and values” in order of personal importance. After ranking, participants in the self-affirmation condition were instructed to write about why their most valued characteristic (the item ranked “1”) was personally important and to describe a time when it had been particularly important to them.

Non-affirmation control condition: participants were instructed to write about why their 9th most important characteristic was important to other people and describe a time when it had been important to others.

The male participants (regardless of the threat instructions) and women in the non-diagnostic control were all given a non-affirmation control packet.

Participants were administered the math test after completing the preliminary form. Following the test, participants completed a brief form that assessed stereotype knowledge, SAT (or ACT) scores, and gender.

Utility goals/values

See row above.

Study 2

Random assignment: 52 female and 53 male, introductory psychology
2 groups: Stereotype threat condition, Stereotype threat plus self-affirmation condition (see study 1). Participants complete a spatial rotation test. Stereotype threat was induced by explicitly telling female participants that they were stereotyped as deficient in spatial rotation ability. Participants were told that they would receive feedback to give them an idea of their strengths and weaknesses on this kind of task. After the test, students provide SAT/ACT scores, GPA, and gender.

Utility goals/values

Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. *Science*, 330, 1234–1237.

Random assignment, intro physics course (15 week)
N = 399 students (283 men and 116 women)
Values affirmation group: Selected their most important values from a list and wrote about why these values were important.
Control group: Selected their least important values from the same list and wrote why these values might be important to other people.
Intervention: 15-min writing exercise, integrated into the class and was given once during week 1 and once in an online homework assignment (week 4) shortly before the first midterm exam (week 5). The other two midterms were administered Week 9 and 14.

Utility goals/values

Schechter, O. G., Durik, A. M., Miyamoto, Y., & Harackiewicz, J. M. (2011). The role of utility value in achievement behavior: The importance of culture. *Personality and Social Psychology Bulletin*, 36, 303-317.

Study 1

Random assignment: 282 undergraduates (131 males and 151 females) from a Midwestern university. 210 Westerners (100 males and 110 females) and 72 East Asians (31 males and 41 females).

Intervention:

1. Baseline math performance and interest obtained.
2. Participants learned a new four-step technique for solving two-digit multiplication problems.

UV condition: Participants were told about the usefulness of the technique for their performance in future classes, preparation for graduate school admissions tests, and their careers.

Control condition: no mention of utility value.

3. Participants practiced the new technique on multiplication problems.
4. Participants completed a questionnaire assessing the degree of utility value they perceived from the new technique.
5. Participants solved two sets of multiplication problems, which constituted a measure of their performance. Participants reported their interest in the technique.

Utility goals/values

Silverman, A., Logel, C., & Cohen, G.L. (2013). Self-affirmation as a deliberate coping strategy: The moderating role of choice. *Journal of Experimental Social Psychology, 49*, 93– 98.

Study 1

Random assignment: 59 students at a western university (27 women).

Part 1: First, participants ranked a list of values.

(a) Aware-affirmed: participants read an article explaining the benefits of affirmation, and then completed an affirmation exercise (i.e. wrote about a personally important value).

(b) Aware-spontaneous writing: participants read an article explaining the benefits of self-affirmation, and were free to write about whatever they wanted.

(c) Unaware-affirmed: participants read a neutral article and completed the same affirmation exercise noted in (a). Standard affirmation condition.

(d) Control condition: participants read a neutral article and wrote about their ninth most important value and why it would be important to another person

Standard control condition.

Part 2: Participants took two math tests. The first, difficult math test was intended to reinforce threat by presenting participants with failure - 30 extremely challenging problems taken from the GRE and was described as diagnostic of math ability.

Following the difficult math test, participants were given the main dependent measure assessing recovery from failure -- a set of moderately difficult math problems taken from the Scholastic Aptitude Test (SAT).

Utility goals/values

See row above.

Study 2

Random assignment: 81 participants (54 females), University of Colorado

Part 1: participants ranked their values.

(a) Control condition: see study 1.

(b) Aware-affirmed: see study 1.

(c) Aware-affirmed+choice: After reading the report explaining the effects of affirmation, participants chose which value to write about.

Part 2: See study 1.

Utility goals/values

Taylor V.J., & Walton G.M. (2011).
Stereotype threat undermines
academic learning. *Personality and
Social Psychology Bulletin*. 37, 1055–
67.

Study 2:

29 Black undergraduates (16 women).

Students participated individually in two sessions 6 to 13 days
apart. In Session 1, students studied the definitions of 24 rare
words under either learning-threat or learning-no-threat
conditions.

Learning-threat condition: the task was described to
participants as in as evaluative of learning ability.

Control condition: the task was described so as to be irrelevant
to intellectual stereotypes.

Before studying word definitions, participants were given 10
minutes to complete a writing exercise (value affirmation
manipulation). Participants either circled their most important
value from a brief list of values and wrote about why that
value was important to them (affirmation condition) or circled
their least important value and wrote about why it might
matter to someone else (no-affirmation condition).

Utility goals/values

Woolf, K., McManus, I.C., Gill, D., Dacre, J. (2009). The effect of a brief social intervention on the examination results of UK medical students: a cluster randomised controlled trial. *BMC Medical Education*, 9-35.

Random assignment: 348 Year 3 white (W) and ethnic minority (EM) students at one UK medical school
Intervention condition: writing about one's own values)
Control condition: writing about another's values

GPA 0.52

Outcome & Impact: Achievement

GPA: average over 2 years post intervention

Main effect: Condition means and significance levels not provided.

Latino participants: affirmation GPA > control GPA, $b = .18$, $p = .02$, $d = 0.52$

White participants: affirmation GPA < control GPA, $b = -.15$, $p = .04$, $d = -0.43$

GPA: fourth term post intervention

Control: Latino participants < White participants, $p = .05$, $d = 0.46$

Treatment Latino participants do not differ from control white participants; $t(139) = -0.18$, $p = .86$, $d = 0.04$.

For Latino students, affirmation led to a 90% reduction in the ethnic achievement gap.

performance

Performance: total number of problems solved correctly on the two problem sets

Perceived competence in math (PCM) model

Main effect: condition means and significance level not provided.

Differences by group

Low PCM: treatment < control; $30 < 33$, $p = .13$, $B = -.33$

High PCM: treatment > control; $41 > 32$; $p < .05$, $B = .46$

GPA 0.329
Course grade 0.18

Biology course grade

Control (FG-CG): 2.38-2.86; $d=.39$, $p<.001$
Treatment (FG-CG): 2.62-2.82; $d=.18$, $p<.05$
Treatment closed the achievement gap by .21 (.39-.18)
FG (treatment - control): .24 points; $p<.05$

Semester GPA (excluding the biology course grade)

Control (FG-CG): 2.81-3.20
Treatment (FG-CG): 3.05-3.17
FG (treatment - control): .24 points; $t(789)=2.36$, $p=.02$

Continuation in second semester biology course

Main effect, condition: $p=.03$
Control (FG-CG): 66.2-77.7
Treatment (FG-CG): 85.7-74.8
FG (treatment>control): $p<.01$
CG (treatment versus control): $p=.41$

Course grade 0.06 to 0.55

Biology course grade

Main effect (treatment > control): $B=.08$, $P=.024$, $d = 0.06$

Differences by groups

Control (performance gap, URM versus majority student): 2.3-2.8 = .50 grade points, $d=.60$,
 $p<.001$

Treatment (performance gap, URM versus majority student): 2.5-2.9 = .40 grade points

Majority (treatment-control): ns

URM (treatment - control): .20 grade points, $d=0.23$

FG-URM versus CG-majority gap: .84 grade points, $d=.98$, $p<.001$

FG-URM (treatment > control): .51 grade points, $d=.55$

performance

Achievement Performance: the total number of problems solved correctly on the official problem set
Main effect: ns. Condition means not provided.

Course grade NS

Course grades: obtained from departmental records
Main effect: ns. Condition means not provided.

Course grade significant

Force and Motion Concept Evaluation (FMCE): pre and post. Scores reflect adjusted score, controlling for pre-score.

Main effect: condition means and significance not provided.

Differences by group

Females: control condition (score=78) > treatment condition (score=67); $p=.02$

Gender x condition, ns: post-FMCE gender gap in the treatment and control conditions were not significantly different.

Exams: the average score on 3 midterm exams and a final.

Main effect: condition means and significance not provided.

Differences by group

Females: treatment condition (score=66) > control condition (score=62); $p=.03$.

Gender x condition, ns: the gender gaps in the treatment and control groups were not significantly different.

performance test

Math test performance: measures the total number of questions participants answered correctly.

Pairwise comparisons: Females

Self-affirmed group ($M = 6.42$) > stereotype threat condition ($M = 3.60$); $p < .01$

Stereotype threat condition ($M = 3.60$) < non-threat control condition ($M = 5.70$); $p = .05$

Stereotype threat condition: Females ($M = 3.60$) < Males ($M = 8.31$); $p < .01$

Males: no significant difference between groups.

performance test

Spatial test performance: measured as the total items correct.
Main effects (treatment versus control): $F(1,67)=3.78$, $p = .06$.
Differences between groups ~ gender
Females (treatment-control): 13.44-10.05; $p < .05$
Males (treatment-control): 14.24-13.13; ns

Course grade 0.18

Standardized coefficients
Overall exam score in the course (the average of the percent correct for the four exams)
Main effect: condition means and significance level not provided.
Differences by groups ~ gender
Control group (gender gap): $d = 0.93$, $p < .01$
Treatment (gender gap): $d = 0.18$, $p = .13$
End of semester FMCE score [the Force and Motion Conceptual Evaluation (assesses the effect of values affirmation)]: administered Week 1 and Week 15
Main effect: condition means and significance level not provided.
Differences by groups ~ gender
Control group (gender gap): $d = 0.46$, $P = 0.01$
Treatment (gender gap): $d = -0.12$, $P = 0.33$

performance test

Performance: The total number of problems participants solved correctly on the two problem sets.

Main effect: ns. Condition means not provided.

performance test

Test performance (SAT problems -- moderate test): Measures recovery from failure -- see Dweck, 1986. This is equal to the number of problems correct divided by the number attempted.

Aware-affirmed condition (M-adj.=.148, SD=.22)

Aware-spontaneous (M-adj.=.325, SD=.21)

Unaware-affirmed (standard) (M-adj.=.306, SD=.23)

Control participants (M-adj.=.239, SD=.19)

Differences between groups

Unaware-affirmed + aware-spontaneous writing versus control + aware-affirmed;

F (1,52) = 4.00, p=.050

Control versus aware-affirmed conditions; ns

Unaware-affirmed versus aware-spontaneous conditions; ns

performance test

Test performance (SAT problems): Measures recovery from failure -- see Dweck, 1986. This is equal to the number of problems correct divided by the number attempted.

Aware-affirmed < control : .13<.19; F(1,77)=1.29, p=.260

Aware-choice > control: .305>.19, F(1,77)=4.30, p=.042

Aware-choice > aware-affirmed: F(1,77)=10.654, p < .01

performance test

Recall performance on the nonthreatening “warm-up.”:

Black students defined approximately half as many words correctly in the learning-threat condition as in the learning no-threat condition, $t(70) = 2.32$, $p = .023$, $d = 0.83$.

White students showed no condition effect, $t < 1$.

Matching performance on the nonthreatening “warm-up.”:

Black students matched fewer words correctly in the learning threat condition ($M_{adj} = 0.60$, $SD = 0.23$) than in the learning no-threat condition ($M_{adj} = 0.72$, $SD = 0.25$), $t(70) = 1.37$, $p = .18$.

White students showed the opposite pattern (Learning No-Threat: $M_{adj} = 0.58$, $SD = 0.24$;

Learning-Threat: $M_{adj} = 0.71$, $SD = 0.24$), $t(70) = 1.81$, $p = .074$, $d = 0.55$.

Learning-threat condition: Black students tended to perform worse than Whites, $t(70) = 1.45$, $p = .15$.

Learning no-threat condition: Black students tended to perform better than Whites, $t(70) = 1.68$, $p = .097$, $d = 0.57$.

Recall performance on the threatening “test.”:

Black students defined marginally fewer words correctly in the learning-threat condition than in the learning- no-threat condition, $t(70) = 1.88$, $p = .064$, $d = 0.68$.

White students showed the opposite pattern, $t(70) = 1.37$, $p = .18$.

Learning-threat condition: Black students defined fewer words correctly than did White students, $t(70) = 1.97$, $p = .052$, $d = 0.64$.

Learning no-threat: Black students defined more words correctly than did White students, $t(70) = 1.32$, $p = .19$.

Matching performance on the threatening “test.”:

The condition difference for Black students was not significant (Learning-Threat: $M_{adj} = 0.55$, $SD = 0.22$; Learning-No-Threat: $M_{adj} = 0.64$, $SD = 0.24$), $t < 1.15$.

White students performed marginally better in the learning-threat condition ($adj = 0.69$, $SD = 0.23$) than in the learning-no-threat condition ($M_{adj} = 0.57$, $SD = 0.24$), $t(70) = 1.70$, $p = .093$, $d = 0.51$.

Learning-threat condition: Black students performed marginally worse than White students ($M_{adj} = 0.55$, $SD = 0.22$ vs. $M_{adj} = 0.69$, $SD = 0.23$), $t(70) = 1.88$, $p = .064$, $d = 0.61$.

Course exam 0.074

Mean written z-score: measures performance in postintervention summative written assessments (August 2007), adjusted for pre-intervention summative written assessments (March 2007)

Main effect: ns; condition means not reported.

Differences by group: ethnicity x interaction is significant; [F(4,334) = 5.74; p = 0.017] ~ due to decreased scores in white group

White (treatment-control): .063-.244 = scores decrease

EM (treatment-control): -.098-(-0.175) = scores improve

Mean OSCE z-score: measures performance in post-intervention summative objective structured clinical examination (OSCE) assessment (August 2007), adjusted for pre-intervention summative written assessment (March 2007); measured clinical and communication skills.

Main effect: students in the intervention condition outperformed those in the control condition [mean difference = 0.261; F(4,334) = 6.17; p = 0.013].

Differences by group ~interaction is not significant.

White (treatment-control): .271-(-.002)

EM (treatment-control): .001-(-.286)

15 achievement outcomes

GPA: 2 of 2

Course grade: 5 of 6

Outcome & Impact: Competency

Adaptive adequacy: the following 3 measures loaded on one single factor, alpha = .86. 3 scores were averaged to create a single index of adequacy -- Self-integrity, 7 items (alpha = .87); Self esteem, 10-item Rosenberg Self-Esteem scale (alpha = .93); Hope, 8-item Adult Hope Scale (alpha = .82)

Main effect: $F=3.84$, $p = .05$, $d = .43$

Differences by groups

Latino participants (Treatment-Control): 4.91-4.43; $p = .001$, $d = .94$

White participants (Treatment-Control): 4.54-4.62; $p=.62$; $d=-.14$

Academic belonging: measured with a 10-item scale, alpha = .82

Main effect: $F=4.49$, $p = .04$, $d = .38$

Differences by groups

Latino participants (Treatment-Control): 4.76-4.29; $p = .006$, $d = .79$

White participants (Treatment-Control): 4.79-4.76; $p=.83$; $d=.06$

Situational interest in math technique: 3 items, alpha = .88

Perceived competence in math (PCM) model

Main effect: condition means and significance level not provided.

Differences by group

Low PCM: treatment < control; 4.5<5.3, $p<.05$, $B=-.36$

High PCM: treatment > control; 6>5; $p<.01$, $B=.50$

Individual interest in math model

Main effect: condition means and significance level not provided.

Differences by group

Low interest: treatment < control; 4.5<5, ns

High interest: treatment > control; 5.7>5.2, ns

NA

NA

Situational interest: 5 item, alpha = .89

Main effect: $p < .01$, $b = 0.24$, participants in the relevance condition became more interested in the technique than participants in the control condition.

Maintained situational interest in the technique: 1 item, yes/no

Main effect: $p < .001$, (OR) = 8.29, indicating that participants in the relevance condition were more inclined to use the technique in the future than those in the control condition.

Situational interest

Main effect, $p < .01$, $b = .16$: participants in the relevance conditions reported more interest in psychology at the end of the course than participants in the control conditions.

Maintained situational interest: single item (e.g., "I am interested in majoring in psychology").

Main effect: ns. Condition means not provided.

Differences by group

Students with lower exam scores in the relevance conditions reported more interest in majoring in psychology than those in the control conditions ($p = .09$, $b = .13$). Students with higher exam scores reported equivalent levels of interest in majoring in psychology in the relevance and control conditions ($p = .24$, $b = -.07$).

NA

NA

NA

NA

Utility value

All participants in the utility value condition perceived more utility value from the new technique than did those in the control condition; $B=.20$, $p<.01$

Task Interest

East Asian

Main effect: condition means and significance level not provided.

Differences by group

Low interest (treatment > control): $B=.36$, $p<.05$

High interest (treatment < control): ns

Westerner

Main effect: condition means and significance level not provided.

Differences by group

Low interest (treatment < control): $B=-.36$, $p<.11$

High interest (treatment > control): $B=.11$, $p=.25$

Behavioral effort: Assessed by the number of seconds participants spent working on the practice problems.

East Asian

Main effect: condition means and significance level not provided.

Differences by group

Low interest (treatment > control): $B=.43$, $p<.05$

High interest (treatment < control): ns

Westerner

Main effect: condition means and significance level not provided.

Differences by group

Low interest (treatment > control): ns

High interest (treatment = control): ns

NA

NA

NA

NA