

## JUST NOT WORTH MY TIME? EXPERIENCED DIFFICULTY AND TIME INVESTMENT

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Students often fail to devote sufficient time to schoolwork even though they value school success. One reason may be they (mis)interpret what experienced difficulty with schoolwork implies because they misgauge their relative standing. To test this prediction we divided students into four guided-recall groups. For half, the recall was a time that they interpreted experienced difficulty with schoolwork as meaning that it was important to succeed and for half the recall was a time that it meant it was impossible to succeed. Students were then led to believe that they had the guided interpretation more or less frequently than others. Students in the difficulty means importance more for oneself than for others and in the difficulty means impossibility less for oneself than for others conditions were more academically engaged (Study 1) and invested more time (Study 2). Investment mattered, influencing performance on a test of fluid intelligence (Study 2).

American students aspire to get good grades and succeed in college but their attainments often fall short (Rosenbaum, Deil-Amen, & Person 2006; Symonds, Schwarz, & Ferguson, 2011; Trusty, 2000). While a variety of barriers related to social class, race-ethnicity, and gender have been identified as reasons for underper-

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formance (e.g., Jackson, 2010; Orfield, Losen, Wald, & Swanson, 2004; Steele, 1997), these factors do not address underperformance among non-stereotyped groups and do not explicitly focus on time allocation. Yet time use analyses suggest that time use matters. American students relegate studying to only about 14 hours a week, less than half of the recommended amount (Babcock & Marks, 2010). Spending enough time on academics is critical for school success (Allensworth & Easton, 2007; Arum, Roksa, & Cho, 2011; Astin, 1993; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Pascarella & Terenzini, 2005). Students who report investing more time on academics earn higher salaries later on, even controlling for the effect of time investment on their grades while in school (Babcock & Marks, 2010). Why might students under-invest in academics? To address this question, in the current studies we start with the assumption that fully engaging in schoolwork is often experienced as difficult and that students can interpret their experienced difficulty as implying that schoolwork is important to them but also that it is impossible to attain. We build on prior research using identity-based motivation theory and focus explicitly on the effect of implied social context in driving the motivational consequences of students' interpretation of their experienced difficulty.

## IDENTITY-BASED MOTIVATION

Identity-based motivation theory (IBM) predicts that although people prefer to act in ways that are congruent with their identities, the identity-to-behavior link is often opaque because identities are situated (Oyserman, 2007, 2015). Situations influence which identity comes to mind, what a salient identity means in the moment, whether strategies to work toward salient identities feel identity congruent, and how difficult engaging in these strategies is interpreted. The power of situations is a joint consequence of the richness of self-concept content, the looseness of self-concept structure, and the pragmatic nature of human cognition. One's self-concept consists of an array of disjointed identities rather than as an integrated unit (e.g., Markus & Kunda, 1986; Oyserman, Elmore, & Smith, 2012; Swann & Bosson, 2010). Thinking is for doing, implying that how one considers an object, including the self, is dependent on what seems possible in the situation (e.g., Oyserman et al., 2012; Smith & Semin, 2004).

Viewed in this way, what is often termed self-consistency really involves behaving in a way that is consistent with a particular identity; it is not possible to act consistently with all the identities included in one's sense of self. Whether an action appears consistent depends on the identity to which it is matched and what that identity means in the situation. For example, Shih, Pittinsky, and Trahan (2006) showed that verbal task performance of Asian heritage female students matches stereotypes about women and Asians. Performance was higher if being female was on their mind and lower if being Asian was on their mind. Going beyond stereotype activation, IBM predicts that the effect of considering one's gender is dependent on implications of the situation. Indeed, Elmore and Oyserman (2012) showed that students' performance on a math task depended on what the imme-

diate context implied about their gender. Males performed worse, reported fewer academic possible selves and lower long-term occupational and financial aspirations when asked to interpret a census graph showing males underperforming females (fewer graduate high school); the pattern reversed if the graph showed males outperforming females (higher average salary). The effect is not due to a pre-established stereotype, but to the implications of the situation for what being male means.

IBM takes the next step, predicting that the same behavior may feel identity-congruent, consistent with a salient identity, or identity-incongruent, inconsistent with that identity, depending on how difficulty engaging in the behavior is interpreted in context. An initial test of this prediction was conducted as a school-based intervention. Low-income students were randomly assigned to either a 7-week (11-class period) intervention or a “school as usual” control group and their academic outcomes tracked over time (Oyserman, Bybee, & Terry, 2006). While all students experienced the usual difficulties associated with being an eighth grader, intervention group students participated in small-group activities designed to activate an interpretation of this difficulty as a normative part of working toward one’s academic possible identities. Control group students went to class as usual and received no structured interpretation of their experienced difficulties. Content of possible identities, school grades, attendance, homework time, and in-class behavior were obtained for both groups. The two groups did not differ on any measure prior to intervention. Post intervention, students in the intervention group were more likely to report that being successful in school was a possible identity and that they had strategies to achieve that identity. They also spent more time on their homework, even a year after the intervention. Their high school teachers reported that they were more engaged in classroom activities, and their schools reported fewer skipped classes. The effect of the intervention on grades, attendance, and academic engagement was mediated by an increase in school-focused possible identities and strategies to attain them.

The intervention demonstrated that interpretation of experienced difficulty influences content of identity and that this has consequences for behavioral engagement. However, it did not directly test the effect of relative social standing on the implications drawn from salient interpretations of experienced difficulty. As detailed next, social comparisons can be an informational source for what an interpretation of experienced difficulty means for one’s self.

## INTERPRETING EXPERIENCE

Social context is a rich informational source, providing explanations for one’s experiences (Festinger, 1954; Weiner, 1985). People routinely, automatically, and non-consciously use others as standards of comparison to inform themselves about their own abilities, interests, and desires (e.g., Cialdini & Trost, 1998; Smith & Collins, 2009). Schwarz and colleagues have generated a large body of evidence relevant to this point (Schwarz, Bless, Bohner, Harlacher, & Kellenbenz, 1991; Schwarz,

Bless, Strack, Klumpp, Rittenauer-Schatka, & Simons, 1991; Schwarz, Groves, & Schuman, 1998). Their work shows that people are sensitive to subtle information about the frequency with which they experience something relative to others and infer from response scale options what the normal distribution of an experience or behavior is. If the scale includes high-frequency options, the experience or behavior is common. If it includes low-frequency options, the experience or behavior is uncommon. The scale influences people's responses to the question and also influences their subsequent interpretation of what their own behavior implies. As detailed next, the same pattern of behavior can lead to different conclusions about the self, depending on the perceived behavioral frequency of others.

For example, Schwarz and Scheuring (1988) led German adults to believe that they masturbated either more or less often than others. Compared to those in the less condition, those in the more condition later reported lower marital satisfaction presumably because they inferred that they must not be satisfied with their marital life given what their masturbation rate implied about their unmet sexual needs compared to others. Similarly, intentions to use condoms increased for college students led to believe that others had had more sexual partners than they had, presumably because they inferred they would otherwise be putting themselves at risk given others' promiscuity (Rothman, Haddock, & Schwarz, 2001). Across studies effects were found by having people rate the frequency of their own behavior on a scale that manipulated their sense of typical behavioral frequency. If scale frequency was high, they inferred that their personal frequency was less than average and the reverse if scale frequency was low. In this way, biased frequency scales provide information on what the experience of others tends to be, informing what that experience means for the self (Deutsch & Gerard, 1955).

## INTERPRETING EXPERIENCED DIFFICULTY

People are likely to seek an explanation for their experiences of difficulty because difficulty implies that current energy investment is insufficient. Should investment go up to overcome difficulty or go down so that energy can be used elsewhere? From an evolutionary perspective, both interpretations of difficulty, as a sign of importance or as a sign of impossibility, are logical (Charnov, 1976; Nesse, 2009). If experienced difficulty is interpreted as a signal of identity-congruence and task importance then effort should be sustained and even increased in the face of difficulty so that opportunities for success are not missed. If experienced difficulty is interpreted as a signal of identity-incongruence and task impossibility then effort should be channeled away from the unattainable goal so that resources are not wasted and can be used to attain another goal. Thus, sensitivity to experienced difficulty and sensitivity to social and nonsocial cues as to how to interpret experienced difficulty are likely to be rooted in evolutionary necessities to both engage and disengage.

In psychology, the idea that difficulty can increase the intensity of motivation has been discussed at least since William James (1890) and Ach, who discussed it

in terms of the will to overcome distraction (as discussed in Brehm & Self, 1989). The role of difficulty in influencing belief in one's abilities to succeed (see self-efficacy theory; Bandura 1988, 1997), in altering expectations for the likelihood of success (see expectancy-value theories; Atkinson, 1966, 1974; Eccles et al., 1983; Feather 1982, 1992; Wigfield & Eccles, 1992), and in impacting motivation (see Brehm & Self, 1989; Carver & Scheier, 1998) have all been studied. Difficulty increases motivation and the desirability of a goal so long as difficulty is not so great as to render tasks impossible; in this case, effort quickly declines (e.g., Brehm & Self, 1989; Roese & Olson, 2007; Silvestrini & Gendolla, 2013). While difficulty is typically assumed to be a feature inherent to the task or goal, a situated approach focuses on the effects of context on how difficulty is interpreted. For example, Oyserman, Destin, and Novin (2014) showed that interpretation of experienced difficulty with schoolwork depended how the college context and the future self were considered. Students led to consider their desired future self and to imagine college as a success-likely context were more likely to endorse an interpretation of difficulty with schoolwork as implying that schoolwork was for them and worth the effort, so were students led to consider their undesired future self and to imagine college as a failure-likely context.

## THE CURRENT STUDIES

Research to date implies but does not specifically test that the experience of others can be used as an interpretive cue to help understand what one's own experiences of difficulty with schoolwork imply. In the current studies we tested the prediction that students will be more engaged and invested in their schoolwork in two circumstances. First, if students are led to recall a time that they experienced difficulty engaging in school tasks as a signal of importance and are led to believe that they have this interpretation more frequently than their peers. Second, if they are led to recall a time that they experienced difficulty engaging in school tasks as a signal of impossibility and are led to believe that they have this interpretation less frequently than their peers. We use a  $2 \times 2$  design manipulating how experienced difficulty is interpreted (importance, impossibility) and relative frequency (high, low). The interpretation manipulation follows Oyserman and colleagues (e.g., Oyserman et al., 2014) and the frequency manipulation follows Schwarz and colleagues (e.g., Rothman et al., 2001). High-frequency scales in which one's standing is low relative to others should imply that the experience is identity-incongruent. In contrast, low-frequency scales in which one's standing is high relative to others should imply that the experience is identity-congruent. Thus, students asked to report on their experience of difficulty at school on a low-frequency scale should be led on a biased memory search yielding the conclusion that they have the experience of difficulty more often than others. This should be motivating if their biased search is for times difficulty implied importance, and demotivating otherwise. In the same way, students asked to report on their experience of difficulty at school on a high-frequency scale should be led on a biased memory search yielding the

Low Frequency Relative to Others	High Frequency Relative to Others
≤ 10 times	1-2 times
11-15 times	3-4 times
16-20 times	5-6 times
21-25 times	7-8 times
26-30 times	9-10 times
≥ 31 times	≥ 11 times

FIGURE 1. Frequency manipulation used in Studies 1a, 1b, and 2. The scale used in the low relative to others condition is on the left and the scale used in the high relative to others condition is on the right.

conclusion that they have the experience of difficulty less often than others. This should be motivating if their biased search is for times difficulty implied impossibility, and demotivating otherwise.

## STUDY 1A

### SAMPLE AND METHOD

Students attending summer classes at area colleges (University of Southern California, Glendale College, College of the Canyons, Santa Monica College,  $N = 121$ , 53 women, 68 men) were approached on campus and asked to participate in a 1-page study. Unbeknownst to participants, the front of the page was the experimental manipulation and the questions on the back of the page were the dependent measures plus two demographic controls. Questionnaires were randomized prior to distribution. We planned to obtain 30 participants per cell and collected data until that goal had been reached.

On the front of the page was the text: *Experiencing difficulty working on a school task can be thought of as signaling importance [impossibility], that what you are working on is [not] worth your effort because it is important to [it is not for] you. This can be a common occurrence for students. How often have you had the feeling of difficulty in the past month?* In the low frequency relative to others condition, the response scale ranged from  $\leq 10$  times to  $\geq 31$ . In the high frequency relative to others condition the response scale ranged from 1–2 times to  $\geq 11$  times (see Figure 1). We chose this range because experiencing difficulty working on a school task could happen from once a month to more than daily.

On the back of the page were four questions about academic engagement and identity, gender, and year in school. A factor analysis of the four items (standardized with varimax or oblim rotation) yielded a single factor so we took the mean of the four standardized items in our subsequent analysis of the identity congruence of academics ( $\alpha = 0.525$ ). The exact wording of each item, response scales, item means, and standard deviations are presented in Table 1.

*Manipulation Check.* Our frequency manipulation worked as expected. Participants who gave an answer reported more frequent experience of difficulty if they

TABLE 1. Items Used in Studies 1a and 1b as Academic Identity Engagement

Variable	Scale	Study 1a		Study 1b	
		M	SD	M	SD
Doing well in classes in my major is important to me	1 = strongly disagree, 6 = strongly agree	5.39	.88	5.51	.67
Doing well in classes outside my major is important to me	1 = strongly disagree, 6 = strongly agree	4.60	1.13	4.91	.89
How likely are you to skip going out/socializing this weekend to prepare for class	1 = not at all likely, 6 = very likely	3.88	1.37	3.86	1.42
Realistically, how many hours do you plan to study tonight	Open-ended <sup>a</sup>	2.16	1.36	3.26	1.56

Note. <sup>a</sup>The range of responses to the open-ended study question was 0 to 6 in Study 1a and 0 to 8 in Study 1b.

were in the high relative to others rather than the low relative to others condition,  $F(1, 118) = 9.03, p = .003$ .

*Examination of Demographics.* Preliminary analyses showed that gender,  $F(1, 119) = 8.763, p = .004$ , but not of year in school ( $p = .606$ ) mattered, women scored higher on the identity congruence of academics. Gender is a covariate in the analyses reported below.

## RESULTS AND DISCUSSION

Analyses of covariance (ANCOVA) controlling for gender revealed the predicted interaction between interpretation of experienced difficulty condition and relative frequency condition,  $F(1, 116) = 3.141, p = .079, d = 0.32, CI [.091, .708]$ , that modified the effect of frequency,  $F(1, 116) = 3.293, p = .072, d = 0.33, CI [-.025, .693]$ , and interpretation of experienced difficulty,  $F < 1, p = .456$ , conditions. As can be seen in Figure 2, being reminded that difficulty can be interpreted as importance bolstered the identity congruence of academics for students led to believe that they experienced this interpretation more frequently than others and undermined it for students led to believe they experienced this interpretation less than others. Academics is experienced as more identity congruent in the two motivating interpretations of difficulty conditions ( $M = 0.105, SD = 0.86$ ) compared to the two undermining conditions ( $M = -.100, SD = 0.88$ ), at trend level,  $F(1, 118) = 3.35, p = .07, d = .34, CI [-.023, .696]$ ,<sup>1</sup> controlling for gender.

Decomposing the interaction into simple effects and still controlling for gender, we find an effect of frequency scale for participants in the importance condition,  $F(1, 59) = 5.713, p = .02, d = .62, CI [.109, 1.130]$ , but not the impossibility condition

1. The reader will note that degrees of freedom increases in this analysis because rather than two factors (interpretation of difficulty, relative frequency), this analysis uses a single factor coded at -1 difficulty means importance less often for the self than others, difficulty means impossibility more often for the self than others, and +1 difficulty means importance more often for the self than others, difficulty means impossibility less often for the self than for others.

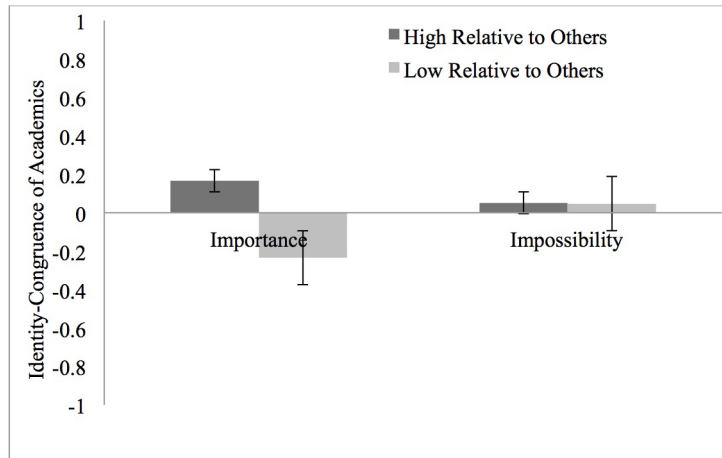


FIGURE 2. Study 1a: Identity-congruence of academics as a function of interpretation of experienced difficulty with schoolwork and implied frequency this interpretation occurs for others (controlling for gender effects).

( $F < 1$ ). Effects are in the predicted direction but not significant when the effect of interpretation of difficulty in the low,  $F(1, 60) = 2.23, p = .14, d = .38, CI [-.114, .884]$ , and high,  $F(1, 55) = 1.01, p = .32, d = .27, CI [-.247, .787]$ , frequency conditions are examined separately.

Though providing initial support for the predicted effect of interpretation of experienced difficulty, effects are weaker than expected and their interpretation is made ambiguous by the fact that the probe simply asked how often students had experienced difficulty in the past month. It did not direct their memory scan to look for experiences of difficulty interpreted in a manner congruent with the prime. Hence, it is not clear whether the response reflected the intended biased scan of memory. To strengthen clarity of causal interpretation, in Study 1b we included the biased memory search instruction as detailed below.

## STUDY 1B

### SAMPLE AND METHOD

University of Michigan undergraduates ( $N = 104$ , 63 female, 49 underclassmen) were approached on campus and asked to participate in a 1-page study using the same procedure as Study 1a, with the modification of the manipulation so that the bias scan of memory was tested. The text read: *Experiencing difficulty working on a school task can be thought of as signaling importance [impossibility], that what you are working on is [not] worth your effort because it is important to [it is not for] you. This can be a common occurrence for students. How often have you had the feeling of difficulty as importance [impossibility] in the past month?* On the back of the page were the same four questions as in Study 1a (see Table 1 for means and standard deviations) as well as gender and year in school. We planned to obtain 25 participants per cell



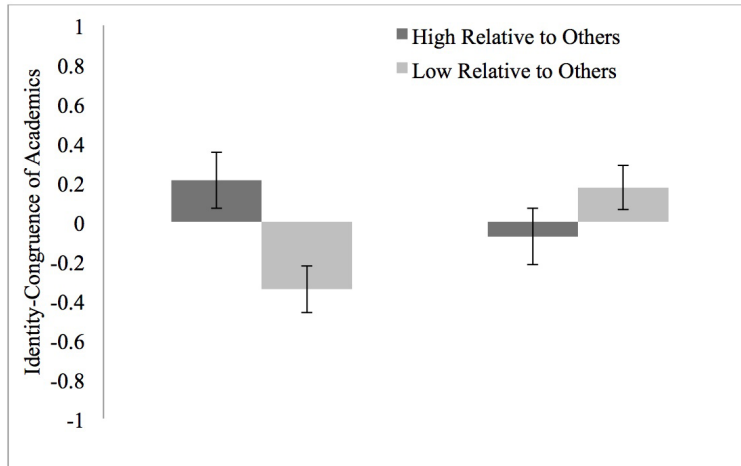


FIGURE 3. Study 1b: Identity-congruence of academics as a function of interpretation of experienced difficulty with schoolwork and implied frequency this interpretation occurs for others (controlling for gender effects).

and stopped data collection once that goal had been reached. We again took the standardized mean of the four items as a rough indicator of identity congruence of academics.

*Manipulation Check.* We verified that our manipulation of frequency worked as expected. Participants reported more frequent experience of difficulty in the high relative to others frequency condition,  $F(1, 96) = 3.90, p = .051$ .<sup>2</sup>

*Examination of Demographics.* As in Study 1a, gender ( $p = .004$ ) but not year in school ( $p = .339$ ) mattered for academic identity-congruence so we included gender in the final analyses reported below.

## RESULTS AND DISCUSSION

Analyses of covariance (ANCOVA) controlling for gender revealed the predicted interaction between interpretation of experienced difficulty condition and relative frequency condition,  $F(1, 96) = 11.843, p = .001, d = .35, CI [1.267, .340]$ ; there was no main effect of frequency,  $F(1, 96) = 1.757, p = .188, d = .27, CI [-.125, .659]$ , or interpretation of experienced difficulty,  $F(1, 96) = 1.026, p = .314, d = .20, CI [-.188, .595]$ , conditions. As can be seen in Figure 3, being reminded that difficulty can be interpreted as importance bolstered the identity congruence of academics for students led to believe that they experienced this interpretation more frequently than others and undermined it for students led to believe they experienced this interpretation less than others. Academics is experienced as more identity congruent in the two motivating interpretations of difficulty conditions ( $M = 0.191, SD =$

2. Six participants did not mark a response on the frequency scale used in the manipulation check, one each failed to answer the question about importance of classes outside one's major and the question about skipping socializing to study, three did not report their planned study hours, and three did not report their gender, resulting in loss of sample size.

0.82) compared to the two undermining conditions ( $M = -.201$ ,  $SD = 0.82$ ),  $F(1, 98) = 11.21$ ,  $p = .001$ ,  $d = .68$ ,<sup>3</sup> CI [.278, 1.081], controlling for gender.

Simple effects show that controlling for gender, the effect of frequency scale is significant in the importance condition,  $F(1, 46) = 8.952$ ,  $p = .004$ ,  $d = 0.90$ , CI [.312, 1.487], and in the same direction but not significant in the impossibility condition,  $F(1, 49) = 2.687$ ,  $p = .108$ ,  $d = .46$ , CI [-.086, 1.016]. The effect of interpretation of difficulty as importance rather than impossibility is significant in the high frequency condition,  $F(1, 47) = 9.345$ ,  $p = .004$ ,  $d = .90$ , CI [.316, 1.48], and in the same direction but not significant in the low frequency condition,  $F(1, 48) = 3.063$ ,  $p = .086$ ,  $d = 0.51$ , CI [-.052, 1.064].

Thus, taken together the results of Studies 1a and 1b support the prediction that accessible interpretation of school difficulty influences the identity congruence of academics if biased recall provides a sense that one's interpretation is positively distinctive. That is, academics are experienced as more identity congruent if biased recall implies that a productive interpretation of difficulty (difficulty means the task is important) is more common for oneself than for others. In the same way, academics are experienced as less identity congruent if biased recall implies that an unproductive interpretation of difficulty (difficulty means the task is impossible) is more common for oneself than for others. Effects are in the expected pattern though smaller for the predicted reversal, that recalling times when experienced difficulty was experienced as impossibility can be motivating if one considers others to have had that experience more frequently than others.

The recall question needed to direct attention to the primed interpretation of difficulty as was done in Study 1b: *How often have you had the feeling of difficulty as importance [impossibility] in the past month?* Effects were weaker when this was omitted as in Study 1a (*How often have you had the feeling of difficulty in the past month?*). In Study 2 we retain the wording of Study 1b's manipulation and move from self-report to behavior, examining time on task in the difficult problems in the Raven's Progressive Matrices test of fluid intelligence.

## STUDY 2

Time investment is crucial for success on difficult tasks and we predict that our biased recall method should influence time investment. Students led to believe that they experience difficulty in schoolwork as signaling the importance of schoolwork more than others (or difficulty in schoolwork as signaling the impossibility of schoolwork less than others) will actually invest more time on this task. As a follow-up, we test the assumption that time on task reaps benefits of better performance.

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3. The reader will note that degrees of freedom increases in this analysis because rather than two factors (interpretation of difficulty, relative frequency), this analysis uses a single factor coded at -1 difficulty means importance less often for the self than others, difficulty means impossibility more often for the self than others, and +1 difficulty means importance more often for the self than others, difficulty means impossibility less often for the self than for others.

## SAMPLE AND METHOD

Introductory Psychology subject pool ( $N = 292$ , 169 female, 180 undergradmen<sup>4</sup> students were randomized to the same conditions as in Study 1. Students received course credit for participating in the Qualtrics programmed “difficulty during the college years” study. Following the experimental manipulation, participants completed the 12-item Bors and Stokes (1998) short form of Raven’s Progressive Matrices (RPM; Raven, 1962). The short form RPM is a test of fluid intelligence (see Conway, Kane, & Engle, 2003; Gray, Chabris, & Braver, 2003) that predicts performance on the full set of Raven’s items. We recorded average time spent on each item ( $M = 36.91$  seconds,  $SD = 18.96$  seconds) as well as the solution chosen. Because time data can require transformation, we checked skewness (.94,  $SE = .14$ ) and kurtosis (1.58,  $SE = .28$ ). Both were within acceptable limits for a normal distribution so analyses use untransformed (raw) time data. Average time spent and average accuracy were highly positively correlated,  $r = .61$ ,  $p < .01$ . Demographics questions followed the dependent measures as in Study 1. We planned to obtain a relatively large sample size of 70 per cell because our dependent variable was time on a difficult task and we assumed that the effect of our prime would be small given the prior results.

*Manipulation Check.* The manipulation of frequency worked; participants reported more frequent experience of difficulty in the high relative to others frequency condition compared to the low relative to others frequency condition,  $F(1, 290) = 6.58$ ,  $p = .011$ .

*Examination of Demographics.* Preliminary analyses showed that both being an advanced student (i.e., not a freshman),  $F(1, 289) = 2.72$ ,  $p = .100$ , and being male,  $F(1, 288) = 6.33$ ,  $p = .012$ , were associated with more time spent on the Raven’s items and that being male was also associated with better performance on the Raven’s items,  $F(1, 288) = 6.91$ ,  $p = .009$ . Therefore, gender and freshman status were included as controls in all analyses reported next.

## RESULTS AND DISCUSSION

Analyses of covariance (ANCOVA) controlling for gender and freshman status revealed a significant interaction effect,  $F(1, 284) = 4.22$ ,  $p = .040$ ,  $d = .24$ , CI [2.828, 15.347], which moderated the main effect of interpretation of difficulty,  $F(1, 284) = 4.28$ ,  $p = .040$ ,  $d = .25$ , CI [.015, .477], and the nonsignificant effect of frequency scale,  $F(1, 284) = .06$ ,  $p = .81$ ,  $d = .03$ , CI [-.202, .258]. This interaction is depicted graphically in Figure 4. Time on task was higher in the two motivating interpretations of difficulty conditions ( $M = 38.872$ ,  $SE = 1.52$ ) compared to the two under-

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4. One participant ran out of time and did not complete the demographics measures; another participant did not wish to disclose his or her gender. These participants are not included in analyses that involve these variables.

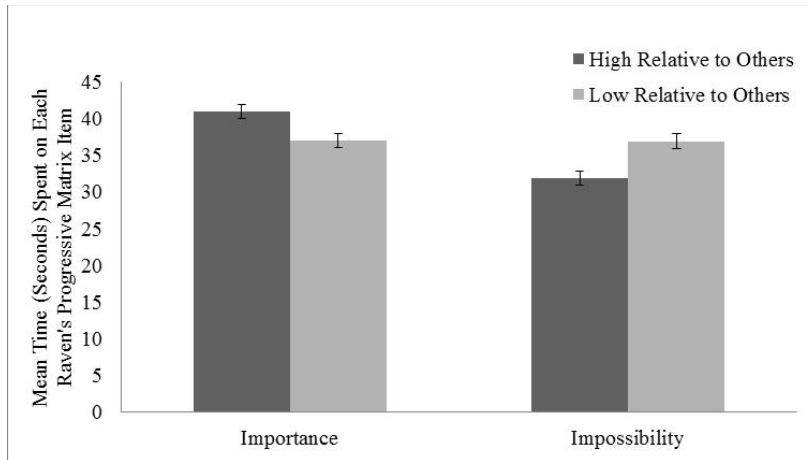


FIGURE 4. Study 2 Mean Time (seconds) spent on each Raven's Progressive Matrix Item: Graph depicts the interaction between interpretation of experienced difficulty in schoolwork and frequency of interpretation relative to others (controlling for gender and class standing).

mining conditions ( $M = 34.570$ ,  $SE = 1.58$ ),  $F(1, 286) = 3.856$ ,  $p = .051$ ,  $d = .23$ ,  $CI [.001, .463]$ <sup>5</sup> controlling for gender and freshman status.

Simple effects show that controlling for gender and freshman status, the effect of interpretation of difficulty is significant in the high frequency relative to others condition,  $F(1, 136) = 7.916$ ,  $p = .006$ ,  $d = 0.49$ ,  $CI [.149, .822]$ . Students spent more time on the Raven's items if they recalled times that they interpreted difficulty as importance more than others compared to if they recalled times that they interpreted difficulty as impossibility more than others. No effect of interpretation of difficulty was found in the low relative to others condition ( $F < 1$ ). The pattern of effects was in the predicted direction for both of the interpretation of difficulty conditions. For interpretation of difficulty as impossibility, students in the high relative to others condition spent less time than students in the low relative to others condition,  $F(1, 141) = 2.865$ ,  $p = .093$ ,  $d = .28$ ,  $CI [-.044, .612]$ . For interpretation of difficulty as importance, students in the high relative to others condition spent more time than students in the low relative to others condition,  $F(1, 141) = 1.522$ ,  $p = .219$ ,  $d = .21$ ,  $CI [-.120, .533]$ .

Time on task correlated with task performance (percentage of items correctly answered) at  $r = .61$ ,  $p < .01$ . Performance was not a direct function of the condition assignment interaction,  $F(1, 284) = .04$ ,  $p = .84$ . However, we predicted an indirect effect of condition on performance via time. Specifically, our prediction was that condition assignment would influence time on task and that time on task would influence performance. To test this prediction, we compared performance in the motivating conditions to performance non-motivating conditions as above. Condition influenced time spent on the Raven's items (unstandardized  $b = 4.301$ ),

5. The reader will note that degrees of freedom increases in this analysis because rather than two factors (interpretation of difficulty, relative frequency), this analysis uses a single factor coded at -1 difficulty means importance less often for the self than others, difficulty means impossibility more often for the self than others, and +1 difficulty means importance more often for the self than others, difficulty means impossibility less often for the self than for others.

$t(3, 286) = 1.96, p = .051$ , and time spent on the Raven's items predicted accuracy overall (unstandardized  $b = .078$ ),  $t(3, 286) = 12.74, p < .001$ . Using the PROCESS computational tool to examine indirect simple mediation (Hayes, 2012), we found the posited indirect effect of condition on accuracy via time. The bootstrap confidence interval for the indirect effect (CI: .0025, .6908) did not contain zero, indicating mediation for the Raven's items. Increasing time spent on difficult tasks pays off in terms of better performance, and whether time is spent on difficult academic tasks is influenced by how students interpret their experienced difficulty relative to their peers.

## GENERAL DISCUSSION

American college students want to succeed academically, but invest too little time pursuing academic success (e.g., Arum, Roksa, & Cho, 2011). Structural reasons for academic disengagement, including stereotype threat (see Steele, 1997) and lack of economic resources (see Jackson, 2010; Orfield, Losen, Wald, & Swanson, 2004) are important but do not explain underinvestment in non-stigmatized and non-economically disadvantaged students. To understand this larger issue, in the current article we synthesized social cognition (e.g., Bless & Schwarz, 2010) and identity-based motivation (Oyserman, 2007, 2009) approaches to predict that social context influences interpretation of experienced difficulty in the academic domain. That is, difficulty with schoolwork can be interpreted either as implying that one should turn one's attention elsewhere ("schoolwork is impossible for me") or that one should increase effort ("schoolwork is important to me") and students are likely to have had both interpretations at differing times in the past. Whether having had a particular interpretation in the past is motivating should depend on what it implies and the relative frequency one has had this interpretation compared to others.

Indeed, considering times in which experienced difficulty implied that schoolwork is important and worth one's time created a sense that schoolwork was identity congruent and increased time on task for students led to believe that they had this interpretation more frequently than others. The reverse was also true. Considering times in which experienced difficulty implied that schoolwork is impossible and not worth one's time created a sense that schoolwork is identity congruent and increased time on task for students led to believe that they had this interpretation less frequently than others. Time on task mediated task success. Given that the task was an intelligence test, results provide a strong demonstration of the socially contextualized motivational power of interpretation of experienced difficulty.

Effects were stronger if we guided students' recall and also guided how they interpreted their relative standing so that their own memory seemed to validate the impression created by the priming task. Our results demonstrate that students are sensitive to the experience of others in making sense of their own experiences of difficulty with schoolwork and that even negative experiences can be positive if one is doing relatively better than others.

Our manipulations showed small, significant effects in an important domain. Like any set of studies, our studies have a number of limitations. First, it would be useful to test our effects using a variety of operationalizations of academic engagement. For example, we show an effect of interpretation of experienced difficulty on engagement and investment which appears similar to other research showing effects on executive functioning for students led to believe that school ability is a malleable skill (Autin & Croizet, 2012). The interplay between these mindsets seems to be an important avenue for future research. That said, initial results suggest that each of these mindsets or interpretations explains unique variance in students' efficacy and that endorsement of one set of beliefs is not correlated with endorsement of the others (Oyserman, 2015; Oyserman et al., 2014). Second, it would be useful to know the circumstances in which our manipulations yield lasting or more ephemeral results. Our results show that effects can occur and awake further examination of conditions in which they are likely to be consistently brought to mind.

Our results complement a number of contemporary construal models of goal pursuit (e.g., Kruglanski et al., 2002; Trope & Liberman, 2003; Vallacher & Wegner, 1987). Of particular interest is the integration of our results with the predictions from action identification (Vallacher & Wegner, 1987) and temporal construal models (Trope & Liberman, 2003). Both models distinguish concrete, low-level construal (how to do it) from abstract, high-level construal (why do it). Action identification theory (Vallacher & Wegner, 1987) predicts that to take action, people need to shift from high-level "why" goals such as doing well in school to lower-level "how" goals such as spending time on school work. Construal level theory (Trope & Liberman, 2003; Liberman & Trope, 2008) predicts that goals associated with high-level "why" construal are perceived to be more important than goals associated with low-level "how" construal. Goals construed at a high-level feel meaningful but are temporally distal, so students do not feel constrained in planning how they will actually attain them (Liberman & Trope, 1998), leading to both lack of preparation and to overly optimistic estimates about the likelihood of distal goal attainment (the planning fallacy, Buehler, Griffin, & Peetz, 2010; Gilovich, Kerr, & Medvec, 1993; Kahneman & Tversky, 1979).

In our studies, experiencing academics as identity-congruent can be seen as a "why" response and investing more time in schoolwork as a "how" response. Interestingly, our participants seemed to be both more "why" and more "how" engaged if they were made to believe that they experienced difficulty as importance more often than others or if they were made to believe that they experienced difficulty as impossibility less than others. IBM theory predicts that one needs both a "why" explanation for experienced difficulty (because it is identity-congruent) and a "how" explanation (by engaging in identity-congruent behaviors) in order to motivate action. Without a "why" explanation, one might know how to succeed but not see the importance of doing so for the self (it is not for me); without a "how" explanation, one might know why to work hard (it is for me) but strategies to do so will not be readily apparent.

From an evolutionary perspective, it makes sense that people have mechanisms to encourage investing energy in pursuit of important goals as well as to trigger turning away from pursuit of impossible goals that are simply out of reach, not worth the time (Charnov, 1976; Nesse, 2009). In the current studies, we focused on the first part, triggers that encourage investing energy. It is possible, though, that when a student sees a task as out of his or her reach because of experienced difficulty, it would be useful to switch to another task or to another goal entirely. Quitting one goal could then facilitate moving onto another, though the evidence suggests that quitting is difficult (Worsch, 2010). Students might use this method to reframe, if a particular academic goal feels impossible, they could switch to another or ask themselves what else they need to give up to make their academic goal possible to attain. Of course it is critical to know when this switching involves another academic goal and when it involves a goal that competes with academics. While the current studies were not aimed to answer this question, it is an important issue both theoretically and practically. Future work could address this issue, for example, by priming participants with both academic and social goals, providing relative standing feedback on both, and seeing how participants respond.

While our studies involved experimental manipulation, they are likely to be applicable to everyday time investment of students. Our results imply that students will be sensitive to contextual cues of relative standing. Even something as prosaic as learning that test results are curved can matter. A curve implies that everyone experienced difficulty so raw scores cannot be used. The interpretation for those on the top of the curve is that they experienced difficulty as impossibility less frequently than others, implying that school engagement is identity-congruent for them. The interpretation for those at the bottom of the curve is that they experienced difficulty as impossibility more frequently than others, implying that school engagement may not be identity-congruent for them. These interpretations are consequential; students at the bottom of the curve may invest less time studying for the next exam, a proposition that deserves empirical test.

## CONCLUSION

If experienced difficulty engaging in schoolwork is (mis)interpreted as signaling that school success is impossible, then school engagement feels less like a “me” thing to do and attention shifts. Schoolwork is not worth one’s time. In contrast, framing difficulty as a signal that school success is important increases students’ sense that school engagement is a “me” thing to do. Then students not only prioritize schoolwork, but also spend more time on difficult tasks, increasing the likelihood of success. Taken together, our results highlight that the interpretation of experienced difficulty matters for school outcomes. Academic engagement and ultimate success depends on how experienced difficulty is interpreted in light of the (presumed) interpretive experiences of others.

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