Improving academic effort and achievement among low-income minority youth

using small scale interventions

by

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ABSTRACT

The dissertation uses a contemporary motivation theory, identity-based motivation, to predict when and how motivation can be leveraged to improve attainment among low-income, minority students. Identity-based motivation theory predicts that people prefer to act in identity-congruent ways but are sensitive to contextual cues that influence which identities come to mind, what these identities mean in context, and how difficulty is interpreted (e.g., Are people like me succeeding? When I experience difficulty with schoolwork, does that mean the work is impossible or important?). Following these predictions, the first paper examines gender as a identity that can be framed as congruent or incongruent with achievement success to increase or decrease motivation. In the second paper, I turn to interpretations of difficulty in the classroom and show that contextual cues about difficulty can improve or undermine motivation depending on whether students accept or reject the messages they communicate. Lastly, the third paper attempts to leverage students' and professionals' past experiences of success despite difficulty to promote interpretations of difficulty that support motivation in response to difficult tasks in the present. The final chapter provides a theoretical synthesis across these three papers and considers the implications of these results for intervention and policy to encourage student motivation and success.

Chapter I

Introduction

Although most adolescents expect to attend and graduate from college (Mello, 2009; Trusty, 2000), only 28% of men and 36% of women successfully do so. Youth from low-income and minority backgrounds—and young men in particular—are disproportionately unlikely to graduate from college; Whites (39%) are more likely to finish college than Blacks (20%) and Latinos (13%) (NCES, 2012). These disparities have far-reaching consequences for individuals, communities, and society. At an individual level, college graduates enjoy higher incomes (Baum, Ma, & Payea, 2010) and lower unemployment (Shierholz & Edwards, 2011) than non-graduates, and, at a societal level, fewer graduates translates to lost economic benefits and more government spending (Baum, Ma, & Payea, 2010). The goal of the proposed dissertation is to test theory-based approaches to increasing the number of disadvantaged youth pursuing higher education. Rather than adopting the perspective that these outcome inequalities can only be ameliorated through changes at the social-structural level, my dissertation examines the immediate psychological context surrounding everyday decisions about effort at school as one key mechanism underlying these disparities. I expect students' motivation to reflect contextual information about what people like them do and how they respond to difficulty, and this information is processed through the lens of the self.

The role of the self in motivation

Many theories of motivation expect the self to matter for goal-directed behavior, describing the self as guiding individuals towards some goals and away from others (e.g., Carver & Scheier, 1981, 1990; Deci & Ryan, 1985; Gollwitzer, 1999) and shaping how goals are pursued (e.g., Higgins, 1997; Spiegel, Grant-Pillow, & Higgins, 2004; Liberman, Idson, Camacho, & Higgins, 1999). One concretization of how the self directs motivation is through possible selves (also termed possible identities), which are positive and negative images of oneself in the future (Markus & Nurius, 1986). These future selves direct current effort and have been linked to successful self-regulation towards academic achievement (Oyserman, Bybee, Terry, & Hart-Johnson, 2004) and health goals (Hooker & Kaus, 1994) and away from delinquency (Oyserman & Markus, 1990a, 1990b). Other theorists use similar concepts, albeit different terms, to understand student motivation; expectancy-value theorists measure students' future expectations in order to predict current effort and achievement (Eccles et al., 1983; Feather, 1982; Wigfield & Eccles, 1992). As these theories anticipate, possible selves indeed matter for college attendance outcomes; students who report expecting to attend college are more likely to enroll (Beal & Crockett, 2010; Ou & Reynolds, 2008; Uno, Mortimer, Kim, & Vuolo, 2010). However, while 80% of adolescents report expecting to attend college (Mello, 2008), fewer than half of them realize their expectations, as evidenced by the college attendance rates reported earlier. These low rates of actual college attendance, particularly among low-income minority youth, illustrate that holding these college-bound possible selves does not necessarily translate into successful college enrollment. As argued elsewhere (see Oyserman & James, 2009, 2011), students' possible selves can provide a link between current action and later educational expectations, but this link does not always lead to academic effort.

Simply imagining positive things for the self does not necessarily translate to action to achieve them, and the dissertation uses the theory of identity-based motivation (IBM; Oyserman, 2007, 2009) to investigate the circumstances under which the self motivates effort. Building upon theories of situated social cognition (e.g., Fiske, 1992; Schwarz, 2007; Smith & Semin, 2004, 2007), IBM theory offers testable predictions about the role of contextual factors in shaping which goals feel self-relevant and possible in the moment. In the case of low-income minority students, IBM theory predicts that if contextual factors cue students' college-bound aspirations and frame academic success as relevant and possible for people like them, then students will take action towards these goals. Once begun, action towards achievement goals will persist when difficulty encountered in their pursuit is interpreted as signaling task importance rather than impossibility. A full discussion of the IBM model can be found elsewhere (Oyserman 2007, 2009a, 2009b), but next I outline the model components most relevant to the dissertation, highlighting the predictions addressed by the dissertation studies.

How Do Identities Shape Possible Selves & Academic Outcomes?

Focusing first on the role of personal and social identities, IBM theory argues that individuals are motivated to engage in actions that feel identity-congruent. In other words, people prefer behaviors that feel like something that people like them do. But what determines which identities matter for behavior in the moment? Given that the self is so large that only some aspects can be accessed at any one time (e.g., Markus & Wurf, 1987), moment-to-moment motivation is shaped by the identities that are most salient. Diverse aspects of the self can be brought to mind, including personal identities (e.g., an avid reader, a coffee drinker, a student), relational identities (e.g., best friend, father, sister), and social identities (e.g., gender, race, nationality, class). IBM theory predicts that these identities carry with them a set of related

thoughts and behaviors, which are more likely to occur when the identity is salient, in a process termed action-readiness. As a result, these identity-linked thoughts and actions are more likely to occur, regardless of whether they support or undermine academic effort. Thus not all identities are equally likely to cue college-bound possible selves and encourage academic success.

A large body of research demonstrates the effects of identity salience—specifically, social identity salience—on academic outcomes. This focus on social identities make sense due to both their connection to achievement disparities as well as their status as broad, frequently prominent categories that carry stereotypes as to what group members do and are capable of doing (e.g., Hogg, 2003; Tajfel & Turner, 1987). Numerous studies based on stereotype threat theory find that being reminded of a negatively stereotyped social identity undermines performance in stereotyped domains (e.g., Schmader, 2010; Spencer, Steele, & Quinn, 1999; Steele, 1997; Steele & Aronson, 1995). Alternatively, cues that bring to mind positively stereotyped identities can boost performance (e.g., Shih, Pittinsky, & Ambady, 1999; Walton & Cohen, 2003). Whether it helps or hinders achievement, having a stereotyped identity in mind promotes stereotype-consistent performance.

IBM theory assumes that these connections between stereotyped identities and behaviors are not static or stable. Instead, IBM theory predicts that not just identity salience but *identity content* is dynamically constructed in context. The IBM model is illustrated in Figure 1, and the model situates identities as subject to both chronic and momentary contextual influences. Much as the self can be understood in many ways, only some of which are held in mind at any time, IBM argues that any particular identity has multiple aspects that may or may not be brought to mind in a given context. Consider gender identity; what being a boy means may differ quite significantly across contexts such as when sitting in language arts class, playing basketball in

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gym class, or babysitting a younger sister. In the case of racial identity, having the identity in mind can either benefit or undermine academic motivation depending upon how students construe their racial identity in the moment. In one set of relevant studies, students were asked to describe their racial-ethnic identity either before or after completing a novel math task. Students who were randomly assigned to report their racial-ethnic identity prior to the math task worked harder on the task, but only if they described school effort as congruent with their racial-ethnic identity (Oyserman, Gant, & Ager, 1995; Oyserman, et al., 2003). In this way, the content of salient identities mattered for academic effort, but these studies did not directly address the dynamic construction of this content.

The first paper (Chapter II) of the dissertation will address this gap by testing directly whether contextual cues can shape the content of identity with downstream effects on possible selves and academic performance. As illustrated by Figure 1, the IBM model predicts that identity content will affect possible selves (Path 1) and academic performance (Path 2). Directly manipulating identity content offers a strict test of IBM theory's prediction that identity content is malleable. The study in Paper 1 (Chapter II) focuses on gender identity, testing whether contextual cues can encourage boys to work harder at school by framing their gender as congruent with achievement success.

How Do Interpretations of Difficulty Matter for Academic Outcomes?

Returning to Figure 1, IBM theory also predicts that students' theories about difficulty influence the possible selves they imagine and their subsequent academic success. All students naturally encounter difficulty in their education; school success becomes progressively harder over time. To understand student responses to this difficulty, the IBM model includes the interpretation of difficulty, postulating that difficulty is a metacognitive experience that requires

interpretation (Oyserman, 2009a, 2009b). IBM argues that students will persist in working toward their school goals only when encountered difficulties are interpreted as evidence that their goals are worthwhile and important.

Past work has considered responses to difficulty along a continuum, illustrating that effort can increase in response to difficulty, but when tasks become too difficult, effort decreases (Brehm & Self, 1989). Research on fluency, however, suggests that difficulty is interpreted in context, rather than existing along a simple continuum (e.g., Schwarz, 2004). School tasks may feel difficult due to their challenging content, but there are also factors beyond content (i.e., figure-ground contrast, clarity of print, font) that can also create a metacognitive experience of difficulty if disfluent or difficult to process (e.g., Oppenheimer, 2006; Reber & Schwarz, 1999). Context shapes how disfluency is interpreted; for example, compared to fluent versions, difficult to read behaviors are judged as more instrumental for goals (Labroo & Kim, 2009) and difficult to read cognitive tasks are processed more carefully and accurately (Alter, Oppenheimer, Epley, & Eyre, 2007). These effects were applied in the school context by researchers who manipulated the font of course material for students in honors and advanced placement courses; students receiving course materials in difficult to read font performed better than their peers with clearly printed materials (Diemand-Yauman, Oppenheimer & Vaughan, 2010). In that study, students responded to the disfluent materials with increased effort, potentially because students interpreted difficulty as a sign that they needed to keep working.

Building upon these processing fluency results, similar logic has been applied to interpretations of the difficulty inherent in tests. Efforts to improve test performance have targeted the feelings that accompany taking difficult tests; test performance improved as a result of messages that framed the testing experience as an opportunity to learn new things rather than

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demonstrate ability (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010) or reframed feelings of physiological arousal as helpful bodily preparation for a challenge (Jamieson, Mendes, Blackstock, & Schmader, 2010). Similarly, reframing adolescents' experience of difficulty as the normal feeling that accompanies learning led to improved performance on working memory and academic tasks (Autin & Croizet, 2012). These various approaches support IBM theory's assumption that difficulty is an experience that can be interpreted in divergent ways that have implications for performance.

In order to predict when difficulty encourages versus undermines effort, IBM theory predicts that the self is involved in making sense of the metacognitive experience of difficulty, providing a lens through which difficulty is interpreted (Oyserman, 2009a, 2009b). The link between identity and interpretations of difficulty is represented in Figure 1. Depending on the identity that is in mind, difficulty may be interpreted as a sign of task importance or task impossibility. Students for whom school success is identity-congruent (i.e., possible for people like them) are likely to interpret the feeling of difficulty at school as an indication of their commitment to their school success—a sign of the importance of school success, rather than its impossibility. On the other hand, IBM predicts that students who perceive school success as identity-incongruent will interpret the experience of difficulty at school as evidence that school success is impossible for them. This latter scenario may describe many of the encounters that low income and minority youth have with difficult coursework, particularly those in school contexts where failure seems likely.

Fortunately, research suggests that these interpretations of difficulty are sensitive to contextual influence rather than fixed. Field experiments with low income and minority youth that framed difficulty at school as a sign of importance led youth to generate more school-

focused future selves and perform better on difficult math and writing tasks (Smith, Novin, Elmore, & Oyserman, 2014). This work also indicated that receiving the message that difficulty signals importance is particularly critical for low income minority students, who automatically interpreted difficulty at school as a sign that school success was impossible for them unless reminded that difficulty can mean importance (Smith, Novin, Elmore, & Oyserman, 2014). These results suggest that students will persist on difficult school tasks only when difficulty encountered along the way is interpreted as evidence of task importance.

Papers 2 (Chapter III) and 3 (Chapter IV) of the dissertation build upon these promising findings by investigating ways to encourage effort-energizing interpretations of difficulty; these new approaches can help inform both intervention and IBM theory. Paper 2 considers messages that teachers can use to encourage students in their classrooms to interpret difficulty as a signal of task importance. Simply telling students that they should interpret difficulty as importance may not work for all students, and in fact it may evoke reactance among adolescents seeking to demonstrate their autonomy. Paper 2 of the dissertation examines the conditions under which messages about difficulty have their anticipated effects on student performance. By measuring students' endorsement of messages about difficulty, Paper 2 considers the potentially divergent effects of message endorsement versus rejection in response to two types of messages (difficulty means importance and difficulty means impossibility). In examining the potential for students' reactance to support or undermine motivation, depending upon the message about difficulty in question, this study suggests new potential intervention approaches. In addition, Paper 2 offers additional support for Path 3 linking interpretations of difficulty to achievement in Figure 1.

Finally, Paper 3 examines an alternative approach to promoting the interpretation of difficulty as a sign of task importance rather than impossibility. Simply holding positive images

of the self in the future may or may not support motivating interpretations of difficulty in the present. Rather than imagining the future, perhaps looking to the past would be more helpful to keep one going in the face of difficulty. Recalling memories in which one's past self effectively navigated difficulty, increased effort, and succeeded may be useful in ways that positive thinking about the future is not. Paper 3 will again test Path 3 linking interpretations of difficulty to achievement (Figure 1) but also will provide insight into the role of past identities in the model by investigating the effect of mental time travel to a past success over difficulty on interpretations of difficulty in the present. Recalling a past success has the potential to cue an identity as the type of person who is efficacious and able to triumph over difficulty.

Each paper of the dissertation tests core theoretical predictions as outlined above, namely that framing school success as identity-congruent and that interpreting difficulty with schoolwork as importance rather than impossibility will both improve academic motivation. The papers in the dissertation address these questions with multiple methods (field experiments, online studies, and lab-based studies) and across samples (children, college students, and adults). These diverse approaches examine a general process of motivation that has particularly relevant implications for low-income and minority students.

Figure 1

Model of Identity-based Motivation Theory
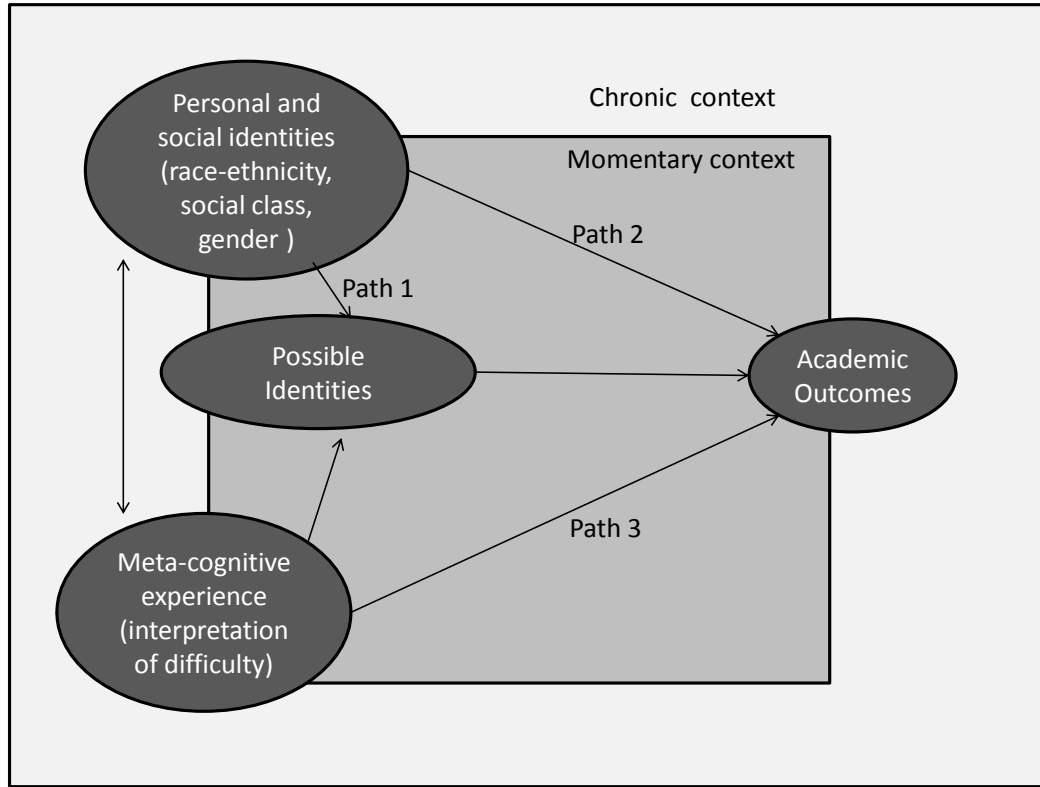
Note: The model reflects the full Identity-based Motivation theory, but the labeled paths are those that relate most closely to predictions addressed by the current studies.

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Chapter II

If 'we' can succeed, 'I' can too: Identity-based motivation and gender in the classroom

"I think girls work harder than boys. Maybe not doing your work is a sign of being cool." (Male middle school student, Portland Press Herald, 2006)

"Girls are a lot more organized. Every homework I remember to do is because it's still in my head. In contrast, 90 percent of the girls have the neat handwriting, the notebook, the color-tabbed notes." (Male high school student, Portland Press Herald, 2006)

The boys quoted in the Portland Press Herald (2006) experience school as gendered. The first boy identifies working hard in school as a girl thing, something not cool for boys. The second boy identifies organization as a skill girls have and boys simply do not have. If working hard is not cool for boys and being organized seems just not possible for boys, then whenever their gender is salient, male students do not need to seriously weigh the pros and cons of choices such as studying vs. goofing off. Instead, they know they are boys, and this identity directs their choices. In that sense, their choices feel identity-based and identity-congruent but are likely to produce negative academic consequences for them as well as for other boys who identify school as gendered.

Indeed, nationwide girls seem to rule the classroom, outperforming boys on virtually all visible indicators of classroom success, particularly among low income and minority populations

(EPE Research Center, 2007; Roderick, 2003). Girls participate more in academic clubs, student government, and school newspapers (Bae, Choy, Geddes, Sable, & Snyder, 2000), select harder courses (King, 2006), earn better grades (Peter & Horn, 2005), and equal (math) or outperform (language arts) boys on standardized tests (CEP, 2010). Girls finish high school (EPE Research Center, 2007) and go on to college (King, 2006) at higher rates than boys. We use an identity-based motivation perspective to consider the implications of this experience for children's identities and effort in school. We make two core predictions: first, that both boys and girls are sensitive to gendered cues about who is likely to succeed in school; and second, that this sensitivity influences both the content of children's identities and their willingness to work hard at academic tasks. With regard to identity content, experiencing one's own gender as successful means that academics are more likely to be salient in one's own imagined possible future identity. Similarly, with regard to current investment in school tasks, experiencing one's own gender as successful means that one should be willing to persist even if a task feels difficult. With regard to expectations for their adult success, experiencing one's own gender as successful implies that one should expect success in adult career and educational endeavors as well.

The idea that current success matters for future identity construction was described in early writings by Erikson (1963). During adolescent identity development, youth seek clues in their present situations about the adult they may become. Both one's own current successes and the successes of people like oneself are useful in predicting who one may become: one's future adult identity. Erikson (1963) also emphasizes that identity development is rooted in socio-historical and cultural context. In his description of the 'Eight Ages of Man,' Erikson (1963) tasks adolescents with the challenge of integrating how they view themselves with the roles available to them in this context. This requires that they fit their individual "dreams,

idiosyncrasies, roles, and skills cultivated earlier with the occupational and sexual prototypes of the day" (Erikson, 1963, p. 307). From his perspective, both boys and girls are sensitive to messages about gender as they seek information about the identities currently available to members of their group. If in the current time and place, a look around the classroom leads boys and girls to the conclusion that girls are more successful, then Erikson would predict that girls would be more likely to develop success-based identities. As reviewed next, a similar argument could be made based on the gender identity literature which provides evidence that gender is part of children's self-image from an early age. These perspectives predict a gender effect with girls working harder than boys in school and girls having more school-focused possible selves or future identities than boys. However, what these perspectives neglect is that whether gender comes to mind, and its consequences for behavior and identity content, are not fixed. Instead, context dynamically determines whether gender is salient and shapes what identity content is linked to gender. As predicted by identity-based motivation theory, girls and boys are sensitive to subtle cues about what it means to be a boy or a girl but not to the source of these cues. In the current study, a small experimental manipulation shifts the salience of academic success in children's imagined future identities (both for the coming year and as an adult) and increases boys' current effort in school.

Gender Identity

Why should gender matter? Gender is a core identity; it is established early, and there is evidence that it is consequential for both boys and girls. Boys and girls know their own gender before their second birthday (Martin & Ruble, 2009), and knowing whether one is a boy or girl influences what one prefers to do and what feedback matters. Preschoolers increase their effort on a maze task after being shown the successful maze completion of a same-gender child and

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decrease their effort on the task after being shown the successful maze completion of an opposite gender child (Rhodes & Brickman, 2008). Both boys and girls scan their environments for gender-connected information, constructing gender stereotypes about the traits, abilities, and behaviors of boys and girls (Bigler & Liben, 2007; Patterson & Bigler, 2007). Having learned their own gender, boys prefer behavior that is gender-typed as male, whereas girls prefer behavior that is gender-typed as female (for a review, Martin & Ruble, 2009). When asked about future occupations, boys express more interest in professions stereotyped as masculine, whereas girls are more interested in feminine-stereotyped professions (Liben, Bigler & Krogh, 2001). Even in experimental situations in which novel toys are presented as preferred by boys or girls, girls report more liking of the toy that girls prefer (and boys like the toy they are told is preferred by boys) even if it is a less attractive toy (Martin, Eisenbud, & Rose, 1995).

While gender stereotypes may become more flexible during adolescence, this does not mean that the influence of gender fades. There is some evidence that both genders remain interested in engaging in gender congruent action during adolescence (Martin & Ruble, 2004; Alfieri, Ruble, & Higgins, 1996). It is possible that gender may become an even more salient determinant of identity and behavior during puberty. First, physical changes may make gender even more psychologically salient. Second, pubertal adolescents are rewarded for engaging in gender-congruent behavior (Eccles et al., 1983; Hannover, 2000; Hill & Lynch, 1983). Third, effects of gender identity on behavior are not necessarily consciously chosen. Consider the research on stereotype threat which documents that standardized test performance of both women and men is influenced by making gender salient (for a review, Steele, Spencer & Aronson, 2002). As documented by Spencer, Steele & Quinn (1999), effects are congruent with gender stereotypes about capabilities, with women showing a decline in math performance if

gender is subtly brought to mind. The effect of gender is completely eradicated if participants are either informed of the effect (Johns, Schmader, & Martins, 2005) or told that there are unlikely to be gender differences on the particular task being performed (Spencer et al., 1999).

While the stereotype threat literature has focused primarily on the negative effects of gender identity for women, there is some support for the notion that boys may be more influenced by gender than girls. First, what gender-congruent behavior entails may be more tightly defined for boys than for girls. Second, boys are more likely to be sanctioned for failing to pay attention to the gender relevance of behavior. Boys prefer gender-congruent behaviors at an earlier age than girls (Bauer, 1993). They face more criticism for engaging in gender-incongruent play activities (Fagot, 1994; Fagot, 1985) and show more interest in enforcing and adhering to gender norms (Leaper & Friedman, 2007; Leaper, 1994) than girls. Even parents reinforce more narrow gender roles for boys than for girls (Fagot & Hannon, 1991). More broadly, it is possible that boys are more sensitive to many types of environmental cues beyond information about gender. In support of this gender-specific sensitivity, findings from correlational studies examining the influence of parents (Morisset, Barnard, & Booth, 1995; Bee et al., 1984) and neighborhoods (Oyserman, Johnson, & James, 2010; Entwisle, Alexander, & Olson, 1994) on child outcomes indicate increased sensitivity to environmental influence among males as compared to their female peers.

Taken together, the gender identity literature documents that gender identity is established early and that from an early age children care about what their gender implies for their own actions. Gender, gender identity, and gender-based stereotypes continue to matter as shown in the stereotype threat literature, which shows that contexts which make gender salient can influence outcomes outside of one's awareness. While the gender identity literature focuses

on the stability of identity content, we now turn to the identity-based motivation literature which focuses on the dynamic and situated nature of identity.

Identity-Based Motivation

Identity-based motivation theory (IBM) assumes that the self-concept is multifaceted, including many diverse and not well integrated identity-components whose content is dynamically constructed in context (Oyserman, 2007, 2009a, 2009b; Oyserman, Fryberg, & Yoder, 2007). People prefer identity-congruent to identity-incongruent behaviors. Furthermore, people are more likely to use identity-congruent than identity-incongruent lenses to interpret their social and physical world. IBM specifies this underlying motivational process with three core postulates which can be termed *action-readiness*, *dynamic construction*, and *interpretation of difficulty* (Oyserman, 2009a; Oyserman & Destin, 2010). Action-readiness refers to the prediction that identities cue readiness to act and to make sense of the world in terms of the norms, values, and behaviors relevant to the identity. However, which actions are relevant and what sense to make of situations depends on identity content, which itself is dynamically constructed. Dynamic construction refers to the prediction that which identities come to mind, what these identities are taken to mean, and therefore which behaviors are congruent with them are dynamically constructed in context (even though identities feel stable and separate from contexts). The third postulate, interpretation of difficulty, refers to the prediction that when a behavior feels identity-congruent, difficulties in engaging in the behavior will be interpreted as meaning that the behavior is important not impossible. Therefore, effort is meaningful not pointless. Thus, the interpretation of difficulty matters because it influences judgment, choice, and behavior.

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These three postulates explain both how it is that identities feel stable but are instead malleable and why it is that school success needs to feel identity-congruent. William James (1890) first articulated a version of these postulates by arguing that the self includes content, motivation, and action tendencies, that social contexts matter for who one is in the moment, and that the self is malleable. In that sense, the identity-based motivation approach is rooted in the earliest psychological formulation of the self-concept. The novel approach that the identity-based motivation model brings is twofold. First, it focuses on predicting *when* and *how* aspects of the self-concept matter by operationalizing the three core postulates (action-readiness, dynamic construction, interpretation of difficulty) in a manner amenable to experimental manipulation. Second, it focuses on experimental methodology to test the efficacy of these postulates to predict behavioral outcomes in the moment and to form the basis for interventions influencing behaviors over time. Like James, the IBM model invokes both current and possible future identities, the identities one has now and the ones a person can imagine becoming in the future. The term possible identities is used in preference to the more commonly used *possible selves*, because as detailed in Oyserman and James (2011), what is typically studied in the possible self literature is some possible identity or part of the future self, such as the successful in school self or the salary-earning self, not the future self in its entirety. Rather than refer to both parts and the whole as self, we refer to possible identities as composing the future self.

As outlined next, prior identity-based motivation studies have demonstrated the contextual sensitivity of social identities including race-ethnicity, social class, and being an undergraduate or graduate student. In some studies, a social identity was made salient in an experimental induction; in other studies the content of a social identity such as race-ethnicity was assessed. However, prior research has not focused explicitly on gender identities. By focusing on

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gender identity and manipulating contextual cues of whether one's gender is associated with success, the current study moves beyond prior gender identity and IBM research as detailed next.

In perhaps the most relevant prior research, Oyserman, Fryberg and Yoder (2007) showed that racial-ethnic and social class identities are associated with consequential beliefs about health. Students were asked whether they themselves or people like them engage in a variety of health and health risk behavior. Healthy behaviors such as eating salads or keeping one's weight down as an adult were generally not perceived as congruent with working class and minority racial-ethnic identities (Oyserman et al., 2007, Studies 1-2). A series of follow-up experiments documented that whether healthy or health risky behaviors felt identity congruent matters when identity is salient. Low income and minority eighth graders were asked about their social class and racial-ethnic identities either before or after a healthy behavior quiz. Students performed worse on the quiz if their social class and racial-ethnic identities had been brought to mind before the quiz, implying that health risky, not healthy behavior, felt identity congruent (Oyserman et al., 2007, Study 3). This result was replicated using a measure of health fatalism rather than a health quiz. Students reported more fatalism about their future health if their social class and racial-ethnic identities had been brought to mind first, again implying that health risky, not healthy behavior, felt identity congruent (Oyserman et al., 2007, Study 4). To test whether effects were due to the perception that health risk behavior, rather than healthy behavior was identity congruent, three follow-up experiments tested the moderating effect of identity content. As predicted, making racial-ethnic identity salient only had negative consequences for participants who perceived unhealthy behavior as identity congruent and healthy behavior as identity incongruent (Oyserman et al., 2007, Studies 5-7).

Racial-ethnic identities also were shown to matter for academic outcomes in a number of studies (Oyserman, Gant, & Ager, 1995, Study 2; Oyserman, Kemmelmeier, Fryberg, & Brosh, 2003, Studies 2 and 3). In these studies, students were randomly assigned to describe the content of their racial-ethnic identity either before or after working on a novel math task. Students who first brought to mind their racial-ethnic identities worked harder on the math task, but only if their racial-ethnic identity included school-attainment as ingroup congruent, not otherwise (Oyserman, et al. & Ager, 1995, Study 2; Oyserman, et al., Studies 2 and 3). These experiments pinpoint the causal effects of salient racial-ethnic identity content. Follow-up studies using short term longitudinal designs rather than experimental manipulations replicate results while increasing the ecological validity of the experimental results. In one study, African American and Latino low income students reported on the content of their racial-ethnic identity at four points in time (fall and spring of eighth grade and fall and spring of ninth grade) (Altschul, Oyserman, & Bybee, 2006). The three assessed components, termed connectedness, awareness of racism, and embedded achievement, were not only relatively stable across time but also predicted grade point average over time. In another study, the racial-ethnic identity, grade point average, and classroom engagement of entering high school students were assessed (Oyserman, 2008). Here too, racial-ethnic identity content at the beginning of high school predicted change in grades and engagement four years later. Thus, whether racial-ethnic identity was induced to be salient with an experimental manipulation or simply assessed over time, identity content mattered as predicted by the IBM model.

Other research has sought to manipulate the content of a relevant social identity and demonstrate the effect of identity content in this way. In one experiment, a group of university undergraduates were made to believe that graduate students were particularly heavy consumers

of alcohol. These undergraduates subsequently reported less interest in and less consumption of alcohol, an effect interpreted as signaling distance from the undesired identity of graduate student (Berger & Rand, 2008). In another field study, Livestrong wristbands were distributed to a campus dorm, and wristband wear was measured among dorm residents. A week later, wristbands were distributed to a neighboring academic dorm known for being the "campus geeks." After the second distribution, wristband wear decreased by a third in the target dorm, as wearing the wristband could signal an undesired "geek" identity (Berger & Heath, 2008). These studies imply that associations between particular identities and certain products or behaviors can be successfully manipulated. Effects have also been found for health promotion behaviors. Health messages to reduce caffeine consumption were more persuasive to East Asian participants when they were collectively-focused and more persuasive to European American participants when they were individually-focused, but only when the relevant cultural frame was first primed (Uskul & Oyserman, 2010). Similarly, cancer awareness leaflets (published by Cancer Research UK) that described prevention strategies increased readiness to take preventive action among participants who described themselves as cautious and prevention-focused if they were first reminded of this identity (Uskul, Keller, & Oyserman, 2008).

Moreover, experimentally induced effects are robust; Oyserman and colleagues used the identity-based motivation model as the basis for intervention in schools (Oyserman, Terry, & Bybee, 2002; Oyserman, Bybee, & Terry, 2006). They designed classroom-based activities to create a sense that school success is a possible identity, congruent with other important social identities, and to encourage an interpretation of difficulty as meaning that engaging in school is important (rather than a sign that success is impossible). Follow-ups at one and two years post intervention showed effects for academic outcomes (grades, test scores) and effort (attendance,

homework, in-class behavior). Effects were mediated by changes in students' school-focused possible identities (Oyserman, et al., 2006). In intervention but not control group students, believing that success in school was a possible future identity was positively associated with racial-ethnic identity (Oyserman, et al., 2006). Following these experimental manipulations of identity-congruence based on identity-based motivation theory, the current study explicitly tests the malleability of gender identity in relation to motivation at school.

Current Study: Hypotheses and Research Design

Following identity-based motivation theory, we predict that children will be sensitive to subtle contextual cues about the gender-identity congruence (vs. incongruence or irrelevance) of school success. Specifically, when primed to consider success as gender-identity congruent, children will imagine more school-focused possible identities, work harder on difficult school tasks, and believe that they will be generally successful relative to other Americans (finishing more years of schooling and earning more).

To test our predictions, we use a between-participants experimental design. Children are randomly assigned to experimental or control conditions in which graduation rates and adult income are presented either with or without gender information. We chose graduation and income as context cues for two reasons. First, these are ecologically valid descriptors of gender-based differences. Second, as described next, prior research shows that current school success and future occupational success are linked in children's minds by middle school. In a set of studies with urban, low-income and minority youth, Destin and Oyserman (2010, Study 1) first asked 12-13 year olds to imagine themselves in ten years and the job they would most likely have. About half described an education-dependent future identity that was linked to school success, and about half described an education-independent future identity that was separate

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from school success. Children who described their future as education-dependent reported spending more time on homework and, controlling for their prior school grades, attained a better grade-point average by the end of the semester. Results implied that children work harder in school when they see their adult futures as dependent on education. In a follow-up experiment to test the underlying causal process, the authors randomized children to adopt either an education-dependent or an education-independent mindset by showing them information on adult earnings either organized by education-level or not. As predicted, students in the education-dependent condition planned to spend more time on homework that night than students in the education-independent condition. Moreover, eight times as many children in the education-dependent condition completed an extra credit assignment that night (while 3% of students in the education-independent condition completed the assignment, about 24% of students in the education-dependent condition did so, Destin & Oyserman, 2010, Study 2).

Our dependent variables test the theoretically relevant predictions that identity is dynamically constructed in the moment and influences behavior. We use two previously validated measures, operationalizing identity content as the content of next year possible identities (possible selves, following the coding of Oyserman & Markus, 1990) and school behavior as the number of attempts at a novel math task (following Oyserman, Gant & Ager, 1995). We chose the future identity task because it would allow us to see if children's future identities were dynamically constructed, becoming more focused on school when success seemed gender identity congruent. We chose the math task because it provided a measure of effort relevant to the context of the study (math class). We also assessed expectations for adult educational and career success with a two-item measure developed for this study to test the effects of children's current conceptualization of identity on more distal future expectations.

Sample

Participants were eighth-grade students ($n = 149$, 68 male, 80 female, 1 who omitted gender information, 76 African American, 34 European American, 9 Latino, and 30 who gave other responses or omitted this information) enrolled in one of six math classes taught by two teachers in a Detroit-area middle school. Most were from low income families – 68.3% were eligible for free or reduced lunch. Those who were eligible for free lunch came from families with incomes up to 130% of the Federal poverty guidelines ($29,000 for a family of four), and those eligible for reduced cost lunch had families with incomes up to 185% of the Federal poverty guidelines ($40,000 for a family of four).

Procedure

Children participated in their math class (tracked as advanced, regular, or needing-support). They were told that they would be asked questions about how students their age see themselves in the future and that they would see a graph and complete a few academic problems. Randomization to condition occurred within classroom. Specifically, each child was given a 5-page booklet that looked identical from the outside but contained the condition manipulation (displayed in Figure 2.1) inside the front cover on the booklet's first page. Each child saw one of four graphs created from Michigan Census data. The instructions were "*Please look carefully at the graph below then answer the questions below it*." As displayed in Figure 2.1, below each graph were four comprehension questions meant to simulate a graph comprehension activity in math class but serving as the manipulation check. Graphs showed information about income or high school graduation and were presented either as a single bar (control -- no gender information) or as two bars marked by gender. The comprehension questions matched the graph,

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for example *"Men typically earn more than women*," or *"A little more than 75% of all students in Michigan graduate from high school."*

The control condition graphs did not provide gender information: One showed the median income in Michigan (Figure 2.1a); the other showed the percentage of Michigan adults who graduated high school (Figure 2.1b). The experimental condition graphs provided information by gender for income (Figure 2.1c) or high school graduation (Figure 2.1d). Since men earn more than women, in this condition, success was gender congruent for boys, not for girls. Since women are more likely to graduate high school, in this condition, success was gender congruent for girls, not for boys.

On the second page of the booklet, instructions were *"Each of us has some image or picture of what we will be like and what we want to avoid being like in the future. Think about* ***next year*** *-- imagine what you'll be like, and what you'll be doing next year"* followed by the prompt, *"Next year, I expect to be:"* and four lines. Children were asked to list up to four expected identities. Next was the instruction *"Think a minute about ways you would **not** like to be next year -- things you are concerned about or want to avoid being like"* and four lines. Children were asked to list up to four feared identities with the prompt, *"Next year, I want to avoid."* [1]

On the third page of the booklet, instructions were: *"In the lines below, write down as many ways as you can think of to combine the numbers **2, 3, and 7** to obtain **the number 36**. You can add, subtract, multiply, or divide and use each number as many times as you like."* The rest of the page was lined. Students decided for themselves how many attempts to make. [2]

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[1] Based on Oyserman & Markus (1990). The entire text of the measure and format of the responses is available online at http://www.sitemaker.umich.edu/culture.self/measures.
[2] Based on Oyserman et al. (1995) and Oyserman et al. (2003).

On the fourth page of the booklet were two items, "*Select the response that best describes how much farther you expect to go in school*" and "*Select the response that best describes how much money do you think you will earn as an adult,*" each followed by a 5-point response scale (labeled at the end points as 1=*A lot less than the average American*, and 5=*A lot more than the average American*).

Students reported their gender and race-ethnicity on the last page of the booklet.

The study took less than 30 minutes to complete. Each class was thanked and fully debriefed. All were reminded that effort in school matters.

Dependent Measures

School-Focused Possible Identities. We used the method described by Oyserman and Markus to count and content code expected and feared possible identities. Two independent coders double coded a random 20% of responses, yielding an interrater reliability of α=.83. On average, children wrote six possible identities ($M = 5.92$, $SD = 2.13$). We counted any mention of school as a school-focused possible identity (among both expected and feared possible identities). School was the most common focus ($M=3.26$, $SD=1.66$), followed by interpersonal relationships ($M = 1.11$, $SD = 1.08$). We content coded what students described about school in their school-focused possible identities and found two themes: academics (e.g., expecting to be "getting good grades" and wanting to avoid being "unfocused on my studies") and behavior in school (e.g., expecting to be "well behaved" and wanting to avoid "talking back to teachers"). Almost all children (95%) generated at least one academic possible identity (98.7% of girls and 90.5% of boys). Most (70%) also generated at least one school behavior-focused possible identity (67% of girls and 73% of boys). School-focused possible identities were basically

academic in nature; only 3% of children described a school behavior-focused future identity

without also describing a future identity related to academic achievement.

Math Task. We counted each attempt on the math task. Attempts ranged from 0 (no

attempts) to 29. Outliers above 11 were truncated to equal 11 to adjust for positive skew. On

average children made three attempts ($M = 2.99$, $SD = 3.08$).

Future Success Expectations. The two future success items were averaged ($\alpha=.64$) to

attain a future success expectation score ($M=4.19$, $SD=.69$).

Results

Analysis Plan

Given our prediction that gender congruence of success matters, we labeled the

graduation condition for girls and the income condition for boys as gender-congruent success.

We also labeled the income condition for girls and the graduation condition for boys as gender-

incongruent success. Preliminary analyses of variance demonstrated no difference between the

two control conditions or between the control conditions and the gender-incongruent success

conditions (all Fs < 1.50, ps between .23 and .78). Therefore we combined the two control

conditions (results do not differ when analyses preserve original four groups).[3] This allowed us

to focus on the planned contrast between children in the gender-congruent success condition and

children in the other conditions (gender-incongruent success and control). We controlled for

possible effects of race, math track and teacher by entering race, dummy coded for the school

context's majority racial group (African American), math track, and teacher codes as covariates.

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[3] Analyses of contrasts were conducted with and without boys and girls combined in the control
conditions and no substantive differences were found. For simplicity, we are reporting results
with boys and girls combined in the control conditions.

We considered the possibility that condition affected the number of possible future identities listed but did not find any evidence for this, so we do not include this count variable as a control.

Manipulation Check

The initial sample included $n = 149$ children, data from one child was omitted because he or she did not report on gender. Of the $n = 148$ children who reported their gender, all but two correctly answered at least one of the manipulation check questions and were retained for further analyses (final $n = 146$).

School-focused Possible Identities

As depicted in Figure 2.2, children imagined more school-focused future identities if success was presented as characteristic of their own gender (i.e., graduation success for girls, income success for boys) rather than otherwise, $F(1, 129) = 4.85$, $p<.05$. This effect was not moderated by gender ($F<1$, *ns*).

Math Task

As depicted in Figure 2.3, children made more attempts to solve the math task if success was presented as characteristic of their own gender (i.e., graduation success for girls, income success for boys), than otherwise, $F(1,135) = 3.08$, $p<.10$. When effects for boys and girls were analyzed separately, we found a significant condition effect only for boys, who increased effort if success was presented as characteristic of their gender rather than otherwise, $F(1,135) = 3.99$, $p<.05$. Girls worked equally hard at the task across conditions.

Future Success Expectations

As depicted in Figure 2.4, boys and girls imagined themselves going farther in school and earning more money as adults compared to the average American if success was presented as

characteristic of their own gender rather than otherwise, $F(1,133) = 4.14$, $p<.05$. This effect was not moderated by gender ($F<1$, *ns*).

Discussion

Gender identity and identity-based motivation models both predict that gender identity matters. However, while gender identity theories assume the stability of identity content once formed, the identity-based motivation model predicts that identity may feel stable but is actually dynamically constructed from situational cues. Moreover, according to the identity-based motivation model, once a course of action feels identity-congruent, difficulty along the way is likely to be interpreted as meaning that the behavior is important, not impossible. Results of a brief experimental manipulation support these latter predictions, demonstrating that subtle situational cues about the link between one's gender and future success influence not only identity content but also current effort on academic tasks, especially for boys.

Specifically, we presented boys and girls with graphs of earning and graduation success. Half of the children saw graphs marked by gender; half did not. When success was linked to one's own gender rather than to the other gender or not linked to gender at all, children reported more academic goals for themselves—that is, they generated more school-focused identities when describing what they expected and feared being like in the coming year. In this condition, children also expected relatively more success as adults – higher income and educational attainment compared to the average American. At trend level, children also tried harder on a novel math task, generating more attempted solutions. The effect of contextual cues about the link between gender and success was equally strong for boys and girls for the two future identity measures. For the behavioral measure, the effect was significant for boys only, and girls tried equally hard regardless of the contextual cue.

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By demonstrating that content of an important, chronically accessible or *broad* social identity (Oyserman, 2009a, 2009b) such as gender is dynamically constructed by subtle momentarily salient contextual cues, our results move beyond prior identity-based motivation research. Research to date has either assessed the content of broad social identities (e.g., racial-ethnic identities; Oyserman et al., 2003; Oyserman, 2008) or manipulated salience rather than content of these identities (e.g., Oyserman et al., 1995). When content of identity has been manipulated, the focus was on *narrow* social identities – identities that are less likely to be chronically accessible and less likely to be relevant across contexts and life domains such as that of video-gamer, graduate student, or dorm resident (Berger & Rand, 2008; Berger & Heath, 2008).

We demonstrate that effects are not limited to manipulations of the content of such narrow social identities. Rather, subtle contextual cues were used to dynamically construct a broadly important social identity, gender identity. Effects of this manipulation are important because both children and adolescents prefer gender-congruent actions (Martin & Ruble, 2009). Therefore, by demonstrating a manipulation of gender-congruent action, our results advance gender-identity research.

A limitation of our study is that, while we successfully changed the extent to which boys and girls envisioned academics and earnings as part of their next year and adult identities, we succeeded in changing the behavior of boys but not girls. Perhaps our behavioral task was too easy for girls, who are more likely to work hard in school (Peter & Horn, 2005; King, 2006). Moreover, our primes differed, reflecting differences in outcomes between men and women in earnings and graduation rates. Prior research has demonstrated both effects separately. Children work harder at school tasks when school-success is linked to future earnings (Destin &

Oyserman, 2010) and when the path to future school-success feels open (Destin & Oyserman, 2009). However, the relative power of each cue is not known, and it is possible that a larger gap favoring women could lead to behavioral effects among female participants as well. Finally, it is possible that boys are more sensitive to gender cues or to contextual cues generally. Higher responsiveness among boys to cues about gender fits with evidence that boys are more likely to be monitored for deviance from gender-congruent behavior than girls (e.g., Leaper & Friedman, 2007). While the next year and adult possible identities of boys and girls were equally influenced by the prime, boys might be particularly sensitive to behavioral possibilities. If the range of acceptable behavior is more restricted for boys than for girls, then information that expands the behaviors defined as masculine may be especially powerful for boys who might otherwise see effortful engagement with school tasks as a something girls, not boys, do.

Taken as a whole, our findings also have practical implications for interventions in schools to motivate effort among both boys and girls. As evidenced by the gender gaps between girls and boys on achievement measures (e.g., CEP, 2010; Peter & Horn, 2005), gender matters for students at school. The findings reported here support the possibility that children currently experience differing local contexts, with girls' better performance creating a sense that school is for girls. This produces an upward spiral of effort and therefore better outcomes for girls, and a downward spiral of effort and therefore worse outcomes for boys. Boys and girls' identities and behavioral responses are likely to fit the sense they make of gender. Indeed, in the current study we demonstrate that boys and girls are sensitive to situational cues about the link between gender and school performance. In the world outside our experimental manipulation, if cues stay stable, so will perceptions and behavior. Conversely, if cues change, so will perceptions and behavior. Schools may not be causing gender gaps to occur, but schools can help remediate them.

Currently, contextual cues highlight the congruence between female gender and academically oriented behavior; if cues differed, both boys and girls should be sensitive to them, with both boys' and girls' outcomes improving if success were cued as congruent with both genders. Identities feel stable but are dynamically constructed in context. When a behavior feels identity congruent, then effort is more likely because difficulty will be interpreted as importance, not impossibility. We are currently testing this possibility by manipulating interpretations of difficulty directly. This ongoing work may offer additional insight on approaches that encourage academic effort and persistence among boys and girls alike.

Figure 2.1

Manipulations of the Gender Ingroup Congruence of Success

Figure 2.1a   Control (Income)
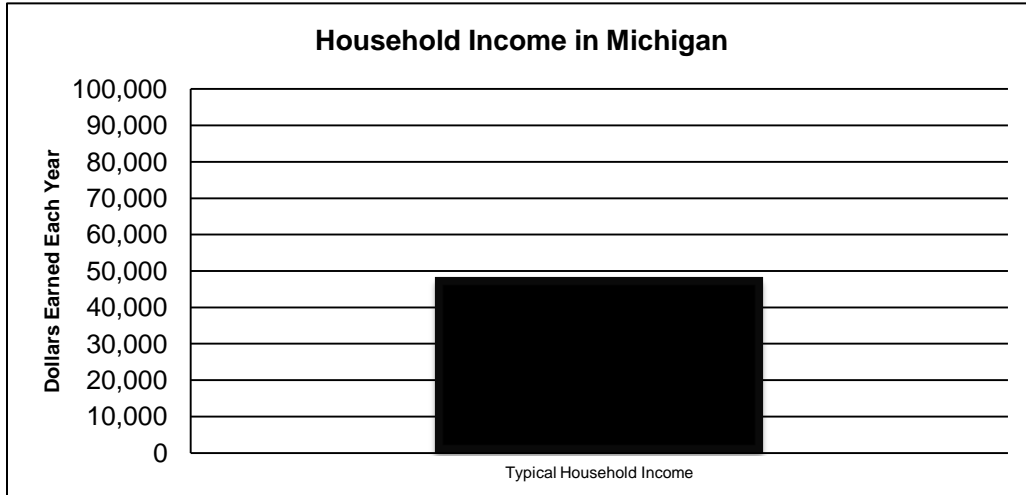
Household Income in Michigan

Here are some statements that students made about this graph. Read each statement and mark whether it is true or false according to the graph above.

☐ True   ☐ False   -   Student 1 said, "It is typical to earn more than $40,000 a year."

☐ True   ☐ False   -   Student 2 said, "The typical annual income of a household in Michigan is around $48,000."

☐ True   ☐ False   -   Student 3 said, "Most families live on less than $100,000 a year in Michigan."

Of the students above, which one do you think gave the statement that is the best, most complete summary of the information shown in the graph? (Student 1, Student 2, or Student 3?)

Figure 2.1b   Control (Graduation)

High School Graduation in Michigan

Here are some statements that students made about this graph. Read each statement and mark whether it is true or false according to the graph above.

☐ True   ☐ False   -   Student 1 said, "Most students finish high school."

☐ True   ☐ False   -   Student 2 said, "A little more than 75% of all students in Michigan graduate from high school."

☐ True   ☐ False   -   Student 3 said, "Not graduating from high school is uncommon."

Of the students above, which one do you think gave the statement that is the best, most complete summary of the information shown in the graph? (Student 1, Student 2, or Student 3?)

Figure 2.1c   Experimental Condition (Success as Gender Congruent for Girls)

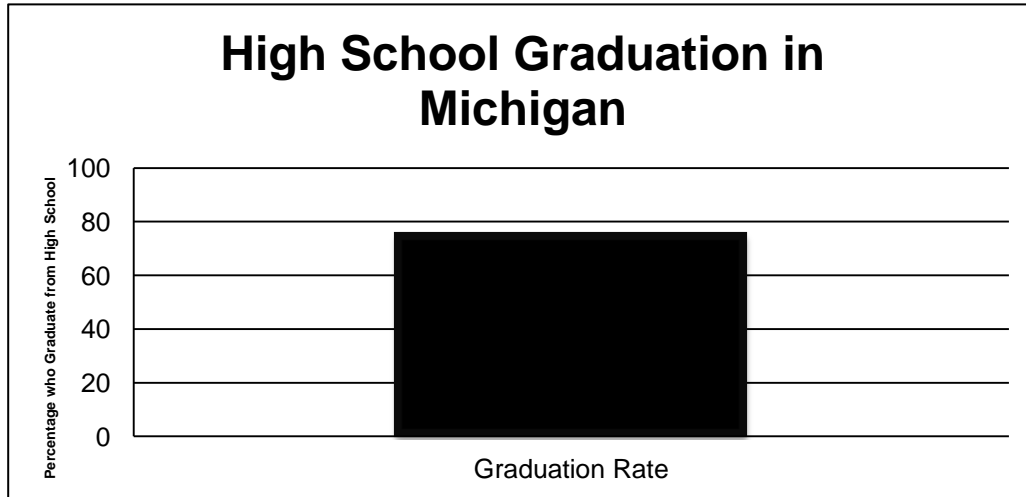**Male and Female Income in Michigan**

Here are some statements that students made about this graph. Read each statement and mark whether it is true or false according to the graph above.

☐ True   ☐ False   -   Student 1 said, "Men typically earn more than women."

☐ True   ☐ False   -   Student 2 said, "The typical annual earnings of a man in Michigan are higher than the typical annual earnings of a woman."

☐ True   ☐ False   -   Student 3 said, "Women typically earn less than men."

Of the students above, which one do you think gave the statement that is the best, most complete summary of the information shown in the graph? (Student 1, Student 2, or Student 3?)

Figure 2.1d   Experimental Condition (Success as Gender Congruent for Boys)

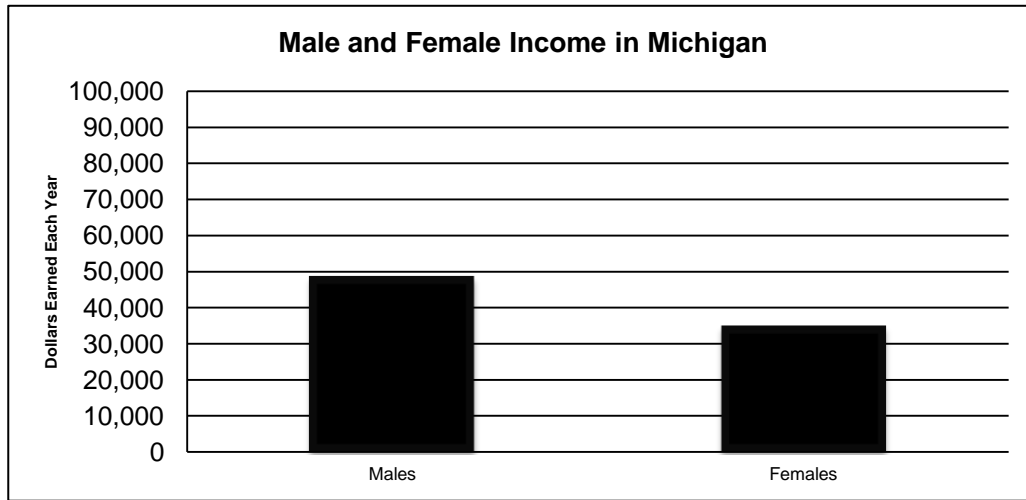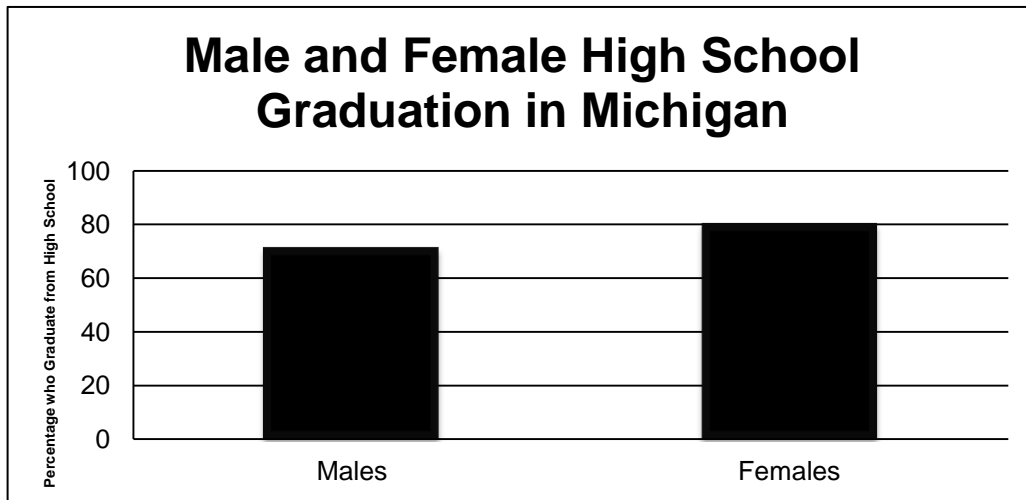**Male and Female High School Graduation in Michigan**

Here are some statements that students made about this graph. Read each statement and mark whether it is true or false according to the graph above.

☐ True   ☐ False   -   Student 1 said, "More girls finish high school."

☐ True   ☐ False   -   Student 2 said, "A higher percentage of female students than male students graduate from high school in Michigan."

☐ True   ☐ False   -   Student 3 said, "The amount of boys who do not finish high school is higher."

Of the students above, which one do you think gave the statement that is the best, most complete summary of the information shown in the graph? (Student 1, Student 2, or Student 3?)

Figure 2.2

Differential effect of priming success as gender identity-congruent vs. gender identity-incongruent or no gender controls on school-focused next year possible identities
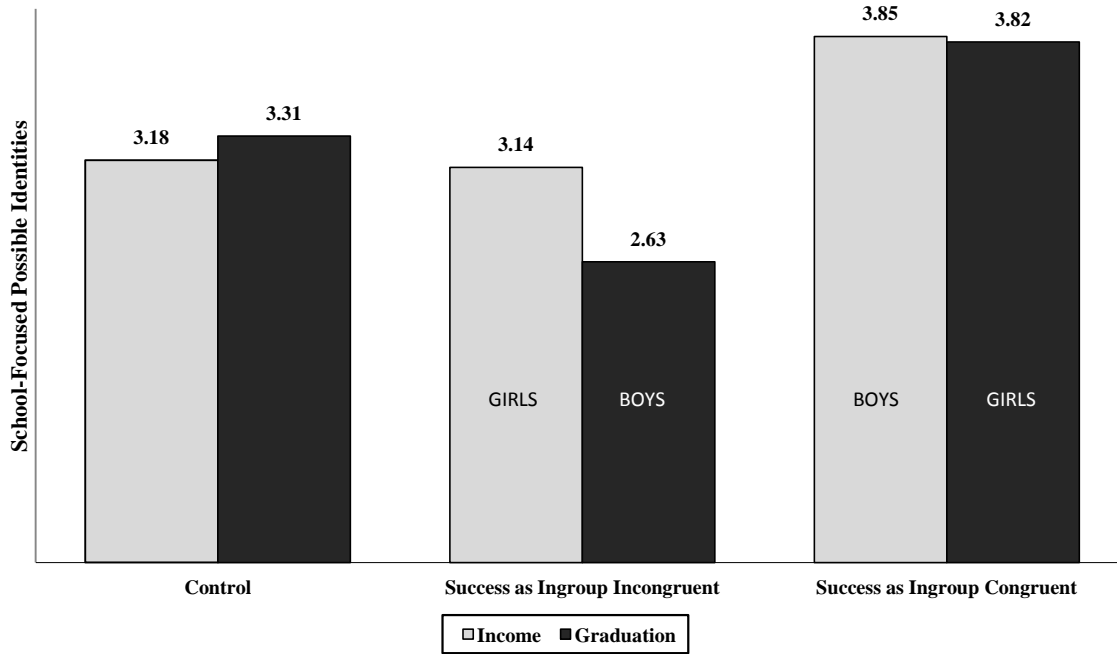
Note: Boys and girls generated more school-focused possible identities in the Success as Ingroup Congruent condition than in the other two conditions combined. The two Control conditions (Figure 2.1a income, F2.1b graduation) did not present gendered information: boys and girls saw information about income or graduation rates in the population at large. The Ingroup conditions (Figure 2.1c income, Figure 2.1d graduation) did present gendered information. Success was Ingroup Incongruent for girls when they saw the gendered income information (males earn more). Success was Ingroup Incongruent for boys when they saw the graduation information (females graduate at higher rates). Success was Ingroup Congruent for boys when they saw the income information by gender (Figure 2.1c) and Ingroup Congruent for girls when they saw the graduation information by gender (Figure 2.1d).

Figure 2.3

Effect of priming achievement success as identity-congruent on students' effort on an academic math task
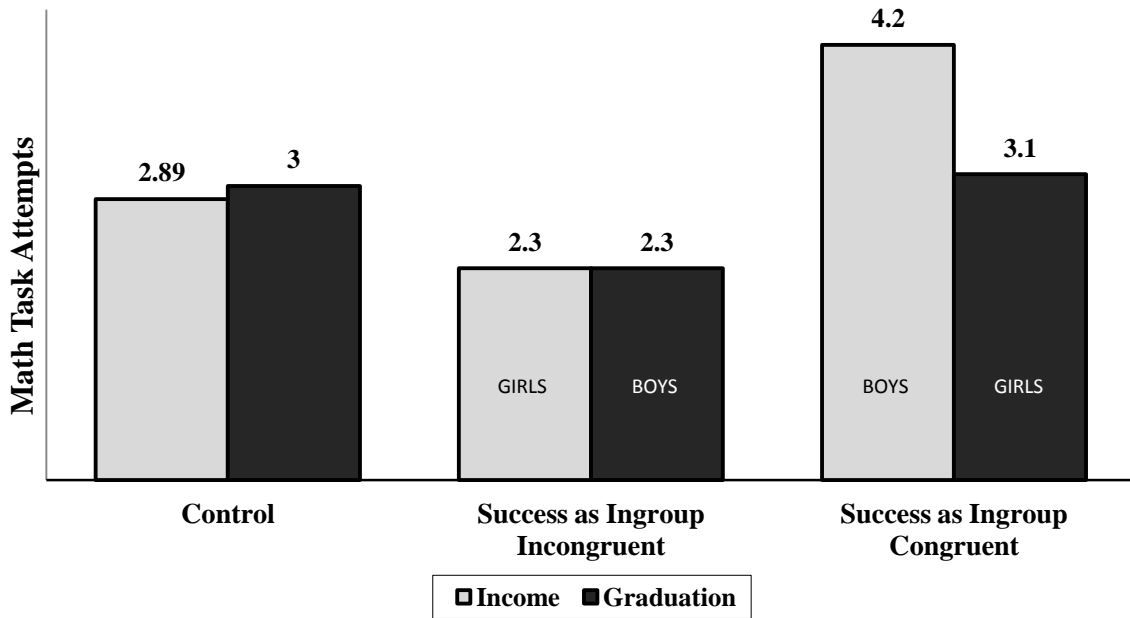
Note: Boys made more attempts to solve an academic math task in the Success as Ingroup Congruent condition than in the other two conditions combined. The two Control conditions (Figure 2.1a income, F2.1b graduation) did not present gendered information: boys and girls saw information about income or graduation rates in the population at large. The Ingroup conditions (Figure 2.1c income, F2.1d graduation) did present gendered information. Success was Ingroup Incongruent for girls when they saw the gendered income information (males earn more). Success was Ingroup Incongruent for boys when they saw the graduation information (females graduate at higher rates). Success was Ingroup Congruent for boys when they saw the income information by gender (Figure 2.1c) and Ingroup Congruent for girls when they saw the graduation information by gender (Figure 2.1d).

Figure 2.4
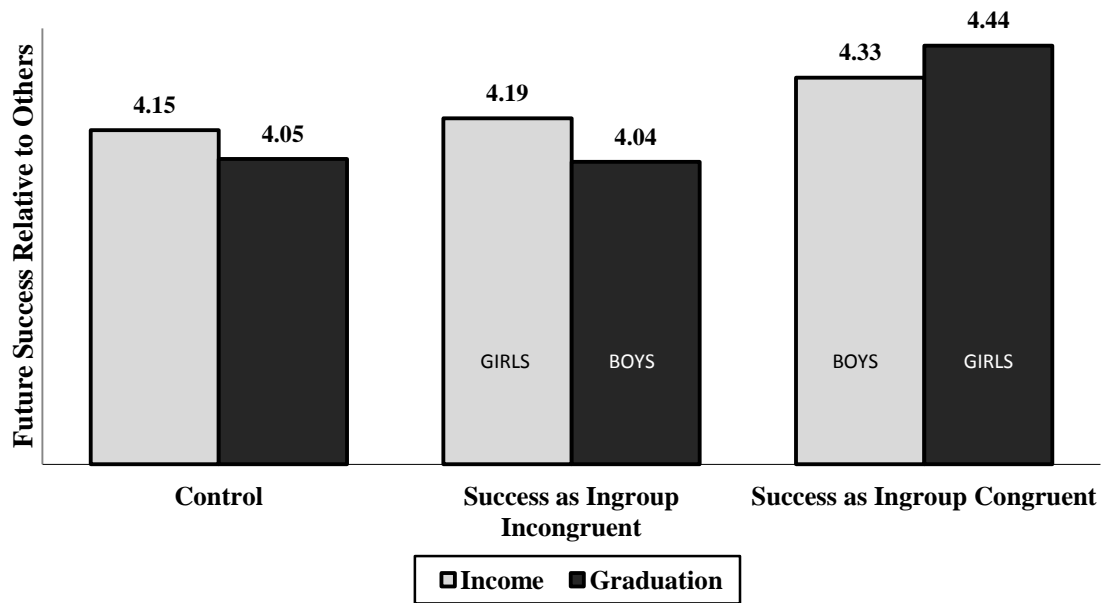
Differential effect of priming success as gender identity-congruent vs. gender identity-incongruent or no gender controls on future success expectations

Note: Boys and girls reported higher expectations of adult success in the Success as Ingroup Congruent condition than in the other two conditions combined. The two Control conditions (Figure 2.1a income, F2.1b graduation) did not present gendered information: boys and girls saw information about income or graduation rates in the population at large. The Ingroup conditions (Figure 2.1c income, F2.1d graduation) did present gendered information. Success was Ingroup Incongruent for girls when they saw the gendered income information (males earn more). Success was Ingroup Incongruent for boys when they saw the graduation information (females graduate at higher rates). Success was Ingroup Congruent for boys when they saw the income information by gender (Figure 2.1c) and Ingroup Congruent for girls when they saw the graduation information by gender (Figure 2.1d).

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Chapter III

When the going gets tough: Intervening to change how students interpret experienced

difficulty with schoolwork

Early adolescence is a time in which youth are particularly sensitive to the possibility that their autonomy is being undermined rather than supported (Chirkov & Ryan, 2001; Grandpre et al., 2003; Miller et al., 2006; Steinberg & Silverberg, 1986). It is also at time of increased risk, as youth attempt to make sense of what their experiences of ease and difficulty at various tasks including schoolwork, sports, and socializing might mean for their possible future selves (Oyserman & James, 2009). During adolescence, students report less effort and engagement with schoolwork, and withdrawal of effort and engagement increases risk of school failure (Barber & Olsen, 2004; Roeser et al., 1999; Seidman et al., 1994). The coupling of adolescents' interest in autonomy with this increased risk presents a challenge for interventions aiming to encourage academic effort. Direct persuasion attempts run the risk of being challenged by teens seeking opportunities to demonstrate their independence from authority figures (e.g., Koepke & Denissen, 2012; Mazor & Enright, 1988; Steinberg & Silverberg, 1986) and social influence more generally (Hill & Holmbeck, 1986). How should concerned adults proceed? Should they try to intervene to convince adolescents that their experienced difficulty with schoolwork signals that schoolwork is important and worth the effort? Or should they remain silent and hope that students do not interpret their experienced difficulty with schoolwork as signaling that schoolwork is impossible and not worth their energy? The current study considers the

motivational impact of adolescents' endorsement or reactant rejection of messages about interpretation of experienced difficulty.

Reactance and Boomerang Effects

Psychological reactance theory predicts that a persuasive appeal, once perceived as a threat to one's self-determined thought or behavior, will elicit motivation to restore this threatened freedom (Brehm, 1966). Restoring this freedom may involve embracing the derogated attitude or performing the unsanctioned behavior (Brehm, 1966; Brehm & Brehm, 1981). This has been termed a "boomerang effect" (Wicklund, 1974). Boomerang effects are common in the adolescent intervention literature (Burgoon et al., 2002). For example, exposure to a series of anti-smoking messages released by the tobacco-industry actually increased adolescents' interest in smoking (Farrelly et al., 2002). Prevention programming featuring a recovered eating disorder patient boomeranged as well, increasing teens' perceptions that girls with eating disorders were pretty and in control of their lives (Schwartz, Thomas, Bohan, & Vartanian, 2007). In yet another example, an anti-littering campaign in which children and teens at a neighborhood pool were given a handbill printed with the directive "Don't Litter" resulted in a full 50% of the handbills being tossed on the ground (Reich & Robertson, 1979).

Once a message is rejected, message resistance increases over time (Sherman & Cohen, 2006). Because teens commonly express reactance in response to adults' attempts to influence their personal goals (Brehm, 1966; Erikson, 1968)—rejecting adults' suggestions or even endorsing their opposite to reassert autonomy (see Lapsley & Yeager, in press), researchers seek strategies to make messages persuasive without threatening autonomy (Aronson et al., 2002; Walton & Cohen, 2011; Yeager & Walton, 2011). Although message-undermining reactance has been more fully considered in the domain of health (e.g., Dillard & Shen, 2005; Whitehead,

2005), there is no reason not to expect reactance to occur for messages meant to promote a particular way of thinking about effort at school. The current study addresses a gap in the literature by considering how reactance may lead adolescents to reject helpful and endorse unhelpful lay theories about what experienced difficulty with schoolwork implies for the importance (vs. impossibility) of succeeding in schoolwork.

Using Lay Theories to Interpret Experiences

Lay theories (also termed intuitive, everyday, or naïve theories) are knowledge structures that people use to interpret their observations and experiences. Lay theories allow people to draw inferences and make predictions about themselves (Schwarz & Hippler, 1987) and their social world (Heider, 1958; Kruglanski, 1980; Ross, 1977). Lay theories of personality structure thoughts about how traits link to behaviors and covary with other traits (Schneider, 1973). Lay theories about social groups allow people to not only differentiate among types of groups but also to observe behavioral norms within groups (Lickel, Hamilton, & Sherman, 2001). Lay theories about how the mind works allow people to draw inferences about other's beliefs and goals based on their observable behaviors (Gopnik & Wellman, 1992; Wellman, 1990). While there is cultural variation in lay theories of attribution (Hong & Chiu, 2001; Hong, Morris, Chiu, & Benet-Martinez, 2000; Morris & Peng, 1994; Norenzayan, Choi, & Nisbett, 2002), there is a universal need to make sense of one's experiences, and lay theories provide a means to do so.

Lay Theories of Experienced Difficulty

Of particular importance for us are lay theories about what experienced difficulty means. A large body of work demonstrates that people are sensitive to their experienced difficulty and interpret that experience in terms of what their difficulty seems to imply in context. For example, having difficulty coming up with examples may mean that there are not many examples or that

one is not an expert on the topic (Schwarz, 1998). Follow-up studies show that there are many

lay theories about what difficulty means and that which comes to mind depends on contextual

cues. Difficulty can be primed by having people make longer than average lists (e.g., give 12

examples of times they were assertive; Schwarz et al., 1991) or by making information difficult

to process (e.g., using poor color contrast or font; Novemsky, Dhar, Schwarz, & Simonson,

2007). After researchers give participants text that is difficult to process (e.g., the text is faded,

the color contrast is poor, or the font is difficult to read), they ask questions related to the content

of the text and find that people use the questions to infer which lay theory to use (e.g., Labroo &

Kim, 2009; Reber, Schwarz, & Winkielman, 2004; Song & Schwarz, 2008). Of interest to us in

the current study is what experienced difficulty with schoolwork is taken to mean. We focus on

two accessible lay theories that have been described in identity-based motivation theory

(Oyserman, 2007, 2009, in press). Specifically, experienced difficulty can imply that one is no

good at a task and hence should move on to something else (difficulty means impossibility), or

that the task itself is important and hence worth the effort (difficulty means importance).

When attempting to make sense of experienced difficulty, the interpretation that students

use should depend on which lay theory is temporarily accessible at the moment of judgment.

Interventions targeting the accessibility of these lay theories of difficulty suggest that this is the

case (e.g., Smith & Oyserman, 2014; Smith, Novin, Elmore, & Oyserman, 2014). For example,

students reminded that experiencing difficulty can be interpreted as task importance increased

their effort on the Raven's Progressive Matrices (Study 2, Smith, Novin, Elmore, & Oyserman,

2014). In a follow up study, students produced higher quality essays in response to an assessment

modeled on the statewide standardized writing test after being reminded that difficulty can imply

task importance (Study 3, Smith, Novin, Elmore, & Oyserman, 2014). Moreover, long term

academic outcomes of low-income minority students improved after they were randomly

assigned to intervention activities in which students practiced using a lay theory of difficulty as

importance (using the School-to-Jobs intervention, Oyserman, Terry, & Bybee, 2002; Oyserman,

Bybee, & Terry, 2006).

Reactance and Interpretation of Difficulty

When experiencing difficulty with schoolwork, students can either apply a lay theory that

experienced difficulty signals the importance of succeeding at schoolwork or the lay theory that

experienced difficulty signals that schoolwork is not worth the effort. The current study

considers the potential for message interventions to benefit motivation by presenting students

with either one of these lay theories. On one hand, interventions can attempt to bolster the chance

that students faced with difficulty will think of the first lay theory and endorse the idea that

difficulty signals that school success is an important goal for oneself. On the other hand,

interventions can attempt to bolster the chance that students will have a reactance response to

messages about the second lay theory and reject the idea that difficulty signals that school

success is not possible for oneself. Interventions should attempt to avoid creating conditions

under which students accept the idea that difficulty signals that school success is not possible for

oneself or reject the idea that difficulty implies that school success is important for oneself.

The potential for students to experience reactance and reject an intervention message has

divergent implications for both lay theories. If students reject messages suggesting that they

should interpret difficulty at school as a signal of schoolwork's importance, they will be unlikely

to work hard on difficult assignments and may be left with effort-undermining perceptions of

difficult tasks as impossible and school effort as identity-congruent. This pattern was found in

the health domain, in which minority Americans perceived healthy lifestyle choices as effective

ways to promote longevity, but not if they perceived engagement in healthy choices as identity-incongruent (Oyserman, Fryberg, & Yoder, 2007). At the same time, however, if students reject messages suggesting that they should interpret difficulty at school as a signal of schoolwork's impossibility, such reactance may actually be energizing and productive. Rejecting a persuasive message can serve as an inoculation against making a later judgment aligned with the rejected message (McGuire & Papageorgis, 1961; McGuire, 1964), suggesting that students who reject messages that difficulty signals schoolwork's impossibility may avoid falling victim to that interpretation in the future.

The current study asked if in conditions conducive to reactance, students might actually be better off hearing and rejecting an effort-undermining message rather than hearing and rejecting an effort-enhancing message. To answer this question, we consider the potentially divergent effects of message endorsement versus rejection of a persuasive message about one of the two lay theories of experienced difficulty (either difficulty signals importance or difficulty signals impossibility). To allow for within classroom randomization and individual assessment of endorsement, the message was delivered as written text as detailed next. Participants were adolescents from a predominately low-income, minority public school near Detroit, Michigan.

Methods

Participants

Participants were students enrolled in the 6th to 8th grade at a public school near Detroit, Michigan (N=272; 53% boys, M_{age}=12.15, SD_{age}=0.92, 73% African American, 17% Caucasian American, 7% other ethnicities, 77% eligible for free or reduced lunch).

Procedure

The procedure scaffolded the possibility of reactance by quite literally limiting freedom; students were taken from their gym (physical education) classes, stopped from engaging in physical activity, and instead made to sit still and work on schoolwork. Within each class, students received a questionnaire that contained four statements to read and rate, a difficult fifteen-item pattern task, and demographics (gender, age, grade level in school, race-ethnicity, and grade point average) in that order, as described next.

Though the questionnaires looked identical on the outside, they differed in their first page. For a random one third of students, printed on the inside first page were four statements (see Appendix) implying that a feeling of difficulty can signal that schoolwork is an important goal (importance condition $n=87$); students were asked to indicate how much they agreed with each statement on a 6-point scale from 1=*strongly disagree* to 6=*strongly agree*. For another random one third of students, printed on the inside first page were four statements (see Appendix) implying that a feeling of difficulty can signal that schoolwork is an impossible goal (impossibility condition $n=88$); students were asked to indicate how much they agreed with each statement on a 6-point scale from 1=*strongly disagree* to 6=*strongly agree*. The final one third of students had no reading task (no reading condition $n=90$), the inside first page was blank; the two message conditions were the focus of our predictions.

Raven's Progressive Matrices Task

The dependent variable was performance (percentage correct $M=40\%$, $SD=26\%$, $\alpha=.83$) on the first 15 items of the Raven's Progressive Matrices task (Raven, 1962), a difficult pattern task used as a measure of fluid intelligence (Carpenter, Just, & Shell, 1990).

Preliminary Analyses

Preliminary analysis showed that performance on the Raven's was negatively associated with first having to read and evaluate text compared to having no text to read ($F(1,269) = 5.81$, $p <.05$). This implied that the "no text" condition could not be used as an effective baseline performance indicator, so our main analyses do not include this group. Though unfortunate, this is not surprising given that reading comprehension is particularly challenging for low-income and minority youth (Reardon, Valentino, & Shores, 2012). Performance on the Ravens was also related to race, white students performed better than did minority students ($t(243) = 3.13$, $p <.01$). Performance was also positively associated with grade point average ($|t|(243) = 2.09$, $p <.05$) and school grade level, as 7th grade ($t(243) = 2.18$, $p <.05$) and 8th grade ($t(243) = 2.22$, $p <.05$) students performed better than 6th grade students. Performance was not associated with gender or age in years (ts <1.60, ps $>.10$). However none of these demographic variables affected the relationship between condition and performance (Fs <1.20, ps $>.30$).

Results

An analysis of variance was used to test whether *message content, message endorsement*, and their interaction term would predict performance on the Raven's Progressive Matrices. Students receiving the interpretation of difficulty as importance message outperformed students receiving the interpretation of difficulty as impossibility message at trend-level ($M = 34.7\%$ vs. $M = 33.6\%$, $F(1,173) = 3.48$, $p =.06$). As would be expected under reactance, this main effect was qualified by a significant interaction between *message content* and *message endorsement*, $F(1,173) = 4.32$, $p <.05$ (there was no main effect of *message endorsement*, $F <1$, $p =.99$). As depicted graphically in Figure 3.1, the positive effect of receiving a message interpreting difficulty as importance compared to receiving a message interpreting difficulty as impossibility only held for students who endorsed the message.

What happened to students who rejected the message content they were delivered? We followed Aiken and West (1991) and used linear regressions to test for simple slopes comparing the effect of message content on performance for participants who accepted (M + 1SD) vs. rejected (M - 1SD) the message. This analysis revealed that message acceptance vs. rejection particularly mattered if the message was that difficulty should be interpreted as implying that succeeding at schoolwork is an impossible goal. Participants who rejected the message that difficulty implies task impossibility scored over 26% better on the Raven's Progressive Matrices task than those that accepted it, $|t|(173) = 1.77$, $p = .08$ ($M = 38.9\%$ and $M = 28.4\%$ respectively). Students in the interpretation of difficulty as impossibility condition who accepted this message scored 29% lower on the Raven's than students in the interpretation of difficulty as importance condition who accepted this message, $t(173) = 1.85$, $p = .07$ ($M = 39.9\%$ and $M = 28.4\%$ respectively).

Discussion

Adolescents are often the target of well-meaning persuasive messaging attempts that fail to consider adolescents' sensitivity to being told what to do and the reactance that is likely to ensue if they feel their autonomy is being curtailed. In the current study, we asked if in conditions likely to generate reactance, it is better to attempt to provide the persuasive message as intended (when schoolwork feels hard, it's a sign that succeeding in schoolwork is an important goal) or to provide the opposite message (when schoolwork feels hard, it's a sign that succeeding in schoolwork is an impossible goal). We found a trend level main effect of hearing the intended persuasive message but also a significant interaction between persuasive message content and message endorsement, implying reactance. Disagreeing with the intended persuasive message undermined subsequent performance if the message was that difficulty means

importance, but bolstered subsequent performance if the message was that difficulty means impossibility.

Limitations and Future Directions

We used a single reading-based message approach so that we could capture individual-level message endorsement and demonstrated effects on a demanding school task. A limitation of this method was that we could not unpack the process and examine students' spontaneous engagement with or counter-arguing of the persuasive message, nor could we test longitudinal effects of message content and message endorsement. Given that we have demonstrated effects on immediate behavior, these are important next steps. Teachers care about students' effort and engagement both in the moment and over time.

While the current study does not identify the cognitive process through which students engaged with the messages, students experiencing reactance may be engaging in message counter-argumentation to reassert autonomy. Past research has examined the benefits of adolescents counter-arguing in response to potentially harmful media messages (e.g., Brucks, Armstrong, & Goldberg, 1988; Goldberg, Niedermeier, Bechtel, & Gorn, 2006; Slater et al., 1996; Slater et al., 1998). For example, counter-argumentation has been successfully employed with elementary and middle school students to develop critical thinking about pro-alcohol and tobacco media messages (Kupersmidt, Scull, & Austin, 2010; Kupersmidt, Scull, & Benson, 2012). This implies that future research should assess whether students rejecting the idea that experienced difficulty implies task impossibility are generating arguments to the contrary.

Implications for Intervention

The divergent effects of students' acceptance or rejection of messages about how to interpret experienced difficulty with schoolwork suggests two key implications for intervention.

First, heavy-handed messaging attempts of even the best intended messages can have boomerang effects, as seen in the worse performance of students rejecting the difficulty means importance messages. Second, interventions that purposefully elicit reactance against messages promoting the interpretation of difficulty as impossibility can have beneficial effects, as seen in the better performance of students rejecting the difficulty means impossibility message.

Drawing upon these implications, there are a number of potential intervention approaches that we believe allow teachers to avoid heavy handed messages and, instead, empower students to exercise autonomy and generate their own arguments about the interpretation of difficulty. One such intervention approach is to help students engage in message counter-argumentation when confronted with messages implying that experienced difficulty signals the impossibility of success (e.g., "Others may say that when school work is hard, it's impossible. What would you say to them?"). Asking adolescents to counter-argue this unproductive interpretation of difficulty may help undermine its power as an interpretation for one's own experience of difficulty. Alternatively, students could be asked to counter-argue messages that difficulty implies a lack of importance (for example, "Others may say that they don't believe that when schoolwork is hard, it's important. What would you say to them?").

Conversely, an effective intervention approach when confronted with a productive interpretation of difficulty might be to help students actively engage with the message (e.g., "If keeping going even when it is hard was easy to do, then there would be nothing to it. What makes you stand up to difficulty?"). Similarly, students could be asked to provide an example of a time that they were faced with a difficult task that was important and proved to be a worthwhile goal (for example, a teacher might ask students, "Describe a time that something difficult was important to you and you kept trying until you succeeded"). Aronson, Fried, and Good (2002)

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found that college students directed to write persuasive letters and record a video message describing their own experiences with the malleability of intelligence earned higher grades than a control group of pen pals. These students likely dug into their pasts and found a supporting example, in this way actively engaging with this new perspective. Our results suggest that interventions promoting student engagement and counter-argumentation in response to lay theories of experienced difficulty can promote energized engagement with difficult schoolwork.

Figure 3.1

Effect of interpretation of difficulty message and message endorsement on Raven's performance
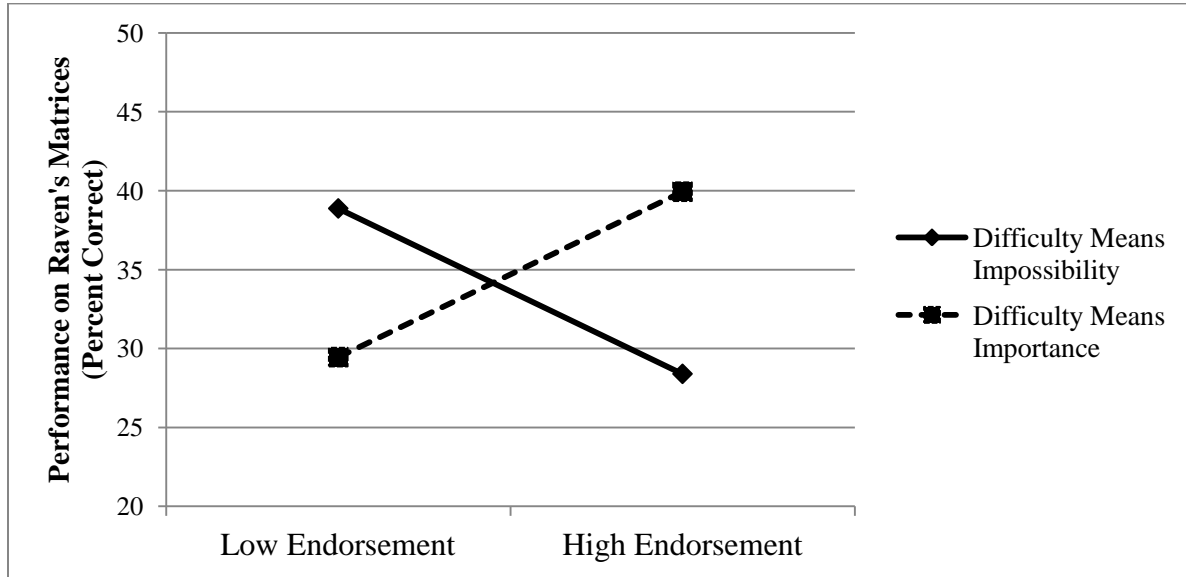
Note: Graph depicting the effect on students' performance on the Raven's matrices of the interaction between the naïve theory of difficulty condition (Message Content) to which they were assigned and their endorsement of the interpretation of difficulty items they read (Message Endorsement). Students were randomized to either the Difficulty Means Impossibility condition or to the Difficulty Means Importance condition. Endorsement refers to how much they agreed with the items presented in the condition to which they were assigned. Low endorsement refers to responses at one standard deviation below the mean and high endorsement refers to responses at one standard deviation above the mean.

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Appendix A

Message Content Manipulation

Difficulty means Impossibility Condition

1. When you're stuck on a school task, it is a sign that your effort is probably better spent elsewhere.
2. Sometimes, working on a school task feels very difficult – impossible really. That's okay because finding out that you are not likely to be successful can be helpful for moving on to other tasks.
3. Students shouldn't waste time on tasks that just aren't meant for them. If a task feels too hard, then you should move on to something else so that you can succeed in something else.
4. As a student, you know that when working on a school task feels hard, that feeling means that it might just not be for you.

Difficulty means Importance Condition

1. When you find yourself working really hard on a school task, it's okay. That feeling just means it's important to you.
2. You can use your feelings about working on a school task to tell you how important it is for you. If you keep working even when it feels hard, it's probably important to you.
3. As a student, you know that difficult goals are the important ones. On those tasks, difficulty means that you should work harder.
4. Sometimes you have to work really hard in order to be successful at a school task, and there's nothing wrong with that. Having to work hard at a task means it is important.

Chapter IV

Stay focused or change course? The time traveling self and current difficulties

Everyday life involves making sense of experienced difficulties, whether on the job, at school, or in other life domains. Difficulties might imply that the goal is important, so one should stay focused, or that the goal is impossible to attain, so one should change course, perhaps seeking other goals. In the current paper we are particularly interested in the influence of mental time travel, imagining past or future possible successes, on interpretation of experienced difficulty in school (e.g., studying for the chemistry final) or on the job (e.g., preparing for a project). In the next section, we review relevant research on the interpretation of experienced difficulty and its role in motivating effort. We then consider the impact of thinking about the past and future self on motivation, raising the question of the role of mental time travel in interpreting experienced difficulty. We make the novel prediction that because the past self feels more certain than the future self, mental time travel to the past will be particularly effective in helping people interpret current difficulties in ways likely to facilitate continued engagement.

The Role of Interpretations of Difficulty in Motivation

The experience of difficulty can serve as a cue to increase effort, but effort will cease if the task feels so difficult that it is seen as impossible (Brehm & Self, 1989). Perspectives from self-regulatory focus theory suggest that effort is more likely to be sustained on difficult tasks perceived as aligned with one's self-regulatory focus (Higgins, 1997; 1998; 2000). For example, prevention focused individuals may keep working on tasks seen as obligatory or necessary, even

when there is a low likelihood of success. On the other hand, a promotion focus may increase persistence and performance on challenging tasks by focusing attention on the possibility that difficulty signals an opportunity for gain and advancement (Crowe & Higgins, 1997). In both cases, how difficulty is interpreted likely matters for motivation.

To understand how difficulty can be interpreted in ways that promote either continued effort or moving onto something else, we draw upon the theory of identity-based motivation (IBM; Oyserman, 2007, 2009a, 2009b). Identity-based motivation theory argues that people act and interpret their experiences in identity-congruent ways, but what feels identity-congruent is subject to contextual influence. Drawing upon other situated cognition theories (e.g., Schwarz, 2007; Smith & Semin, 2007), IBM theory predicts that self-representations are dynamically constructed using information available in the moment. The self-representation that is held in mind has implications for which working theory of difficulty is more likely to be invoked in the moment. If effort and success in the face of difficulty feels identity-congruent, then IBM theory predicts that feelings of difficulty will be interpreted as evidence of task importance. Interpreting difficulty as importance suggests the one should stay the course and increase effort on what seems to be an important, challenging task. In contrast, if succeeding in the face of difficulty feels incompatible with one's cued identity, then difficulty may be interpreted as task impossibility. If success is not possible for oneself, then effort is not worthwhile and one should change course to work on something else.

A number of studies have illustrated the motivational effects of these two interpretations of difficulty by manipulating which interpretation of difficulty is more accessible for students. For example, providing middle school students with the message that their experienced difficulty in school implies that schoolwork is important to them, improved their performance on a difficult

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pattern completion task, compared to those receiving no message or the message that experienced difficulty implies that schoolwork is impossible for them (Study 2, Smith, Novin, Elmore, & Oyserman, 2014). Similarly, reminding middle school students that difficulty can be interpreted as evidence of task importance (rather than impossibility) increased students' performance on a practice version of a statewide writing assessment (Study 3, Smith, Novin, Elmore, & Oyserman, 2014). An even more subtle manipulation with college students simply implied that students experienced one of the two interpretations of difficulty relatively more or less than their peers. Students led to believe that they experienced difficulty as importance relatively more or experienced difficulty as impossibility relatively less than their peers were more willing to invest time on difficult tasks (Smith & Oyserman, 2014).

The key message across these studies is that difficulty needs to be interpreted in a way that keeps people going—staying on course, putting in more effort, and investing more time. Therefore, the goal of the current studies is to test a potential intervention to change interpretations of difficulty. These studies build upon previous work on interpretations of difficulty in two novel ways. First, these studies measure rather than manipulate the two interpretations of difficulty (importance and impossibility). Past survey work suggests that these two interpretations of difficulty are orthogonal (Smith, Novin, Elmore, & Oyserman, 2014), thus measuring intervention effects on both interpretations separately will provide new insight into how these interpretations function separately. Second, the current research tests an intervention approach with the potential to discourage the interpretation of difficulty as impossibility in particular. Previous studies have focused on increasing the accessibility of interpretations of difficulty as importance, but discouraging interpretations of difficulty as impossibility offers a promising but unexplored target of intervention. We ask whether individuals' autobiographical

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knowledge of previous successes over difficulty can be leveraged to lower interpretations of difficulty as impossibility. Next we consider the "time travelling" self as a potential source for intervention.

The Time Traveling Self

People experience themselves over time; the self they were, are now, and could become are at once distinct and connected to the current self (Tulving, 1983; Wheeler, Stuss, & Tulving, 1997). Autobiographical memory provides a way of highlighting both continuity and discontinuity between the self one was and the self one is now (Bluck & Alea, 2008; Gallagher, 2000; Suddendorf & Corballis, 1997). The way that the past or future self is considered can result in inclusion or exclusion of these selves in the current self. For example, bringing to mind a semantic barrier between the current self and the past or future self leads to exclusion. College freshman directed to recall a positive event that "happened two years ago" report feeling more positive affect than those recalling an event that "happened two years ago, that is, before you came to the university" (Schwarz & Strack, 1999; for future self, see Schwarz & Strack, 2005). But in the absence of a reason to exclude, the past or future self informs one's understanding of the current self.

Mental time travel is most often discussed as a purposeful and goal-directed way of thinking about the past or future self (Atance & O'Neill, 2001; Buckner & Carroll, 2006). Using mental time travel, people are able to project themselves in the past or the future, reliving a personal event that already occurred or imagining a personal event that could occur (Tulving, 1983; Wheeler, Stuss, & Tulving, 1997). The acts of recalling the past self and imagining the future self share similar cognitive procedures and neural activity (Addis, Wong, & Schacter, 2007; Botzung, Denkova, & Manning, 2008; Szpunar, Watson, & McDermott, 2007). When imagining a future outcome, people typically begin by drawing related concepts and experiences

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out of episodic memory (Szpunar & McDermott, 2008). The results, however, of metal time travel to the future or the past may have different implications for informing interpretations of difficulty in the present.

Mental Time Travel to the Future

Most discussions of motivation are inherently future-focused; people engage in current effort and resist current temptation in hopes of becoming a desired future self. It is therefore unsurprising that the future self has been the temporal focus of a large body of theoretical and empirical work on motivation (e.g., Carver & Scheier, 1982; Fishbach & Ferguson, 2007; Gollwitzer, 1990; Higgins, 1987). As one prominent example, control theory proposes that imagining the future self motivates action to either close or widen the discrepancy between the current and the future self, depending upon whether it is a desired or undesired future state (e.g., Carver & Scheier, 1982; Carver, 2001; Carver & Scheier, 2001). In this vein, self-reported future possible selves increase behaviors to achieve desired and avoid feared future selves (Oyserman, Bybee, Terry, & Hart-Johnson, 2004), particularly when linked to concrete strategies (Oyserman, Bybee, & Terry, 2006). It only makes sense to expend effort in the present if it feels connected to a desired future self.

This body of work suggests that mental time travel to a future self accomplishing a valued goal will motivate engagement in action towards that goal in the present. What this work does not yet consider, however, is how this future self informs interpretations of difficulty in the present. Without an effort-sustaining interpretation of difficulty, an initial willingness to work towards a future self may quickly fizzle out when progress feels difficult. Unfortunately, a future imagined self does not offer real evidence of being the type of person who can succeed over difficulty. The past, however, is both real and certain. For this reason, the past self may offer a

lens for interpreting difficulty that the future self is less likely to provide, a possibility considered next.

Mental Time Travel to the Past

The future must be imagined and is uncertain, but mental time travel to the past conjures an actual, definite memory. Mental simulations of the past are more vivid, involving more sensory information than imagining the future (D'Argembeau & Van der Linden, 2004; Larsen, 1998) suggesting that the past self offers concrete details to draw upon. When considering how to interpret the experience of difficulty, it may be useful to bring to mind vivid, tangible details about how the past self successfully overcame difficulty to accomplish a goal. If this past self is included in the current self, then these memories may offer information about the current self's ability to navigate difficulty.

A related literature on self-efficacy connects personal experiences of performance success in the past to belief that one is capable of producing a desired outcome in a particular domain (e.g., Bandura, 1977; Bandura & Locke, 2003). In academic domains, higher levels of self-efficacy are linked to setting higher personal goals, more persistence, more efficient problem solving strategy selections, and better performance (e.g., Bouffard-Bouchard, 1990; Schunk, 1982; Schunk & Rice, 1993; Zimmerman, Bandura, & Martinez-Pons, 1992; see review, Bandura & Locke, 2003). Self-efficacy theorizing argues that in the absence of belief that one can successfully accomplish a difficult task, there is no reason to persist working (Bandura, 1977). Although self-efficacy has not traditionally been conceptualized in connection to mental time travel or interpretation of difficulty, mentally travelling to a past success over difficulty has the potential to provide evidence that one is efficacious and capable of handling difficulty effectively. Feeling efficacious may be particularly informative for interpretations of difficulty as

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impossibility; confidence that one can handle difficulty argues directly against the belief that difficulty signals the impossibility of success.

Current Research

The aim of the present investigation is to determine whether mental time travel to a past success over difficulty will lead to interpretations of difficulty that promote motivation and performance. Rather than directly manipulate how students interpret difficulty (as in previous studies), this work attempts to leverage individuals' past experiences of success despite difficulty and examines effects on both interpretations of difficulty (importance and impossibility).

In Study 1, we investigate the effects of recalling past success and difficulties along the way (compared to imagining a future success and difficulties along the way) on self-reported interpretations of difficulty. We predict that recalling that one is the type of person who overcomes difficulty (compared to imagining future success in overcoming difficulties), will produce more useful interpretations of difficulty in the present. Study 2 examines the process through which imagining past successes over difficulty affects current interpretations of experienced difficulty, asking whether recall of a past success is enough or whether recalling success *over difficulty* is a critical component. Study 3 builds on these results by replicating the effects of Study 1 on interpretations of difficulty as impossibility and extending these results to show that these changes in interpretations of difficulty, in turn, increase effort on difficult tasks.

<div align="center">

Study 1

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Participants

We recruited 134 college undergraduates (47.8% Male, M_{age}=18.3, 77% White, 16% Asian, 17% Other) to participate in an in-person, computer-based study for academic credit.

Procedure

Participants were randomly assigned to one of three conditions (past success, future success, or control). The two mental time travel conditions wrote responses to prompts asking students to describe an academic success in either the past or the future (italicized text appeared in the future success condition): "Think of a time that you overcame difficulty *<Imagine overcoming difficulty>* and successfully accomplished *<accomplishing>* an academic achievement goal in the past *<future>*. Describe what the goal was *<is>*, how it was *<is>* attained, and any difficulties that arose *<will arise>* in accomplishing it." The control condition was instructed: "Think of your typical morning routine. Describe what the routine is and how you go about it." Following the manipulation, students rated their agreement with 12 items assessing their interpretations of difficulty. Finally, participants completed a set of demographic items.

Interpretation of difficulty

Participants responded to 6 items assessing interpretation of difficulty as importance (α=.87, "School tasks that feel difficult are important tasks") and 6 items assessing interpretation of difficulty as impossibility (α =.78, "If a school task feels really difficult, it may not be possible for you"). Students rated how much they agreed with the statements on a 1 (strongly disagree) to 6 (strongly agree) scale. The full scales and exact item wording are provided in the Appendix.

<div align="center">

Results

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Preliminary analysis

Prior to our analysis, we first coded participants' responses to the manipulation prompts to determine whether or not participants' written answers fully and accurately addressed the prompts. The coding was a simple binary (0=no, 1=yes) indicating whether or not responses fully answered the prompt. In the two success conditions, responses were identified as fully

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addressing the prompts when they identified not only a success in their respective temporal period but also a specific difficulty related to that success. Examples of specific difficulties included: "trying to manage my time efficiently," "it was difficult to continue to remember equations," and "stress and lack of sleep." Overall, 66.7% of participants in the past success condition and 74.4% of participants in the future success condition wrote about a specific encounter with difficulty, while 100% of the control condition responded appropriately to the morning routine prompt. This coding variable allowed us to test our predictions with the full sample as well as with the restricted sample identified by our coding.

Interpretation of Difficulty Results

We first tested for an effect of the manipulation with the full sample, without incorporating the coded written responses. In the full sample, no effect of condition emerged on the interpretation of difficulty as importance ($F<1$, $p>.6$) or impossibility ($F<1.5$, $p>.3$). We then assessed whether the manipulation had an effect in our restricted sample, whose written responses accurately reflected the manipulation prompt and included descriptions of difficulty in the two mental time travel conditions. Analysis with the restricted sample revealed that the condition manipulation impacted participants' beliefs that difficulty signals impossibility, $F(2, 104)=2.712$, $p=.071$. Illustrated in Figure 4.1, pairwise comparisons between the three conditions indicate that recalling a past success over difficulty lead to less belief that difficult tasks are impossible ($M=2.26$) than did imagining a future success ($M=2.59$, $F(1,104)=4.46$, $p=.037$) or the control condition ($M=2.59$, $F(1,104)=3.97$, $p=.049$). The control and future success conditions did not differ on the difficulty means impossibility scale ($F<1$, $p>.9$). Condition did not affect participants' beliefs that difficulty signals importance ($F<1.5$, $p>.2$).

Discussion

The results of Study 1 support our prediction that mental time travel to a past success over difficulty decreases the interpretation of difficulty as impossibility. Notably, bringing to mind a past success led to lower endorsement of the interpretation of difficulty as impossibility in comparison to not only the control condition, but also the future success condition. The content of these past success memories mattered, as this effect only emerged when we examined a restricted sample in which participants explicitly recalled successes over difficulty. These results support our prediction that having a concrete reason to see oneself as the type of person who succeeds in the face of difficulty lowers the likelihood that difficult tasks will be interpreted as impossible. These effects emerged for the impossibility interpretations but not the importance interpretations, potentially because past triumphs over difficulty offer more information about the possibility of success on difficult tasks than they do about the importance of success on difficult tasks.

Effects only emerged in the restricted sample of participants who explicitly discussed difficulty along the way to success. This raises the question of whether recalling a past success over difficulty is indeed more useful than recalling a past success (without difficulty) for interpreting difficulty in the moment. Although Study 1 allowed us to distinguish between past and future mental time travel, it did not allow us to compare mental time travel to the past with and without recalling past difficulty. Study 2 will answer the question of whether recalling difficulty is also an active ingredient in the manipulation. Given that only memories of past success *over difficulty* offer evidence of one's efficacy in dealing with difficulty, we predict that it is less useful to recall a past success without also recalling the struggles along the way.

Study 2

Participants

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Participants were recruited through Amazon's Mechanical Turk and paid a nominal fee for completing an online survey, N=207 (49.3% Male, M_{age}=33.78, Min_{age}=18, Max_{age}=82, 77% White, 8% African American, 15% Other).

Procedure

Participants were randomly assigned to one of three conditions. In the two mental time travel conditions ("past success over difficulty" condition or "past success only" condition), participants were asked to describe a time when they accomplished a professional goal. The prompts, provided below, were nearly identical, except the "past success over difficulty" condition received a prompt that emphasized past difficulty (italics were not used in the study, but are added below for emphasis). In the control condition, participants completed the morning routine neutral writing task. Participants then completed 12 items assessing their interpretations of difficulty, responded to demographic questions, and were asked to recall the topic that they wrote about at the beginning of the study.

Past success only prompt. "Think of a time that you successfully accomplished a career or professional goal in the past. Describe what the goal was, how it was attained, and describe accomplishing it."

Past success over difficulty prompt. "Think of a time that you *overcame difficulty and* successfully accomplished a career or professional goal in the past. Describe what the goal was, how it was attained, and describe *any difficulties that arose in* accomplishing it."

Interpretations of difficulty. Items were identical to those in the Appendix; 6 items assessed participants' belief that the experience of difficulty signals importance (α=.91), and 6 items assessed the belief that difficulty signals task impossibility (α=.86).

Writing topic recall. To assess participants' recall of the topic they wrote about in response to the manipulation prompt, we asked that they identify their writing topic from a set of closed-ended response options: "At the beginning of the survey, select which topic you wrote about: the past (with no mention of difficulty), the past (with mention of difficulty), or your morning."

Results

Preliminary Analyses

Open-ended responses to the manipulation were coded for whether or not they described an encounter with difficulty (Past success over difficulty condition: 70.0%, Past success only condition: 35.3%). Participants in the "Past success over difficulty" condition were significantly more likely to describe an experience of difficulty than those in the "Past success only" condition, $\chi(1, 128)=15.37$, $p<.001$. Examples of difficulties described by participants included: "overcoming unfair criticism and doubts," "the insane schedule I kept with the kids, school, and work," and "work there was extremely demanding both physically and mentally." Using the coding of whether difficulty was discussed or not, we created a new variable indicating the actual content of participants' responses (1= "Describing past success over difficulty," 2= "Describing past success only," or 3= "Control"). Our coding of participants' text responses to the manipulation were significantly related to their self-reported recall of the topic they wrote about ($\chi(1, 128)=22.32$, $p<.001$), with 84.8% of those who actually wrote about difficulties claiming that their writing task specifically mentioned difficulty and 54.8% of people who did not write about difficulty claiming that their prompt had no mention difficulty.

Interpretation of Difficulty Results

We first assessed the effects of the condition manipulation on the interpretation of difficulty scales. Condition did not affect participant endorsement of the difficulty means importance items ($F(2,204)=1.31$, $p=.27$). There was, however, a trend-level effect of condition on belief that difficulty means impossibility, $F(2, 204)=2.41$, $p=.09$, with pairwise comparisons indicating that, compared to the control condition ($M=3.17$), participants reported lower endorsement that difficult tasks are impossible for them after being directed to recall a past success over difficulty ($M=2.90$, $F(1, 204)=3.07$, $p=.081$) or past success only ($M=2.87$, $F(1,204)=3.87$, $p=.050$).

In light of evidence from Study 1 that the content of participants' written responses mattered, we next assessed the effects of participants' actual written responses on interpretations of difficulty. Using our coding of participants' responses as our predictor variable (1= "Describing past success over difficulty", 2= "Describing past success only", or 3= "Control"), effects emerged for both interpretations of difficulty, as illustrated in Figure 4.2. The coded response categories predicted participants' belief that difficulty means importance, $F(2, 195)=2.58$, $p=.078$. Individuals who wrote about a past success over difficulty were more likely to believe that difficult tasks are important ($M=3.81$) than participants who described their morning routine ($M=3.46$), $F(1, 195)=5.11$, $p=.025$. The pattern was in the same direction but not significant if past success over difficulty was compared to past success only ($p=.185$). Coded responses also predicted belief that difficulty means impossibility, $F(2, 195)=3.838$, $p=.023$. Participants who described past successes over difficulty were less likely to believe that difficult tasks are impossible for them ($M=2.75$) compared to those who described their morning ($M=3.16$, $F(1, 195)=7.34$, $p=.007$) and to those who described a past success only ($M=3.05$, $F(1,$

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195)=3.41, *p*=.066). The past success alone and morning routine groups did not differ on the impossibility items (*F*<0.5, *p*>.5).[4]

Discussion

Study 2 offers insight into the mechanism through which the mental time travel manipulation impacted interpretations of difficulty. While Study 1 illustrated the utility of recalling past success relative to imagining future success, Study 2 addressed a limitation of the first study: it did not distinguish between recalling past success and recalling past success over difficulty. By comparing the impact of recalling a past success either with or without the inclusion of difficulty in the memory, Study 2 identifies the act of recalling difficulty as a necessary component of the manipulation.

Considering the content of participants' responses to the manipulation prompts helped to clarify the pattern of results. Without considering the content of those responses, the two intervention conditions appeared to have similar effects on the interpretation of difficulty as impossibility, relative to the control condition. It seems unlikely, however, that simply recalling oneself successfully accomplishing a goal (regardless of difficulty) was causing these effects. Some individuals automatically wrote about past successes over difficulty, even when not explicitly asked to do so, and this recall of success *over difficulty* appeared to be driving the effects of both experimental conditions. Using coded response content as our predictor demonstrated that, compared to the control, recalling past success over difficulty predicted not only lowered belief that difficulty signals task impossibility but also increased belief that

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[4] These analyses were repeated using participants' self-reported recall of their writing topic as the predictor. The patterns were the same as the coded responses predictor, with people who recalled being asked about success over difficulty reporting more belief that difficulty signals importance and less belief that difficulty signals impossibility, compared to those who did not remember being asked about difficulty.

difficulty signals task importance. Comparing participants who included difficulty in their past success descriptions to those who did not also revealed lower belief that difficulty signals impossibility among those who recalled specific difficulties.

These results raise the possibility that recalling past success over difficulty has implications for interpreting difficulty as importance, a result that did not emerge in Study 1. The effects on interpretations of difficulty as impossibility may be more robust, and interpretations of difficulty as impossibility may be particularly sensitive to information the self's ability to succeed over difficulty. Study 2 suggests, however, that participants who engage deeply in the manipulation, spending time thinking about their struggle and triumph over difficulty, may also recall of the importance of that experience of difficulty.

Together, Study 1 and Study 2 provide converging evidence that recalling past success over difficulty discourages the interpretation of experienced difficulty as impossibility, but these effects had not been extended to engagement in a behavioral task. In Study 3, we introduced a measure of performance to determine whether the effects of our mental time travel manipulation on interpretations of difficulty indeed mattered for performance and persistence.

Study 3

Participants

Adult participants recruited online through Amazon's Mechanical Turk ($N = 198$, 42.9% Male, M_{age}=33.78, Min_{age}=18, Max_{age}=67) completed a brief study for a nominal fee.

Procedure

Participants were randomly assigned to one of three conditions, which used a similar manipulation as Study 1, but specified that participants in the two intervention conditions should write about a career or professional success in particular. In the two mental time travel

conditions, the writing prompts differed in whether they asked about a past or a future success over difficulty (e.g., "Think of a time that you successfully accomplished *<Imagine successfully accomplishing>* a career or professional goal in the past *<future>*. Describe what the goal was *<is>*, how it was *<is>* attained, and any difficulties that arose *<will arise>* in accomplishing it."). As previously, the control condition was a neutral writing task in which subjects described their morning routines. After the manipulation, participants completed the interpretation of difficulty scales. Two additional dependent measures appeared after the difficulty scales. First, participants were asked to complete a series of anagrams intended to measure performance on a difficult task. At the conclusion of the anagram task, participants' persistence was measured by a single item assessing their willingness to complete additional anagrams. Regardless of their response, all participants were then asked to complete a brief demographic questionnaire.

Interpretations of difficulty. Participants responded to a series of twelve items (see Appendix) that reflected an interpretation of experienced difficulty as signaling either importance or impossibility (1=strongly disagree to 6=strongly agree). Six items measured the interpretation of difficulty as importance ($\alpha =.92$) and six items assessed the interpretation of difficulty as impossibility ($\alpha =.85$).

Anagrams. Participants were asked to complete a set of 15 anagrams. Anagrams were presented as a test of problem solving ability, "Please unscramble as many of the words listed as you can. Use every letter only once. The more you complete, the more accurate and reliable the information about your problem solving ability will be." Sample items include PNOIA (piano), MOORT (motor), and CEDDAE (decade). Responses were coded for accuracy and summed into a total correct.

Persistence. After responding to the anagram set, participants were asked whether they were interested in completing more anagrams: "As a reminder, the more problems you complete, the more accurate the assessment will be. Do you want to try more?" Participant responses were coded as a binary measure of willingness to persist (0=no, 1=yes).

Results

Preliminary Analysis

As previously, we first coded participants' responses to the manipulation prompts. Following the procedure in Study 1, the coding was a simple binary (0=no, 1=yes) indicating whether or not responses fully and accurately addressed the prompts. In the past and future conditions, responses were identified as addressing the prompts if they identified a specific difficulty related to their success. Examples of specific difficulties included: "the demands of caring for my mom full time," "juggling school, a family, and a full time job," and "learning enough in my current position to be ready to move up." Coding indicated that 73.3% of the past success condition and 73.8% of the future success condition wrote about a specific difficulty, and 100% of the morning routine condition wrote about their morning routine.

Interpretation of Difficulty Results

We first tested the effects of the manipulation using the full sample. The pattern of effects on interpretations of experienced difficulty replicated those in Study 1. Results revealed a main effect of condition on interpretations of difficulty as impossibility ($F(2, 195)=5.39$, $p=.005$) but not importance ($F<1.6$, $p>.2$). Recalling a past success over difficulty lowered belief that experienced difficulty signals impossibility ($M=2.58$) compared to imagining a future success ($M=2.95$, $F(1, 195)=6.43$, $p=.012$) or the morning routine control ($M=3.03$, $F(1, 195)=9.72$,

p=.002). There was no difference between imagining a future success and the control condition on interpretations of difficulty as impossibility ($F<.5$, $p>.5$).

Given that content of participants' mental time travel descriptions mattered in the previous studies, we once again repeated this analysis with the restricted sample identified by our coding of participants' written responses. This analysis uncovers the same pattern of effects we found in the full sample. As predicted, there was a main effect of condition on interpretations of difficulty as impossibility ($F(2, 162)=4.01$, $p=.020$) but not importance ($F<1$, $p>.5$). As illustrated in Figure 4.3, recalling a past success over difficulty predicted lower belief that experienced difficulty signals impossibility ($M=2.60$) compared to describing a future success over difficulty ($M=2.96$, $F(1, 162)=4.52$, $p=.035$) or the control task ($M=3.03$, $F(1, 162)=7.55$, $p=.007$). Interpretations of difficulty as impossibility did not differ between the future success and control conditions ($F<.5$, $p>.6$).

Anagram Performance and Persistence Results

Moving on to the performance and persistence measures, participants solved an average of 8 out of 15 anagrams ($M=7.79$, $SD=3.38$), and approximately half of the sample was willing to persist and solve more anagrams (48% said no, 52% said yes). We examined the direct and indirect effects of the mental time travel manipulation on anagram performance and persistence. To examine indirect effects, we examined interpretations of difficulty as impossibility as a potential mediator of an indirect effect of condition on performance and persistence. The past success manipulation lowered interpretations of difficulty as impossibility (as reported above),

and interpretations of difficulty as impossibility were related to related to worse performance on the anagrams ($B=-.590$, $p=.039$) and lower likelihood of persisting ($Exp(B)=.671$, $p=.023$).[5]

While there was no direct effect of thinking about the past on performance ($F<1$, $p>.4$) or persistence ($\chi^2=.342$, $p>.84$), we found the predicted indirect effect of past success via interpretation of difficulty as impossibility. We used the PROCESS computational tool to examine indirect mediation (Hayes, 2012). Because of our multicategorical independent variable, we estimated the indirect effect of the past success condition relative to the future success condition and the control condition separately (Hayes & Preacher, 2013). Relative to the control condition, there was an indirect effect of the past success manipulation on anagram performance via the interpretation of difficulty as impossibility, as indicated by a bootstrapped 95% confidence interval that does not contain zero (CI: -.634, -.001). This indirect effect on performance did not emerge for the past success vs. future success comparison (CI: -.600, .001). The indirect effect on willingness to persist emerged for both comparisons; interpretations of difficulty as impossibility mediated an indirect effect of the past success condition relative to control (CI: -.429, -.023), and past success relative to future success (CI: -.429, -.014).

Discussion

Study 3 replicated the previous results that mental time travel to a past success over difficulty led to lowered belief that experienced difficulty signals task impossibility. Study 3 also extends these results to actual behavior by showing that lower beliefs that difficulty signals impossibility, in turn, were related to better performance on an anagram task and increased willingness to persist on the task. In line with previous research, Study 3 supports the prediction

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[5] Given that the interpretation of difficulty as importance was not related to the manipulation, we did not consider it as a potential mediator of an indirect effect of condition on performance. Furthermore, the interpretation of difficulty as importance was unrelated to anagram performance ($B=-.085$, $p>.7$) or persistence ($Exp(B)=.864$, $p>.3$).

of identity-based motivation theory that interpretations of difficulty matter for motivation. The observed indirect effect of our manipulation on effort and persistence suggests that leveraging past successes may offer an intervention approach to improve effort by lowering interpretations of difficulty as impossibility.

General Discussion

Three studies examined the impact of mental time travel to a past success over difficulty on interpretations of experienced difficulty. Whereas two studies compared imagining personal successes over difficulty across temporal points (past vs. future), a third study compared recall of past successes with or without the inclusion of difficulty to overcome. Across these studies, when individuals first recall a past success over difficulty, they are consistently less likely to believe that the experience of difficulty signals that tasks are impossible for them. In turn, lowered belief that difficulty signals impossibility was related to increased performance and willingness to persist on a challenging task. These findings are consistent with the prediction from identity-based motivation that framing the self as a person who perseveres despite difficulty will lower the likelihood of interpreting difficulty as evidence that a task is impossible.

The effects obtained were primarily driven by the recall of specific difficulties encountered along the way to these past successes, rather than by simply recalling a past success. This distinction supports the prediction from identity-based motivation that the self is sensitive to information about how to interpret difficulty. When recalling past triumphs over difficulty, there is an opportunity to gather evidence that the self is efficacious and able to handle difficulty, information that would not come to mind if difficulties were not considered. In this way, only recall of specific difficulties is likely to set off an associate network linking the self to more motivating interpretations of difficulty.

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This work also uncovers a motivational role for mental time travel to a past self rather than imagining a desired future self. Although imagining the future pay off for one's effort has proven useful for motivating effort at school (e.g., Destin & Oyserman, 2010), the future self was not the most helpful temporal frame when it came to interpretations of difficulty. Instead, bringing to mind concrete evidence that past encounters with difficulty did not mean that success was impossible for oneself was more useful, resulting in reduced belief that difficulty signals impossibility. Given the observed indirect effects of the past success over difficulty manipulation on performance and persistence, we argue that the past self can be brought to mind in motivation-enhancing ways.

Limitations & Future Directions

One limitation of the current studies is that we did not directly test our hypothesized mechanism through which recalling past success over difficulty influenced interpretations of difficulty as impossibility. Fully understanding this process requires a study to examine mediation of these effects through feelings of efficacy that one can handle difficulties. Results support this potential mediator given our finding that individuals who recalled a past success but did not recall difficulty encountered en route to that success did not report lower belief that difficulty signals impossibility. These results favor the explanation that changes in interpretations of difficulty are contingent on recalling one's ability to navigate difficulty, but changes in these efficacy beliefs need to be directly measured.

Another limitation of the current studies is the use of a scale measure of interpretations of experienced difficulty. These scale measures may be less sensitive to changes in interpretations of difficulty than would be immediate responses to the actual experience of difficulty. A benefit, however, of using these scale measures is that they allowed us to measure endorsement of both

interpretations of difficulty and relate these responses to performance and persistence. Previous work manipulated the accessibility of a particular interpretation (either impossibility or importance or a control that offered no interpretation) and illustrated the benefits of an interpretation of difficulty as importance frame on performance (Smith, Novin, Elmore, & Oyserman, 2014). In the current studies, belief that difficulty signals impossibility, but not belief that difficulty signals importance, was related to anagram performance and persistence and mediated the indirect effect of the manipulation. These results point to the motivational benefits of lowering interpretations of difficulty as impossibility in addition to increasing the accessibility of interpretations of difficulty as importance. Future studies are needed to further investigate these complementary yet theoretically distinct pathways.

Also needed is future work to better understand how the mental time travel manipulation relates to interpretations of difficulty as importance. Recalling past successes over difficulty was particularly effective for lowering the likelihood that difficulty will be interpreted as impossibility, but did not consistently influence beliefs that difficulty signals task importance. It is possible that past encounters with difficulty simply offer more information about whether one should interpret new challenges as impossible than as important. However, more work is needed to understand these relationships more fully. One potential approach would be to consider the instances of past success brought to mind and their relevance to the interpretation of difficulty as importance. Not all difficult tasks are equally important, and individual variation in the past success that came to mind may matter for the interpretation of difficulty as importance. Also, future work could manipulate the subjective importance of the past goal recalled, which might uncover variations in the resulting beliefs that difficulty signals task importance.

Finally, future investigations should further explore the situated nature of these effects on interpretations of difficulty. We intended for participants to view their past and future selves as connected to their current self, allowing those selves to be included in the current self. However, emphasizing a temporal boundary provokes excluding judgments in which the past or future self is seen as a standard of comparison for the current self (Schwarz & Strack, 1999). The observed effects on the interpretation of difficulty may disappear or even reverse if we introduced a temporal boundary into our past success recall task. If the past self is presented as categorically different than the current self, then recalling the meaning attributed to difficulty in the past may give rise to opposing interpretations of difficulty in the present. A related possibility is that failures of a past self brought to mind as categorically different from the current self could provide a comparison standard to encourage motivation-supporting interpretations of difficulty in the present.

Implications for Intervention

Taken together, these studies point to the potential for interventions to leverage mental time travel to past successes over difficulty to discourage students faced with challenging tasks from interpreting their experienced difficulty as impossibility. The results also highlight the performance-undermining implications of interpreting difficulty as impossibility, offering further support for intervention to avoid this outcome.

This work builds upon previous studies illustrating the performance benefits of reminding students that experienced difficulty can be interpreted as task importance rather than task impossibility (Smith, Novin, Elmore, & Oyserman, 2014). It would be unwise, however, to assume that students should be directly told how to make sense of difficulty. Students who perceive messages framing difficulty as importance as heavy-handed influence attempts may

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experience reactance and subsequent performance declines (see Chapter III). Leveraging past successes over difficulty may help circumvent the potential for reactance when using more direct persuasive messages. By having students generate evidence that they personally can succeed over difficulty, we expect that they are less likely to feel subject to a persuasive attempt.

Intervention to discourage the interpretation of difficulty as impossibility could take multiple forms. One possibility is to have students engage in short journal writing activities or small group discussions in which they recall past successes over difficulty, prior to tackling a new challenge. Difficulty in the past did not mean that success was impossible, and students can apply this past insight to the interpretation of new challenges. Along similar lines, successful interventions have reframed test-taking anxiety as useful physiological preparation for a challenge (Jamieson, Mendes, Blackstock, & Schmader, 2010), the test-taking experience as a chance to learn rather than a demonstration of ability (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010), and experienced difficulty as evidence that one is learning (Autin & Croizet, 2012). Our intervention is related in its shared focus on interpreting challenging experiences in ways that support motivation, but uses a more subtle approach. Rather than tell students how they should interpret an experience, recalling past successes over difficulty allows them to remind themselves of how they personally made sense of difficulty in the past.

An alternate intervention that still allows students to discover how to interpret difficulty on their own while permitting more teacher control is the creation of an experience of success over difficulty in the classroom. For instance, teachers could manufacture an experience of success over difficulty by presenting students with a challenging task that involves a struggle (e.g., a logic puzzle that first seems impossible, but is eventually solved). Teachers could then reference this shared experience in the context of future challenges.

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Whether through recall from episodic memory or through experiences created in the classroom, interventions using mental time travel to the past self have the potential to promote interpretations of experienced difficulty that encourage continued effort. Furthermore, the benefits of the past self for interpretations of difficulty may be even more powerful if linked to the future self. Combining the anchoring certainty of the past self with the energizing goal-direction of the future self may offer a way forward for interventions to help students stay on track or keep professionals focused at work. In this way, interventions leveraging the whole self (past, present, and future) offer increased support for the self to navigate and succeed at new challenges.
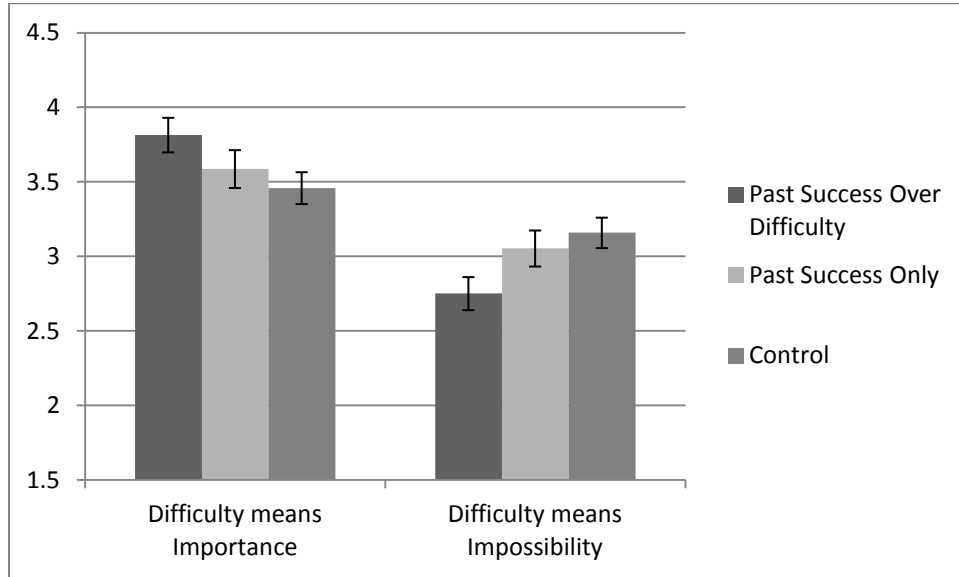
Figure 4.1

Interpretation of Difficulty as Impossibility after Recalling Past Success over Difficulty (Study 1)
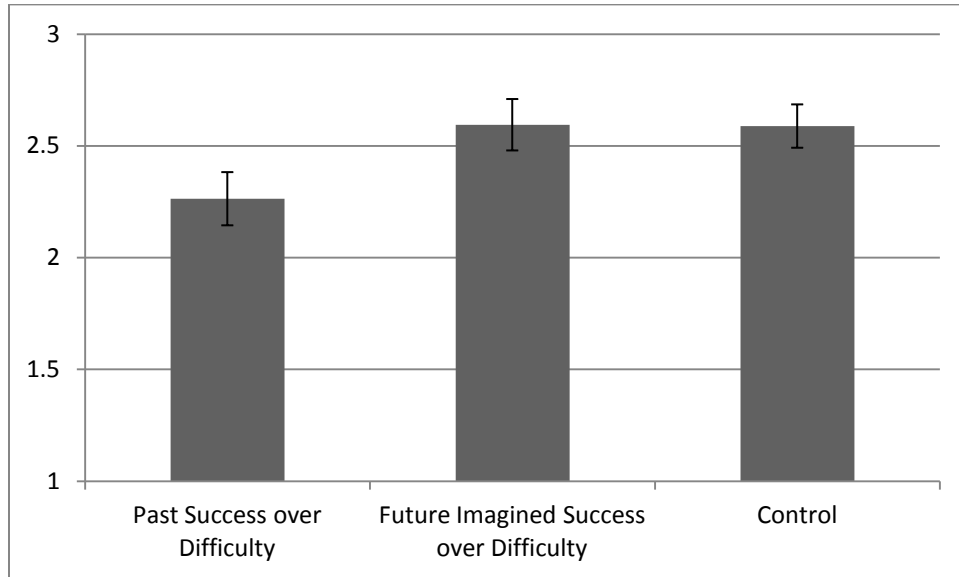
Note: Scores reflect agreement with items describing the interpretation of difficulty as task impossibility (Study 2). Error bars represent standard errors. Condition influenced interpretation of difficulty as impossibility, $F(2, 104)=2.712$, $p=.071$. Students who described a past success over difficulty were less likely to endorse an interpretation of difficulty as impossibility compared to those who imagined a future success ($p=.037$) or described their morning routine in the control condition ($p=.049$).
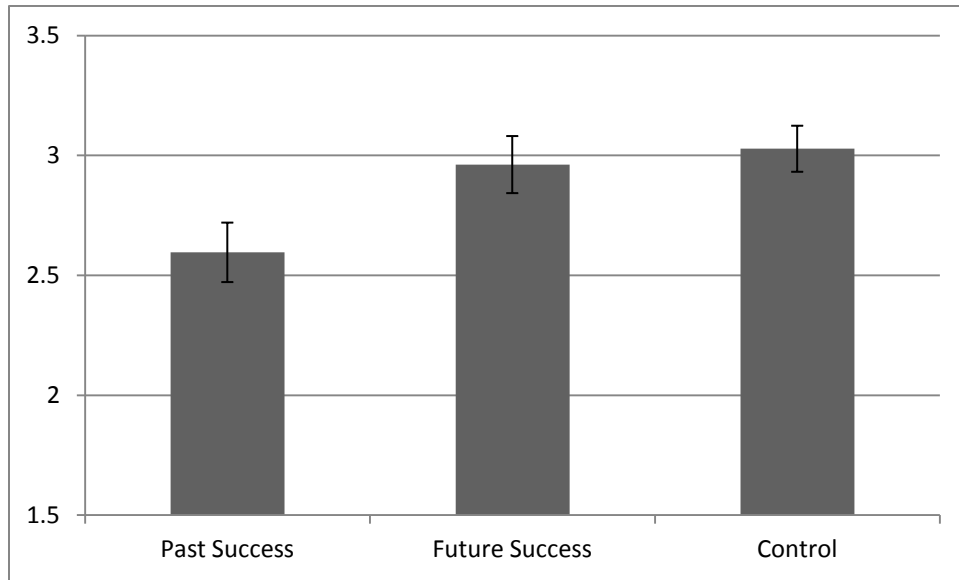
Figure 4.2

Interpretations of Difficulty as Importance and Impossibility after Recalling Past Success over Difficulty (Study 2)

Note: Scores reflect agreement with items describing the interpretation of difficulty as task importance and as task impossibility (Study 3). Error bars represent standard errors. Participants responses to writing prompt were coded and categorized as describing either a past success over difficulty, a past success with no explicit mention of difficulty, or control (describing a morning routine). Writing condition predicted participants' belief that difficulty means importance, $F(2, 195)=2.58$, $p=.078$, pairwise comparisons showed that writing about a past success over difficulty increased this belief compared to control, $p=.025$, the pattern was in the same direction but not significant if past success over difficulty was compared to past success only $p=.185$. Writing condition also predicted belief that difficulty means impossibility, $F(2, 195)=3.838$, $p=.023$, pairwise comparisons indicate that participants who described past successes over difficulty were less likely to believe that difficult tasks are impossible than control ($p=.007$) or those who simply described a past success ($p=.066$).

Figure 4.3

Interpretation of Difficulty as Impossibility after Recalling Past Success (Study 3)

Note: Scores reflect agreement with items describing the interpretation of difficulty as task impossibility (Study 3). Error bars represent standard errors. In the experimental conditions, participants were prompted to either recall a past success or imagine a future success. In the control condition participants were not asked to bring to mind a success and instead wrote about their morning routine. Condition influenced reported interpretation of difficulty as impossibility ($F(2, 162) = 4.01$, $p=.020$). Paired contrasts showed the recalling a past success lowered interpretations of difficulty as impossibility (contrast future success condition, $p = .035$, contrast with control condition, $p=.007$). Control and future success conditions did not differ from each other, $p > .5$.

<div style="text-align: center;">**References**</div>

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Appendix B

Interpretation of Experienced Difficulty Scales

Agreement with each item is rated on a scale from 1 (strongly disagree) to 6 (strongly agree). Studies with college students include the *school* tasks in the question wording (italicization added here for clarity, but not present in the studies). The *school* wording was not present in scales used with adults on Amazon's Mechanical Turk.

Interpretation of Difficulty as Impossibility:

If you feel stuck on a *school* task, it's a sign that your effort is better spent elsewhere.

If working on a *school* task feels very difficult, that type of task may not be possible for you.

Sometimes people work at things that just aren't meant for them. If a *school* task feels too

   difficult, you should move on to something else.

You know that when working on a *school* task feels hard, that feeling means it's not for you.

Finding a *school* task really difficult tells you that you can't complete that task.

If a *school* task feels really difficult, it may not be possible for you.

Interpretation of Difficulty as Importance:

If you're working on a *school* task that feels difficult, it means that the task is important.

A sign that a *school* task is important to you is how difficult it feels while working on it. If it

   feels difficult, it's important.

Struggling to complete a *school* task reminds me that the task is important.

If a *school* task is difficult, it is probably important for you to do well at it.

School tasks that feel difficult are important tasks.

If a *school* task is difficult, it means that it's important for you.

Chapter V

Conclusion

The dissertation studies demonstrated the usefulness of a number of small theory-based interventions to encourage academic effort. Drawing inspiration from identity-based motivation theory, three different approaches targeted how participants think about their identities and how they respond to difficulty. These studies capitalized on the context-sensitivity of individuals' identity content and interpretations of difficulty by offering subtle messages to shift these cognitions in ways that promoted effort and motivation. Taken together, this work offers support for the identity-based motivation theoretical approach as well as insight for researchers, teachers, and policymakers aiming to improve student motivation through school-based interventions.

Implications for Identity-based Motivation Theory

A key innovation of identity-based motivation theory is its integration of perspectives from social identity theory (Tajfel, 1981; Tajfel & Turner, 1986) and social cognition (e.g., Fiske, 1992; Schwarz, 2007; Smith & Semin, 2004, 2007), which are then applied to the self and motivation. Identity-based motivation theory (Oyserman, 2007, 2009a, 2009b) makes novel predictions based on the insight that how individuals understand themselves and their social identities is likely dynamically constructed and sensitive to contextual influence. The dissertation tested two core predictions from identity-based motivation. The first prediction is that the self is dynamically constructed, such that motivation to engage in some behaviors and not others is shaped by contextually cued information about the identity-congruence of those behaviors. The

second prediction is that when engaging in a behavior, individuals are sensitive to information about how to interpret the feeling of difficulty that they experience—interpretations which can either support or undermine effort. By testing these theoretical predictions, the dissertation lends support to the overall IBM model.

The first prediction from IBM theory tested in the dissertation is that social identities—although they feel stable over time—are in fact quite sensitive to contextual influence. The first paper (Chapter II) tested this prediction by focusing on a social identity related to school outcomes: gender. Girls outperform boys academically, and helpful school behaviors (e.g., quiet listening, well-organized note-taking, etc.) may be perceived as "girl" behaviors. By asking whether school success can be framed as "a boy thing," this study introduced contextual cues linking male gender to school success that stood contrary to chronically experienced messages linking female gender to school success. Students imagined more academically focused future selves, and, among boys in particular, even worked harder on an actual academic task, when provided with Census data suggesting that school success is characteristic of *their* gender.

In support of IBM theory, these results suggest that students are indeed scanning their social context for information about what people like them do, and incorporating their findings into their own thinking and behavior. Furthermore, the study points to identity content being dynamically constructed—despite seeing chronic evidence that girls succeed in school, new information portraying school success as "a boy thing" was automatically incorporated into boys' possible selves and effort. As predicted by the IBM model, this dynamically constructed self-content, in turn, affected the future that students imagined for themselves and their effort on academic tasks. These results emphasize the powerful role of social identities in determining the behaviors that feel right in the moment.

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The dissertation also investigated the prediction from IBM theory that the experience of difficulty when working towards goals can be interpreted in motivation-undermining or motivation-supporting ways. The implications of experienced difficulty for motivation depends on how it is interpreted (e.g., "seems like success is impossible for me" vs. "seems like I'm doing challenging and important work"). The second paper (Chapter III) examined the effects of these alternate interpretations by observing the implications of students' endorsement of (versus reactance to) messages about these interpretations of difficulty for performance. Consistent with IBM theory, we observed better performance on a difficult school task among students who either accepted a message that framed difficulty with schoolwork as a signal of importance or rejected a message that framed difficulty with schoolwork as a signal of impossibility.

Interpretations of difficulty were also the theoretical focus of the third paper (Chapter IV), which measured rather than manipulated the two potential interpretations of experienced difficulty. Three studies illustrated that recalling a past self who successfully overcame difficulty to accomplish a goal led to lowered belief that difficulty signals task impossibility. These results support the role of the self in guiding interpretations of difficulty, suggesting that belief in one's ability to navigate difficulty may discourage interpretations of difficulty as a sign of task impossibility. The third paper also provided additional evidence linking interpretations of difficulty and effort, finding that recalling a past success over difficulty had an indirect effect on performance and persistence that operated through lowered belief that difficulty signals impossibility.

Taken together, these projects support the IBM theoretical prediction that subtle situational cues can encourage students to interpret their identities and effort in ways that bolster academic motivation. This situational sensitivity is good news for intervention, and these lines of

work offer insight into interventions that can be fruitfully implemented by teachers and practitioners.

Implications for Teachers & Practitioners

A strength of the dissertation studies is that their simple manipulations could be used by teachers in brief classroom interventions. The IBM theoretical model has already inspired a 12-session intervention (School-to-Jobs), which improved student motivation and achievement through classroom activities linking school success to students' identities and framing difficulty at school as a normal experience that can be overcome (Oyserman, Terry, & Bybee, 2002; Oyserman, Bybee, & Terry, 2006). School-to-Jobs offered an omnibus test of IBM theory; a randomized controlled trial reported favorable program results. Compared to a study skills control group, students in the School-to-Jobs program experienced better academic (i.e., grades, test scores) and behavioral (i.e., attendance, in-class behavior) outcomes (Oyserman, Bybee, & Terry, 2006). In contrast to School-to-Jobs, the dissertation systematically tested smaller theoretical predictions in brief interventions. As a result, the dissertation studies offer guidance for future implementations of School-to-Jobs as well as even shorter, targeted intervention efforts.

For School-to-Jobs, the dissertation results suggest that framing achievement as identity-congruent and encouraging the interpretation of difficulty as importance are essential components of the 12-sessions. Indeed, School-to-Jobs was created with the purposeful inclusion of these points of intervention, but testing their motivational benefits separately lends support to their individual contribution to the program's benefits overall. While the RCT illustrates the benefits of School-to-Jobs when implemented fully and with fidelity, future implementations may be less ideal. In the bustle of overcrowded classes and classroom management challenges,

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holding in mind the most important active ingredients may help maintain the core benefits of the program, even in the absence of smooth implementation. The dissertation studies indicate that a successful implementation of School-to-Jobs will convince students that academic success is possible for them and that difficult tasks along the way are normal challenges that can be overcome.

The dissertation experiments also point to the potential for brief interventions, like those in these studies, to benefit motivation by targeting identity or the interpretation of difficulty. These studies suggest numerous approaches that could be employed by teachers hoping to boost student motivation. However, it is important to highlight not only possible benefits but also potential pitfalls of implementing these approaches, both of which are discussed next.

The dissertation illustrates the benefits, particularly for young men, of framing students' salient identities as congruent with achievement success. However, classroom practices based on these findings must be thoughtful in order to avoid unintentional motivation-undermining messages. One potential pitfall is that simply cuing stereotyped identities, without providing more useful ways to think about those identities, may hurt motivation among some students. For example, although some African American students naturally link their racial-ethnic group to achievement (Oyserman, Gant, & Ager, 1995), simply raising stereotyped identities without a convincing message linking them to effort and success may undercut students' performance through a stereotype threat process (e.g., Schmader, 2010; Steele, 1997; Steele & Aronson, 1995). Framing identities in beneficial ways poses challenges as well. In one example, Betz and Sekaquaptewa (2012) observe that messages depicting women in STEM careers as very feminine actually lower girls' interest in STEM fields. Although these messages link female gender identity to STEM success, they also present a standard that students found unattainable,

mirroring previous work illustrating the self-undermining effects of unattainable role models (Lockwood & Kunda, 1997). This work suggests a boundary condition of identity-congruence frames; students need to see academic success as possible for them without feeling overwhelmed by unrealistic expectations.

Messages to encourage students to interpret difficult work as important, not impossible, also require thoughtful implementation in order to be effective. As indicated by the results of the second paper, an overt, direct message framing difficulty as importance will work for some but not all students. However, reactance in response to the importance message was motivation-undermining. While the study cannot answer why some students endorsed the importance message while others did not, one possibility is that the importance message felt identity-congruent only for some students. To address this possibility, interventions that include the self or identity in the message about difficulty may be more useful. Avoiding reactance, however, may not always be desirable. In the same study, reactant rejection of a message framing difficulty as impossibility led to a motivational boost. Interventions that harness student reactance against the interpretation of difficulty as impossibility may be just as fruitful as those arguing in favor of interpretations of difficulty as importance.

One method to avoid the potential for students to reject motivation-enhancing messages is to have students themselves generate evidence in support of helpful interpretations of difficulty. The approach taken in the third paper, directing participants to recall a past self who succeeded over difficulty, may avoid the potential pitfalls of direct messages about how to interpret difficulty. In practice, however, intervention must compel students to recall a past self succeeding *over difficulty* in order to lower belief that difficulty signals impossibility (as found in Chapter IV). Furthermore, this past self needs to be included in the current self (see Schwarz &

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Strack, 1999). Interventions that unknowingly emphasize a distinction between the current and past self may fail to benefit interpretations of difficulty, and may set up an unfavorable mental contrast that increases belief that difficulty signals impossibility.

Implications for Current Education Policy

This dissertation adds to the body of experimental and intervention evidence supporting the use of IBM theory to encourage school effort among low-income and minority youth. This work shares a common interest in increasing student motivation with a number of ongoing policy efforts in US schools to increase college attendance among students from underrepresented groups. For policymakers, the dissertation studies offer perspective on the content of programs that are likely to encourage college attendance as well as the research approaches that can provide evidence of their effectiveness.

Regarding content, the dissertation underscores the need for programs that set up classroom contexts in which students' salient identities include becoming college-bound and their experienced difficulty is interpreted as meaning that becoming college-bound is an important, not an impossible, future identity. Programs accomplishing these two goals are likely to improve student motivation. Although the brief interventions discussed above may prove useful for programming to accomplish these goals, a number of approaches have the potential to achieve these goals. IBM theory, rather than arguing the superiority of one particular policy approach, instead suggests that many policies can work to motivate students, but that the implementation of any policy needs to be thoughtful. This dissertation highlights the importance of students' immediate context in shaping their effort at school. It follows that the choices made at each program site will shape the immediate context that students experience, and students respond not to a policy's intent but to how they experience it in the moment. Using these IBM theory-derived

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goals to guide program design and implementation empowers programs to design activities and services that suit their population while benefitting from the motivational power of these constructs.

Regarding research approaches, while large-scale evaluation trials are a critical tool to understand program effects, small scale experiments also offer insight to help guide ongoing policy efforts. Lab-based and field-based experiments can greatly expand knowledge of program components and how they are likely to be perceived by students. As in the dissertation studies, small scale experiments can contribute to theory-development while also investigating the effectiveness of individual components of a program or program theory. Testing program theories at the level of each input and output may help evaluators disentangle effective and ineffective program components, insights that may not emerge in an omnibus test. In this way, small scale experiments can be an important part of an evaluator's toolkit.

Researchers, teachers, and policymakers all stand to benefit from work that pursues theory-testing in applied contexts. By grappling with the realities of students in the classroom, we can generate theories that accurately reflect psychological processes as they occur in the real world. At the same time, bringing theory-based approaches into the classroom can offer practical insights into how students are likely to engage and make sense of intervention messages. This is the intent of the experimental work in the dissertation, and I hope that it contributes to the numerous efforts to understand and encourage student motivation in middle and high school, particularly among students at risk of veering off the path to college.

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