ABSTRACT

THE EFFECTS OF UTILITY VALUE INTERVENTIONS ON SELF-DISCREPANCY
ACCESSIBILITY, OBJECTIVE SELF-AWARENESS, AND INTEREST

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In a series of three experiments, the promise of using Carver and Scheier's model of

self-awareness as a framework for understanding utility value intervention effects was

investigated. Three experiments were conducted to guide participants to consider the utility

value of their Introduction to Psychology course. Some participants were prompted to self-

generate their own ideas about utility of the course (a self-generated utility value

intervention), whereas other participants had ideas about the utility of the course directly

communicated to them (a directly communicated utility value intervention). Some

participants received one of the possible two interventions, some received neither

intervention, and others received both. Across the three experiments, the extent to which

utility value interventions highlighted learners' self-discrepancies, induced a state of objective

self-awareness, and affected final interest in psychology was examined. Results of

Experiment 1, but not Experiment 2, suggest that the directly communicated utility value

intervention increased ought-actual self-discrepancies relative to a control group. Experiment

2 results suggest that neither type of utility value intervention induced a state of objective self-

awareness. Further, the results of all three experiments suggest that neither type of utility value intervention increased final interest in psychology relative to a control group. Exploratory analyses were conducted to further understand the results. Overall, the results suggest that in the present samples, Carver and Scheier's model of objective self-awareness may be of limited assistance in understanding utility value intervention effects.

NORTHERN ILLINOIS UNIVERSITY
DEKALB, ILLINOIS

MAY 2017

THE EFFECTS OF UTILITY VALUE INTERVENTIONS ON SELF-DISCREPANCY

ACCESSIBILITY, OBJECTIVE SELF-AWARENESS, AND INTEREST

BY

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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

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CHAPTER 1

INTRODUCTION

It is often assumed by educators that prompting students to consider how learning

material can be useful or valuable to them will encourage students to engage with the

material. Despite this common assumption, research on techniques that aim to guide the

learner to see how learning material is useful or valuable depicts mixed success on measures

of student engagement, such as interest. Techniques that aim to help the learner understand

the usefulness of learning material are called utility value interventions (Durik &

Harackiewicz, 2007; Hulleman & Harackiewicz, 2009). Most commonly, utility value

interventions either directly communicate ways in which the material might be useful (Durik

& Harackiewicz, 2007) or encourage the learner to self-generate ways in which the material

might be useful (Hulleman & Harackiewicz, 2009).

Research in this area has revealed that the effects of different utility value

interventions vary, so recent efforts have focused on how to best design interventions so that

they are beneficial for all learners. This focus has ferreted out several important moderators

of utility value interventions. One particularly important moderator is the learner's own

expectancies for success (Canning & Harackiewicz, 2015; Durik, Shechter, Noh, Rozek, &

Harackiewicz, 2015; Hulleman, Godes, Hendricks, & Harackiewicz, 2010). Although

research has identified expectancies for success as a crucial moderator of utility value

intervention effects, it is not yet fully understood why this moderator is so important. This series of three of studies tested whether a self-awareness model might fill this gap in the literature.

Utility Value Interventions

Utility value interventions have been developed based on the assumptions put forth by the Eccles expectancy value model of achievement motivation (Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 1992). According to this model, the most proximal variables that predict a learner's motivation for an achievement task are expectancies for success and the value learners perceive in the task. Expectancies for success can be defined as the extent to which learners perceive that they will be able to learn the material (Eccles et al., 1983). Task value is divided into four separate aspects: intrinsic value, cost value, attainment value, and utility value (Eccles et al., 1983). The aspect that is most relevant to this project is utility value. Utility value is the extent to which a learning task or material is perceived as being useful for achieving future goals (Eccles et al., 1983). Utility value interventions aim to increase learning outcomes by boosting the extent to which learners view the material as useful for accomplishing their future goals (Durik & Harackiewicz, 2007; Godes, Hulleman, & Harackiewicz, 2007; Hulleman & Harackiewicz, 2009).

Past research has shown that perceptions of utility value are positively associated with important learning outcomes, such as interest (Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Hulleman, Durik, Schweigert, & Harackiewicz, 2008) and performance (Bong, 2001; Cole, Bergin, & Whitaker, 2008; Durik, Vida, & Eccles, 2006;

Mac Iver, Stipek, & Daniels, 1991; Simons, Dewitte, & Lens, 2004). Experimental research has also shown that utility value interventions can increase motivation relative to a control group (Durik & Harackiewicz, 2007; Hulleman & Harackiewicz, 2009). However, utility value interventions are not equally beneficial for all students. Across experimental tests of utility value interventions, expectancies for success emerge as an important moderator of the utility value effects (Canning & Harackiewicz, 2015; Durik et al., 2015; Hulleman et al., 2010). For instance, Durik et al. (2015) found that expectancies for success moderated the effects of a directly communicated utility value intervention. In this study, participants learned a novel way to solve complex multiplication problems mentally, without pencil and paper. After participants completed self-report measures of initial interest, expectancies of success, and a sheet of math problems using their usual method, they followed along with a learning program that detailed how to use the new math technique. Embedded within the learning program, half of the participants were given information about how the new math technique could be useful to them. Specifically, participants in the utility-value-present condition were told how the technique could be used to calculate tips at restaurants and to solve problems that commonly appear on standardized tests. This information was absent from the learning program for the other half of participants (the control condition). After completing the learning session, participants solved several sets of problems using the new technique. Finally, participants reported their situational interest for the task. The results showed that the effects of the utility value intervention was moderated by expectancies for success. Compared to the control condition, participants who had initially high expectancies for success showed higher situational interest in the utility value condition compared to the

control condition. Conversely, participants who had initially low expectancies for success

showed lower situational interest in the utility condition compared to the control condition.

These results suggest that although directly communicated utility information helped interest

for students with high expectancies, it actually hurt interest for students with low

expectancies. These results are troubling considering that the students who have low

expectancies for success are especially vulnerable and are among those whom educators most

wish to target with academic interventions.

In a follow-up to their initial study, Durik et al. (2015) manipulated expectancies for

success in conjunction with a directly communicated utility value intervention. This study

was a replication of their initial study, with one exception. Namely, expectancies for success

were manipulated as well as measured. To manipulate expectancies for success, those in the

high-expectancy condition received an expectancy boost prior to the utility value

manipulation while those in the control condition did not. Specifically, before the learning

session began, participants in the expectancy-boost condition were told that their responses to

several initial measures regarding their prior experiences with math indicated that they would

be able to learn the new math technique. Participants in the no-expectancy-boost condition

were given no such information. The results showed that among learners with low

expectancies for success, those who received an expectancy boost reported more interest in

response to directly communicated utility value than those who did not receive an expectancy

boost. This experiment provided causal evidence of the important role that expectancies for

success play in the effectiveness of utility value interventions. Additionally, this study

offered one suggestion for expanding the benefits of a directly communicated utility value

intervention to learners with low expectancies for success. Indeed, when an expectancy boost accompanies utility value information, even those with initially low expectancies can benefit.

Although providing an expectancy boost is a promising way to expand the reach of utility value interventions, another approach is to reconfigure the way that the learner is encouraged to consider the utility value of the material. For instance, some research suggests that interventions that encourage learners to self-generate the utility value of learning material are more positive for learners who have low expectancies for success than for learners with high expectancies for success. In a study by Hulleman et al. (2010), participants engaged in the same math task paradigm employed by Durik et al. (2015). However rather than directly communicating utility value to the learner, participants instead were prompted to self-generate their own ideas about ways in which the task might be useful to them or relevant to their lives. Participants in the utility-value-absent condition were prompted to describe two innocuous posters that were on the wall of the laboratory. Again, the results showed that there was an interaction between the utility value condition and expectancies for success; however, the nature of the interaction was different. When participants were prompted to self-generate utility value information, participants who had initially low expectancies for success reported greater situational interest following the intervention than participants in the control condition. Self-generating the utility value of the task did not increase situational interest for those participants who had initially high expectancies for success. These results offer a promising way to design utility value interventions so that they are beneficial for learners who have low expectancies for success.

In an important follow-up study, Hulleman et al. (2010) replicated their laboratory findings in an applied setting. Specifically, a self-generated utility value intervention was employed in a classroom setting. In this study, participants were students who were taking an introductory psychology course. After the second course exam, participants were assigned to either self-generate utility value information for what they were learning in the course or to summarize course content. At the end of the semester, participants reported their interest in psychology and their intentions to declare psychology as a major. The results showed that participants who self-generated the utility value for the course reported greater situational interest than those who did not. Again, this effect was moderated by expectancies for success in the course. The results showed that the utility value intervention was more beneficial for those students who had low expectancies for success in the course (i.e., low grades on the first exams) than for the students who had high expectancies for success (i.e., high grades on the first exams). This effect has also been replicated in high school science classrooms (Hulleman & Harackiewcz, 2009).

The authors suggested that the reason the self-generated utility value intervention boosted interest for those learners with low expectancies for success was due to the way in which the learner was prompted to engage with the material. According to these authors, self-generating utility value information of the learning material allows those learners with low expectancies for success to integrate the material with their self-concept. These authors suggested that learners who have low expectancies for success do not initiate such integration without being prompted, as is the case in self-generated utility value interventions. Further, it was suggested that learners who have high expectancies for success spontaneously integrate

the material with the self-concept. For these individuals, being prompted to generate utility

value was not particularly effective at further increasing situational interest.

Recent research has suggested that one reason why self-generated utility value

interventions are effective at improving interest among low-expectancy students is that the

process of self-generating the value directly boosts expectancies for success (Canning &

Harackiewicz, 2015). In this study, the same math task paradigm was used as was employed

in past utility value research (Durik et al., 2007; Hulleman et al., 2010), with one exception.

Rather than either directly communicating the utility value information or prompting

participants to self-generate the utility value, the researchers combined both of these

interventions into one experiment by manipulating utility value in both ways. Participants

were randomly assigned to either directly communicated utility-value-present or -absent

conditions and also to either self-generated utility-present or -absent conditions. This fully

crossed design allowed the researchers to test for an interaction between directly

communicated and self-generated utility value interventions. As was expected, the

researchers found an interaction such that the utility value interventions increased situational

interest most when they were presented together. Importantly, learners who had initially low

expectancies for success demonstrated increased interest when directly communicated utility

value information was presented in conjunction with a self-generated utility value prompt.

This finding is exciting considering Durik et al.'s (2015) finding that learners with initially

low expectancies for success showed less interest following receipt of directly communicated

utility value information. In a follow-up study, Canning and Harackiewicz (2015) found that

the self-generated utility value intervention boosted expectancies of success, which allowed

those participants who had initially low expectancies to benefit from the directly communicated utility value information. Again, these studies highlight the importance of expectancies for success in whether a learner benefits from the utility value intervention.

Across many studies expectancies for success have moderated utility value intervention effects. Some researchers have suggested that expectancies for success determine the extent to which learners connect with the utility value material. For instance, Hulleman et al. (2010) suggested that being prompted to self-generate the utility value of the information allowed learners with low success expectancies to integrate the material within the self-concept. The results of Canning and Harackiewicz (2015) suggested that when learners with low expectancies for success are prompted to self-generate utility value information they can benefit from directly communicated utility value information as well. As postulated by Hulleman et al., this may occur because being prompted to self-generate utility value information integrates that information with the self-concept, which then allows participants to view directly communicated material as more relevant to the self. Hulleman's postulation suggests that the self is an important component in determining the success of utility value interventions. However, research has yet to investigate how and why the self may guide responses to utility value interventions.

One theoretical lens that might be helpful to understanding the importance of expectancies for success and the self in utility value interventions is Carver and Scheier's (1981) model of self-awareness. This theoretical framework has the potential to shed light on why expectancies for success are so important for learners to benefit from utility value

interventions. This series of experiments tested the potential worth of viewing utility value interventions through the lens of self-awareness theory.

Self-Awareness Theory

Self-awareness theory states that thinking about the self comes with consequences (Duval & Wicklund, 1972; Silvia & Duval, 2001; Wicklund, 1975). As such, most people are not self-focused most of the time (Wicklund, 1975). One study demonstrated the prevalence of people's tendency to avoid self-focused attention. In this study, researchers gave participants pagers and prompted them to report what they were thinking about and how it made them feel every two hours (Csikszentmihalyi & Figurski, 1982). In total, the researchers collected 4,792 thoughts, only eight percent of which were considered to be self-focused. Furthermore, the researchers found that when participants did report self-focused thoughts, they tended to report feeling unhappy and interested in escaping those thoughts. This research highlights the negative consequences that can emerge from self-focused attention, such as a bad mood (Flory, Räikkönen, Matthews, & Owens, 2000), feeling depressed (Pyszczynski & Greenberg, 1987), and a tendency towards emotion-focused coping techniques (Mor & Winquist, 2002).

However, self-focused attention does not always incur negative consequences. According to Carver and Scheier's (1981) model of self-awareness, the effects of self-focused attention depends on the person's expectancies for success. Carver and Scheier's model posits that self-focus can result from a disposition towards extreme self-focused attention or can result when something in the environment triggers self-focused attention. These

situational triggers of self-awareness might include a mirror or a poster with a picture of eyes (Beaman et al., 1979; Scheier, Carver, & Gibbons, 1981). In general, objective self-awareness is triggered when individuals consider themselves as an observer would, so environmental cues that provoke such a perspective are likely to cause self-awareness (Silvia & Duval, 2001). Per Carver and Scheier's model, self-focus, regardless of whether it is dispositional or situational, leads a person to experience objective self-awareness. This objective self-awareness is a state in which the self, as an object, is at the forefront of thought. The model further postulates that self-awareness leads to hyper-accessibility of discrepancies between a person's current self and relevant self-standards.

Although Carver and Scheier's model of self-awareness makes no reference to specific types of self-discrepancies, self-discrepancy theory identifies the source of different types of discrepancies a person might have (Higgins, 1987, 1989). According to self-discrepancy theory, a person can have ideal-actual and ought-actual self-discrepancies. Ideal-actual discrepancies emerge when individuals feel that they currently do not live up to personally held ideal standards. In contrast, ought-actual discrepancies emerge when individuals feel that they currently do not live up to the standards or obligations put forth by other people. According to Carver and Scheier's model, if a self-aware person feels that he or she is able to effectively reduce the self-discrepancy (high expectancy for success), then the person is likely to put forth effort and engage with the task to reduce the discrepancy. Contrarily, if the self-aware person feels that he or she is unable to effectively reduce the self-discrepancy (low expectancy for success), then the person is likely to withdraw effort and disengage from the task.

Several studies have demonstrated the value of Carver and Scheier's model in predicting whether a person will put forth or withhold effort (for a review, see Carver & Scheier, 2012). For instance, in one study participants self-reported their fear of snakes and were then asked to interact with a snake in a series of five stages, beginning with being in the same room with a snake and ending with holding the snake (Carver & Scheier, 1981). Self-awareness was manipulated such that for half of the participants a large mirror was present and for the other half there was no mirror. Before attempting to complete the stages, participants self-reported their expectancies for success of completing the stages. Finally, participants were given the opportunity to complete the stages. Those participants who were self-aware and had high expectancies for success completed more snake interaction stages than those who were self-aware and had low expectancies for success. An expectancy effect did not emerge among those participants who were not self-aware. This study shows that when a person is self-aware, expectancies for success are an important predictor of whether the person will put forth or withhold effort.

Additional research has conceptually replicated these results with other tasks (Carver & Scheier, 1981). For instance, the results of one study showed that Carver and Scheier's model of self-awareness predicted how people engaged with a word task. Importantly, expectancies for success were manipulated in this study. After participants were randomly assigned to either a self-focused condition (mirror present) or a control condition (mirror absent) they either received an expectancy boost or were given no information regarding their ability to complete word problems. Finally, participants were given a word problem to solve, which unbeknownst to the participant was unsolvable, and the researchers measured the

amount of time the participant spent trying to solve the problem. The results showed that those participants who were self-aware and given an expectancy boost persisted longer than those participants who were self-aware and were not given an expectancy boost. In the self-awareness-absent condition, no effect of expectancy emerged. These results demonstrate the importance of expectancies for success in determining whether self-aware participants persist and engage with a task.

These studies also suggest that one way a self-aware person can reduce a self-discrepancy is by putting forth effort so that they can match the standard. Research also shows that people can instead reduce the self-discrepancy by lowering the standard (Dana, Lalwani, & Duval, 1997). According to Silvia and Duval (2001) changing the self or changing the standard are equally effective methods for reducing self-discrepancies, but these approaches tend to have different consequences. In one study, researchers manipulated the salience of the self versus the salience of the standard and observed the effects on behavior. When self-aware people focused on the standard, they negatively evaluated the standard and reduced the self-discrepancy by lowering the standard, rather than modifying the self to match the standard (Dana et al., 1997). However, when people focus on the self, they try harder to change their performance to match the standard.

Other research has shown that people attribute the cause of relevant self-discrepancies to either the self or to the standard depending on their focus (Duval & Lalwani, 1999). That is, the reason people change the standard when it is salient (as shown in Dana et al., 1997) is because they blame the standard for the discrepancy. Contrarily, when people focus on their own performance, they blame themselves for the discrepancy and therefore exert effort to

move the self towards the standard. In an experiment that demonstrated this effect, participants copied words written in a foreign language (Duval & Lalwani, 1999). Depending on condition, some participants were made to be self-aware while others were not. After completing the task, all participants were told that they did not match the expected standard of performance. Some participants were then provided with information describing the standard of performance that they were expected to meet, which induced focus on the standard. Other participants were provided with information focused on their own performance, which induced focus on the self. The results showed that participants who were self-aware and focused on the standard blamed the standard for their subpar performance, rather than blaming themselves. As such, these participants modified the standard, rather than exerting effort to meet the standard. Further, participants who were self-aware and focused on their own performance attributed the self-discrepancy to the self and exerted effort to meet the standard.

Utility Value and Self-Awareness Theory

In this series of studies inspired by Carver and Scheier's model of self-awareness, the effects of utility value interventions were investigated. Self-awareness theory may offer a helpful theoretical framework for understanding why expectancies for success are so critical to the effectiveness of utility value interventions. It is plausible that when learners consider how learning material could be useful to them in the future, they become self-aware. That is, utility value interventions may create a situation that evokes objective self-awareness. Indeed, some research suggests that when people think about themselves in the future, future

selves are perceived from the perspective of an observer (Pronin & Ross, 2006). For instance, in one study researchers had participants imagine themselves eating a meal right now, in the near future, or in the distant future. Then participants indicated whether they perceived the imagined scene from their own perspective or from the perspective of an observer. The results showed that participants viewed their future selves as observers would, whereas they viewed their current selves from their own perspectives. Further, the results suggested that people were even more likely to view distant future selves from an observer perspective than near future selves. It is possible that imagining one's future self from the perspective of an observer is similar to viewing oneself in the mirror, because in both cases the person is taking an outside perspective. This tendency to view future selves from an observer perspective may lead to situationally induced objective self-awareness among participants who consider how they might use learning material in the future.

As a consequence of objective self-awareness, Carver and Scheier's model would suggest that self-discrepancies would become highly accessible to the learner. That is, the learner might become particularly aware of discrepancies between their current level of knowledge or performance and their ideal level of knowledge or performance. For example, self-aware learners who are tasked with understanding a new concept may be particularly mindful of the gap between their current understanding and their ideal understanding. If the concept is novel, it is almost certain that a discrepancy exists between the learner's current understanding and complete understanding of the concept. Along similar lines, real or perceived performance standards might be particularly salient to self-aware learners. For instance, while learning a new concept, self-aware learners may be particularly cognizant of

the discrepancy between their current understanding and the level of understanding that they ideally would like to have (ideal-actual discrepancy) or the level of understanding they feel like they should have to meet expectations (ought-actual discrepancy; Higgins, 1987, 1989). It is likely that different types of utility value interventions highlight different types of self-discrepancies. In self-generated utility value interventions, the value emerges from the self, and therefore it is plausible that this type of intervention highlights ideal-actual self-discrepancies. Contrarily, in directly communicated utility value interventions, the value is thrust upon the learner from an external source, and therefore this type of intervention might highlight ought-actual self-discrepancies. Carver and Scheier's model makes specific predictions regarding how self-aware learners will react to these accessible self-discrepancies, and these predictions fit well with what is known about the effectiveness of utility value interventions.

According to Carver and Scheier's model of self-awareness, the way people respond to salient self-discrepancies depends on their expectancies for success. Specifically, Carver and Scheier's model proposes that self-awareness spotlights relevant self-discrepancies and that behavior is determined by expectancies for reducing those discrepancies. Depending on the learner's expectancies for success, self-awareness theory suggests that the learner will either devote effort to reducing the self-discrepancies or will withdraw effort. Specifically, those learners who have high expectancies for success will devote effort to reducing the self-discrepancy, whereas those learners who have low expectancies for success will withdraw effort.

This aspect of self-awareness theory fits well with the current understanding of the conditions needed for a utility value intervention to be effective. Indeed, expectancies for success have emerged as an important moderator of utility value intervention effects (Canning & Harackiewicz, 2015; Durik et al., 2015). For instance, directly communicated utility value interventions are helpful for learners who have initially high expectancies for success, as well as for learners who receive an expectancy boost (Durik et al., 2015). Additionally, research has suggested that when directly communicated utility value interventions are provided in combination with self-generated utility value interventions, the results are more positive than when either intervention is presented alone (Canning & Harackiewicz, 2015). Canning and Harackiewicz suggested that the interaction between intervention types occurs because self-generating utility value boosts expectancies for success, which again implicates the importance of expectancies for success in the effectiveness of utility value interventions.

According to Carver and Scheier's model of self-awareness, expectancies for success are an important determinant of whether people expend effort or withdraw from a task (see Figure 1). It is possible that self-awareness caused by utility value interventions increases the salience of a person's domain-related self-discrepancies. For instance, the discrepancy between an individuals' current understanding of the material and their ideal level of understanding might be highlighted when self-aware. Furthermore, participants with high expectancies for reducing the salient self-discrepancy are likely to expend effort, whereas those with low expectancies are likely to withdraw. This tendency is consistent with what is known about how learners with different expectancies for success react to utility value interventions.
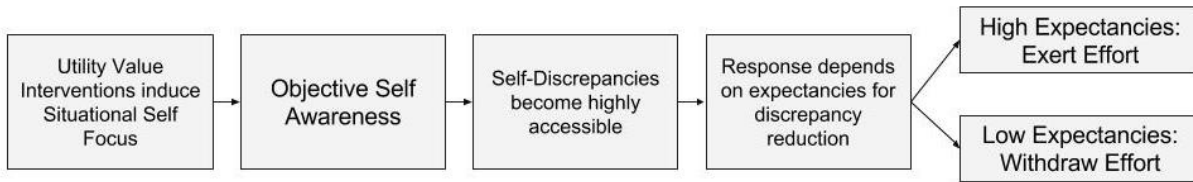
Figure 1*:* Proposed theoretical model of the role self-awareness plays in utility value intervention effects.

It is also important to consider how different types of utility value interventions might increase certain types of self-discrepancies. For instance, it is possible that directly communicated utility value information increases accessibility of discrepancies between what a learner actually understands and what one feels one should or ought to understand (ought-actual discrepancies). Some researchers have suggested that directly communicated utility value information can be perceived as controlling and as guiding participants to focus on a standard that might be perceived as threatening (Durik et al., 2015). Along these lines, directly communicated utility value information might make ought-actual self-discrepancies particularly prominent.

In contrast, it is possible that prompting learners to self-generate utility value information increases accessibility of discrepancies between what learners actually understand and what they would ideally like to understand (ideal-actual discrepancies). Because prompting the learner to self-generate utility value information allows the learner to choose how to interact with the material, such prompts are unlikely to threaten the learner's autonomy (Deci & Ryan, 1985). As such, self-generating utility value information might highlight discrepancies between what learners actually understand and what they would ideally like to understand (ideal-actual discrepancies).

Because of the striking similarities between what Carver and Scheier's model of self-awareness predicts and what is known about learners' reactions to utility value interventions, this model may be helpful for understanding the effectiveness of utility value interventions. This set of three experiments tested the tenets of self-awareness theory in relation to utility value interventions.

Experiment 1 tested whether utility value interventions highlight self-discrepancies. This was an important starting point given that the literature suggests that expectancies for success are important for understanding learners' reactions to utility value interventions. Understanding how utility value interventions might direct a learner's attention towards relevant self-discrepancies could elucidate why expectancies for success are so essential to the success of utility value interventions. Further, Experiment 1 investigated whether self-generated and directly communicated utility value interventions highlight different types of self-discrepancies.

Experiment 2 attempted to link utility value interventions to self-awareness directly. As Carver and Scheier's model of self-awareness suggests, self-awareness increases accessibility of self-discrepancies. As such, it is reasonable to predict that utility value interventions increase objective self-awareness. Further, Experiment 2 tested whether utility value interventions affect the learner's expectancies for reducing self-discrepancies. Additionally, Experiment 2 tested whether an individual difference variable predicted the extent to which individuals have self-discrepancies. Finally, Experiment 3 focused on the effects of utility value interventions on interest.

CHAPTER 2

METHODOLOGY

Experiment 1

Experiment 1 tested the extent to which utility value interventions highlight learners'
self-discrepancies. Experiment 1 employed a 2 (Self-Generated Utility Value: present vs.
absent) x 2 (Directly Communicated Utility Value: present vs. absent) between-participants
design. Expectancies for success in an introductory psychology course was measured and
included as a continuous factor.

In Experiment 1, students in an introductory psychology course participated in an
experiment about their perceptions of the course. At the beginning of the semester,
participants reported their expectancies for success in the course. On arrival in the laboratory,
participants were exposed to a refresher of the topics covered in the class in which they were
enrolled. Then, depending on condition, participants were exposed to either one, both, or
neither type of utility value intervention. Finally, participants reported their accessible self-
discrepancies and interest in psychology. Although interest in psychology was measured,
firm predictions were not made given concerns that this variable's measurement may be
contaminated by participants' reports of self-discrepancies.

Experiment 1 Hypotheses

Hypothesis 1. Prompting learners to consider utility value information, as in self-generated or directly communicated utility value interventions, increases accessibility of self-discrepancies.

Hypothesis 2. The type of utility value intervention increases accessibility of different types of discrepancies. The discrepancies between what learners ought to understand and what learners actually understand are more accessible to learners who receive directly communicated utility value information than those who do not. Contrarily, the discrepancies between what learners ideally would like to understand and what they currently actually understand are more accessible to learners who self-generate utility information than those who do not.

Hypothesis 3. The accessibility of learners' self-discrepancies depends on their expectancies for success. Ideal-actual discrepancies and ought-ideal discrepancies are more accessible to learners with low expectancies for success in introductory psychology than to those with high expectancies for success.

Experiment 1 Method

Experiment 1 Participants

One hundred and fifty-six participants were recruited from the Introduction to Psychology participant pool at a large midwestern university. However, five participants were excluded from analyses (two for not putting their headphones on to listen to the audio,

two for typing nonsense text into the open-ended response boxes, and one who did not speak English fluently). Therefore, 151 participants were included in the analyses. This sample size was determined by an a priori power calculation using a moderate-sized effect size ($f^2 = .15$) like that obtained in similar research by Canning and Harackiewicz (2015). The appropriate sample size was calculated based on 80% power (G*Power; Faul, Erdfelder, Lang, & Buchner, 2007).

Participants were mostly men (57%) and primarily Caucasian (45%, 24.5% African American, 17.9% Hispanic, 7.9% Asian or Pacific Islander, 4.6% other). Participants reported an average age of 19.75 years (*SD*=2.76, range=18-47 years).

Experiment 1 Procedure

At the beginning of the semester, participants completed a measure of expectancies for success for their Introduction to Psychology course. These measures were embedded in a large battery of surveys that were administered to all Introduction to Psychology students during the first week of class.

Participants were recruited for a study investigating how people learn. On arrival to the laboratory, a brief overview of the topics covered in the introductory psychology course was presented. Then the utility value manipulations were presented (see Appendix). Those who were in the directly communicated utility-value present condition received information about how the content taught in Introduction to Psychology might be useful to them in everyday life (e.g., You might use information about how memory works to develop tricks for remembering your shopping list when you are at the store) and in their future (e.g., If you plan

to go on to graduate school, you may use the information you learn in research methods when you design your thesis). This information was excluded for those participants in the directly communicated utility-value-absent condition. Those who were in the self-generated utility-value-present condition were prompted to write about how the content taught in introductory psychology might be useful to them. Those who were in the self-generated utility-value-absent condition were prompted to write a description of two innocuous pictures (a design adapted from Hulleman et al., 2010). Prior to data collection, the utility value manipulations were pilot tested on a small number of participants. These participants were probed for their perceptions of the materials. In particular, participants were asked what they thought about the directly communicated utility value statements. In addition, the self-generated utility value essays of these pilot participants were examined and used to shape the final draft of the directly communicated utility value materials. Specifically, the directly communicated utility manipulation was adjusted to include the ideas that were present in the self-generated utility essays.

For participants who received both types of utility value, the directly communicated utility value information and the self-generated utility prompt were presented in a counterbalanced order. More participants (39.7% of participants) were assigned to this particular condition so that the effects of order of presentation on the study variables could be explored. Importantly, if order effects emerged, then the order of the utility value interventions would be treated as an additional variable. Next, participants completed measures of self-discrepancy accessibility and interest in psychology. Finally, participants were thanked and debriefed.

Experiment 1 Measures

Initial expectancies for success. Three items that were adapted from past research were used to measure initial expectancies for success (Kosovich, Hulleman, Barron, & Getty, 2014). The items were, "I know I can learn the material in my psychology class," "I believe that I can be successful in my psychology class," and "I am confident that I can understand the material in my psychology class," answered on a scale from 1 *(strongly disagree)* to 6 *(strongly agree).* These items were shown to be reliable in past work (ω=.88; Kosovich et al., 2014).

Self-discrepancy accessibility**.** Measures of self-discrepancy accessibility were adapted from the Selves Questionnaire (Higgins, Shah, & Friedman, 1997). This measure of self-discrepancies has been previously used in the self-awareness literature (Phillips & Silvia, 2005). First, participants were asked to identify three concepts or topics they anticipated being covered in their introductory psychology class that they would ideally like to understand and three concepts or topics that they feel that they ought to or should understand. The decision regarding the number of topics for each type was based on pilot testing. Participants who pilot tested the materials suggested that coming up with three concepts was neither too difficult nor too easy. Second, for each of the concepts that participants identified, they rated the extent to which they would ideally like to and feel that they ought to understand the concept. Third, for each of the concepts that participants identified, they rated the extent to which they actually currently understood the concept. All ratings were provided on a 4-point scale, ranging from 1 *(slightly)* to 4 *(extremely).*

Interest in psychology**.** The three-item scale used by Hulleman, Durik, Schweigert, and Harackiewicz (2008) was used to measure interest in psychology. Items included, "I think psychology is a very interesting subject," "I don't think psychology is a very interesting subject" (reversed), and "I would like to take more psychology courses." Participants responded to these items on a scale from 1 *(strongly disagree)* to 7 *(strongly agree)*. These items were shown to be reliable in past work (α=.78; Hulleman et al., 2008).

Experiment 1 Analysis Plan

To calculate discrepancy scores, actual self-ratings were subtracted from the ideal and ought self-ratings for each concept. Then composites were formed for the ideal-discrepancy items and for the ought-discrepancy items.

To test the hypotheses, the data were subjected to two separate regression analyses with accessibility of each type of self-discrepancy serving as the dependent variables. Both categorical independent variables, self-generated utility value and directly communicated utility value, were coded such that directly communicated utility value (coded +1) was compared with no directly communicated utility value (coded as -1), and self-generated utility value (coded as 1) was compared with no self-generated utility value (coded as -1). The continuous variable, expectancies for success, was standardized prior to computing interactions. All three variables and the interactions among them were entered simultaneously. Follow-up simple slope analyses were conducted to probe any significant interactions.

Additionally, the data were subjected to three regression analyses in which actual, ideal, and ought selves served as the dependent variables to explore each subcomponent of the self-discrepancy difference scores. Independent-samples *t* tests were also conducted to test whether the order of the utility value interventions in the both-present condition affected the dependent variables included in this study. Additionally, the effects of the predictor variables on final interest in psychology were explored.

Additional exploratory analyses were also conducted in an attempt to replicate the findings of Canning and Harackiewicz (2015). Specifically, the effects of the variables on interest in psychology were explored using models similar to those tested by Canning and Harackiewicz. Additionally, content analyses similar to those conducted by Canning and Harackiewicz were conducted on the open-ended responses of those participants in the self-generated utility-value-present conditions.

Experiment 1 Results

Examination of Data

Prior to analysis, the data were examined for evidence of skewness and outliers on the continuous predictor variable, expectancies for success. Both the Kolmogrov-Smirnov (.194) and the Shapiro-Wilk (.86) tests of normality were significant (both *p's* < .001), suggesting that the distribution of expectancies for success was not normal. Further inspection suggested that expectancies for success were negatively skewed (skewness = -1.31, SE = .22). Additionally, the mean score on expectancies for success was 5.15 on a 7-point scale, which

suggests that, overall, the sample had high expectancies for success in their Introduction to Psychology course.

The data were also examined for evidence that the responses of those participants who were exposed to both a directly communicated utility value and a self-generated utility value intervention differed depending on the order in which the interventions were presented. To examine this possibility, several exploratory analyses were conducted. The data of those who were exposed to both types of interventions ($n=58$) were subjected to three separate independent-samples t tests. In each t test, the order of presentation (self-generated first vs. self-generated second) served as the independent variable. The dependent variables were ideal-actual discrepancies, ought-actual discrepancies, and final interest. No effects reached statistical significance, suggesting that the order of presentation did not affect either type of self-discrepancy or the measure of final interest.

The data were also inspected for instances in which the discrepancy scores were negative. There were 13 instances in which the discrepancy score was negative for ideal-actual discrepancies. The idea-actual self-discrepancy score ranged from -4 to 11. Additionally, there were 15 instances in which the ought-actual self-discrepancy score was negative. The ought-actual self-discrepancy score ranged from a score of -3 to 11. The hypotheses were tested with these negative scores included and with these negative scores excluded. Because the pattern and significance did not change, the results are presented with the negative scores retained.

Additionally, the data included two extreme outliers (more than 2 standard deviations from the mean). The hypotheses were tested both with those outliers included and with those

outliers excluded, and the results did not differ dramatically. The analyses presented here included all outliers.

Hypothesis Testing

      See Table 1 for bivariate correlations between all variables and descriptive statistics. See Table 2 for regression models.

Table 1

Zero-Order Correlations and Descriptive Statistics for Major Variables in Experiment 1

Variable	1	2	3	4	5	6	7
1. Self-Generated Condition	--	.18*	.07	-.08	-.08	.16*	.06
2. Directly Communicated Condition		--	-.24**	.07	.00	-.04	.06
3. Expectancies for Success			--	.19*	.16	.26**	-.04
4. Ought-Actual Self-Discrepancies				--	.71***	.11	.06
5. Ideal-Actual Self-Discrepancies					--	.14	.06
6. Final Interest						--	-.23**
7. Gender							--
Mean			5.15	2.76	3.19	4.44	
Standard Deviation			0.95	3.00	3.02	0.89	
Conbach's α			0.91			0.65	

Note. Self-generated condition and directly communicated condition are coded as -1=utility absent and +1=utility present. Gender is coded as -1=woman and +1=man. The significant correlation between self-generated condition and directly communicated condition likely emerged due to oversampling in the both-present condition. *p<.05, **p<.01, ***p<.001.

Table 2

Regression Models for Ought-Actual Self-Discrepancies, Ideal-Actual Self-Discrepancies, and Final Interest in Experiment 1

Predictor	Ought-Actual Self-Discrepancies			Ideal-Actual Self-Discrepancies			Final Interest		
	B	t(114)	p	B	t(114)	p	B	t(114)	p
Intercept	3.05	9.78	< .001***	3.43	10.45	< .001***	4.35	45.82	< .001***
SG	-0.52	-1.65	.10	-0.50	-1.52	.13	0.00	-0.01	.99
DC	0.68	2.19	0.03*	0.31	0.94	.35	0.09	0.94	.35
ES	0.70	2.02	.05	0.48	1.33	.19	0.33	3.18	< .001**
ESxSG	-0.10	-0.29	.77	-0.19	-0.52	.60	0.23	2.16	0.03*
ESxDC	-0.03	-0.08	.94	0.19	0.51	.61	-0.09	-0.84	.40
DCxSG	-0.39	-1.24	.22	0.04	0.12	.90	0.06	0.58	.57
DCxSGxES	0.16	0.48	.63	0.19	0.53	.60	-0.16	-1.52	.13

Note. SG= self-generated utility value condition. DC=directly communicated utility value condition. ES=expectancies for success. Self-generated condition and directly communicated condition are coded as -1=utility absent and +1=utility present. *p<.05, **p<.01, ***p<.01.

In the first model, ideal-actual self-discrepancies served as the dependent variable. This model did not reach statistical significance, $F(7, 107) = 1.13$, $p = .349$. Further, no statistically significant main or interaction effects emerged (see Table 2).

The model in which ought-actual self-discrepancies served as the dependent variable did not reach statistical significance, $F(7, 107) = 2.07$, $p = .053$. However, as expected by Hypothesis 2, a statistically significant main effect of directly communicated utility value condition emerged. Participants in the directly communicated utility-value-present condition expressed more ought-actual self-discrepancies than those who were in the directly communicated utility-value-absent condition. No other effects reached statistical significance.

Further, the components of each discrepancy score were analyzed separately to ensure that any effects that emerged could be attributed to the discrepancy itself and not one component alone. No significant effects emerged (all p's > .05), which suggests that the discrepancy is driving the significant effects observed on ought-actual self-discrepancies, rather than the ought or actual scores themselves.

Exploratory Model Predicting Interest

In one exploratory model, the effects of directly communicated utility value condition, self-generated utility value condition, expectancies for success, and the interactions among them were explored on the final interest variable. This model was considered exploratory because it is likely that the measures participants completed prior to reporting their interest in psychology contaminated their reports of interest. The exploratory model in which final

interest in psychology served as the dependent variable did not reach statistical significance, $F(7, 108) = 2.00$, $p = .06$. A positive main effect of expectancies for success emerged. Additionally, a statistically significant interaction emerged between expectancies for success and self-generated utility value condition. However, this interaction was only significant when the (nonsignificant) three-way interaction was included, suggesting that it may be an artifact. As such, this interaction will not be interpreted unless it emerges in further studies. No other effects reached statistical significance (see Table 2).

Exploratory Analyses Replicating Past Work

The effects investigated in Experiment 1 are novel to the utility value literature. Given this, it was of interest to explore whether the aspects of Experiment 1 that were similar to past utility value work replicated. As such, several analyses were carried out to investigate whether the pattern of results obtained in Experiment 1 replicated Canning and Harackiewicz's (2015) work. I decided to replicate their work because their design was most similar to that used in Experiment 1, and Experiment 1 was modeled from their ideas. In following the analyses performed by Canning and Harackiewicz, I explored the effects on the final interest variable. Further, a content analysis was conducted that was similar to that conducted by Canning and Harackiewicz.

Replication of Results on Final Interest

Like the current research, Canning and Harackiewicz (2015) tested the effects of utility value interventions on final interest. However, in their work, the models used to test

for the effects on final interest differed from the models employed in the current work. In

their model, Canning and Harackiewicz included additional covariates. As in Canning and

Harackiewicz, a multiple regression analysis was conducted to investigate the effects on final

interest. In this model, directly communicated utility value condition (coded as: absent= -1

and present= +1), self-generated utility value condition (coded as: absent = -1 and present=

+1), expectancies for success, the interactions among them, and gender served as the predictor

variables. Canning and Harackiewicz's model included baseline performance as an additional

covariate; however, no similar measure was available for Experiment 1.

The expectancies for success variable was standardized prior to calculating the interaction

terms. The model was statistically significant, $F(8, 105) = 3.13$, $p = .003$. A positive main

effect of expectancies for success emerged (see Table 3). Additionally, a statistically

significant two-way interaction emerged between expectancies for success and self-generated

utility value condition. However, this two-way may be qualified by a marginally significant

three-way interaction among directly communicated utility value condition, self-generated

utility value condition, and expectancies for success (see Figure 2). Follow-up simple slope

analyses revealed that, for participants who were exposed to the self-generated utility value

intervention only, the expectancies for success variable was positively related to interest,

$b=.81$, $t(114)=2.61$, $p=.011$. The pattern of the results suggests that for these participants,

being prompted to self-generate utility value information without receiving directly

communicated utility value information led to low interest among those with low

expectancies for success. This pattern is contrary to the findings reported by Canning and

Harackiewicz.

Table 3

Regression Models Replicating Canning and Harackiewicz on Final Interest in Experiment 1

Predictor	Final Interest		
	B	t(114)	p
Intercept	4.38	47.29	< .001***
SG UV	-0.01	-0.13	.90
DC UV	0.11	1.16	.25
ES	0.33	3.22	.002**
ESxSG	0.22	2.10	.039*
ESxDC	-0.09	-0.88	.38
DCxSG	0.06	0.63	.53
DCxSGxES	-0.17	-1.69	.09
Gender	-0.27	-3.29	.001**

Note. SG= self-generated utility value condition. DC=directly communicated utility value condition. ES=expectancies for success. Gender is coded as -1=women and +1=men. SG UV and DC UV are coded as -1=utility absent and +1=utility present. *p<.05, **p<.01, ***p<.01.

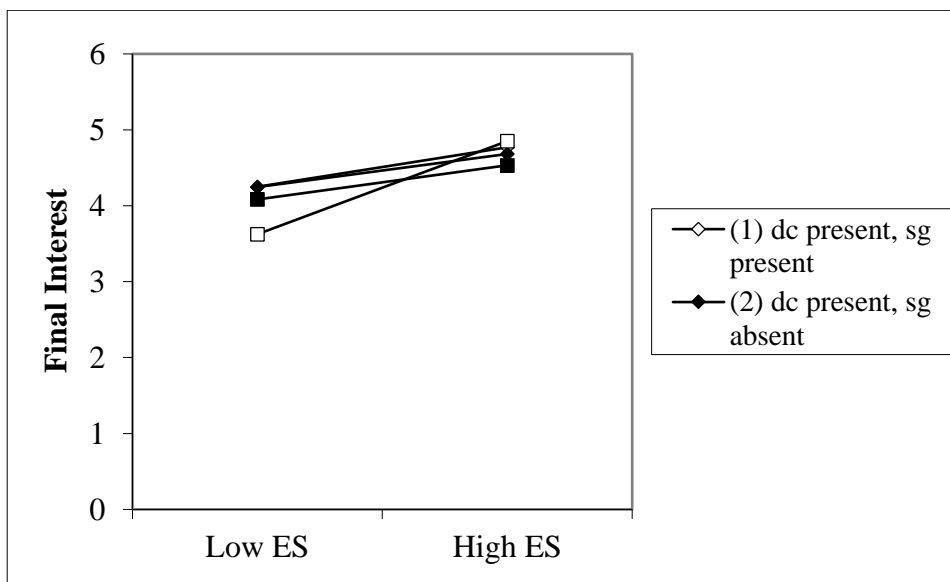Figure 2: Marginally significant interaction among directly communicated utility value condition, self-generated utility value condition, and expectancies for success on final interest in psychology in Experiment 1. Values for expectancies for success are based on 1 standard deviation above and below the mean. ES= expectancies for success, DC=directly communicated utility value, SG=self-generated utility value.

Replication of Content Analyses of Essays

In their work, Canning and Harackiewicz (2015) performed a content analysis to determine whether participants exposed to their self-generated utility-value-only condition generated more utility than participants in the both self-generated and directly communicated utility value conditions. Additionally, they tested whether participants who received the both condition were more likely to borrow utility ideas from those presented in the directly communicated intervention than those who only received the self-generated intervention. Notably, in their work, when both types of interventions were presented, the directly communicated materials always preceded presentation of the self-generated utility value intervention. The results of their content analysis suggested that participants who received both utility value interventions generated more utility statements than those who received only the directly communicated intervention. Additionally, they found that participants who received both types of intervention were not more likely to borrow from the directly communicated materials than participants who received only the self-generated utility value intervention.

The self-generated utility essays collected in Experiment 1 provided an opportunity to replicate Canning and Harackiewicz's findings. To replicate their content analysis, the total number of utility connections made in each essay were coded. Coders counted the number of statements that communicated how content from Introduction to Psychology could be used in real life as one utility statement. Coders then counted the number of statements that participants borrowed from the directly communicated utility value materials. The coders

were blind to condition. To establish interrater reliability, a second coder coded 30% of the utility value statements, and interrater agreement was moderate (*kappa*=.62 for the number of utility statements, *kappa* =.84 for the number of statements borrowed from directly communicated). Any discrepancies that emerged were resolved through discussion.

Regression analyses similar to those conducted by Canning and Harackiewicz (2015) were performed. These regression models included four terms. The first term was a code comparing the self-generated first/only condition (coded as -1) to the condition in which the self-generated utility value intervention followed presentation of the directly communicated utility value intervention (coded as +1). The second term was expectancies for success, which was measured continuously and standardized. The third term was the interaction between the code and the standardized version of expectancies for success. The forth term was gender, which was included as a covariate because it was also included in the prior work; however, its inclusion or exclusion did not impact the results reported here.

Contrary to the results reported by Canning and Harackiewicz (2015), no significant effects emerged for the number of utility statements participants generated (see Table 4). This result suggests that participants who received directly communicated information prior to self-generating utility value came up with a similar number of ideas as participants who did not receive such information prior to self-generating ideas. However, similar to the results of Canning and Harackiewicz (2015), no significant effects emerged for the number of statements borrowed from the directly communicated utility value materials.

Table 4

Regression Models Replicating Canning and Harackiewicz Content Analyses in Experiments 1 and 2.

| | Content Analyses of Experiment 1 Essays | | | | | |
| | Number of Utility Statements | | | Number Borrowed | | |
Predictor	B	t(37)	p	B	t(37)	p
Intercept	2.05	8.69	< .001**	0.67	4.38	< .001**
SG timing	0.13	0.55	.59	-0.07	-0.43	.67
ES	0.12	0.40	.69	-0.04	-0.21	.84
SGtimingxES	0.41	1.31	.20	0.27	1.33	.19
Gender	-0.03	-0.14	.89	0.09	0.61	.55
	Content Analyses of Experiment 2 Essays					
	Number of Utility Statements			Number Borrowed		
Predictor	B	t(38)	p	B	t(38)	p
Intercept	1.91	5.78	< .001**	0.99	4.61	< .001**
SG timing	0.33	1.02	.33	0.29	1.37	.18
ES	-0.53	-1.23	.23	-0.23	-0.83	.41
SGtimingxES	-0.55	-1.28	.21	-0.06	-0.21	.83
Gender	-0.34	-1.21	.23	-0.32	-1.61	.12

Note. SG timing was coded as -1=self-generated presented before directly communicated utility value intervention and 1= self-generated utility value intervention presented after directly communicated utility value intervention. Gender is coded as -1=women and +1=men. ES=expectancies for success. *p<.05, **p<.01, ***p<.01

It is possible that participants in Canning and Harackiewicz's (2015) experiment generated greater or fewer utility statements overall compared to our participants. An examination of the mean number of utility statements suggests that participants in the present experiment generated fewer utility statements than those in Canning and Harackiewicz's sample (see Table 5). Additionally, participants in the present experiment borrowed fewer statements from the directly communicated utility value materials than those in Canning and Harackiewicz's sample. It is plausible that differences in the number of statements generated

and borrowed may be driving the discrepancies between the current findings and those of past work.

Table 5

Means and Standard Deviations of Number of Utility Statements and Number of Statements from Directly Communicated Materials

	Number of Utility Statements		From Directly Communicated Materials	
Experiment	DC 1st	DC 2nd/Only	DC 1st	DC 2nd/Only
Canning and Harackiewicz (2015)	3.96 (1.60)	2.71 (1.08)	1.81 (1.33)	1.64 (1.10)
Experiment 1	1.88 (.99)	1.89 (1.66)	0.76 (1.25)	0.89 (1.91)
Experiment 2	1.61 (2.2)	1.71 (2.01)	0.69 (1.23)	1.20 (.94)

Note. DC=directly communicated utility value

Experiment 1 Discussion

The results of Experiment 1 suggest that certain types of utility value interventions may highlight certain types of self-discrepancies to learners. Specifically, in line with Hypothesis 2b, the results showed that learners who were exposed to a directly communicated utility value intervention reported more ought-ideal self-discrepancies than learners who were not exposed to a directly communicated utility value intervention.

Several unexpected findings also emerged in Experiment 1. For instance, the results suggest that utility value interventions in general do not make self-discrepancies highly accessible. Neither type of utility value intervention increased ideal-actual self-discrepancies compared to the control condition (Hypothesis 2a). Additionally, a self-generated utility value intervention did not increase either type of self-discrepancy compared to the control

condition (Hypothesis 1). Moreover, expectancies for success did not predict participants'
accessibility of either type of self-discrepancy (Hypothesis 3). This result suggests that
expectancies for success may not affect the extent to which utility value interventions
highlight a learner's self-discrepancies. This suggests that directly communicated utility
value interventions may highlight self-discrepancies similarly for learners with high
expectancies for success and low expectancies for success.

The exploratory analyses conducted in Experiment 1 revealed some puzzling results.
Notably, the predictor variables included in Experiment 1 did not affect interest when tested
using the hypothesized models. However, when the model was constructed to replicate work
by Canning and Harackiewicz (2015), a marginally significant three-way interaction emerged
on final interest. Canning and Harackiewicz's model included gender as a covariate, whereas
the originally hypothesized model did not. It seems that when gender is controlled for in the
model, a marginally significant three-way interaction begins to emerge. That said, this
interaction did not match the pattern found by Canning and Harackiewicz's work. Indeed, in
their work, Canning and Harackiewicz found that participants who had initially low
expectancies for success and received both types of intervention showed high interest.
Contrarily, the pattern of the interaction in Experiment 1 suggested that participants who had
initially low expectancies for success and received only a self-generated utility value
intervention reported low interest. Of course, this interaction was only marginally significant
and was not originally predicted.

The content analyses of the self-generated utility value essays partially replicated
Canning and Harackiewicz's (2015) work. The content analysis of the number of utility

statements participants generated did not replicate, yet the analysis of the number of statements borrowed did replicate (although the effect was null). Specifically, in Experiment 1, participants who were exposed to the directly communicated utility value intervention prior to self-generating the utility value came up with a similar number of utility statements as those who were not. However, as found by Canning and Harackiewicz, participants who were exposed to the directly communicated intervention prior to self-generating did not borrow more statements than those who were not exposed to the directly communicated materials.

Despite the unexpected findings that emerged, the results of Experiment 1 have the potential to provide one consequence of providing directly communicated utility value. Per Carver and Scheier's model of self-awareness, a person's response to recognition of a discrepancy depends on the extent to which the person expects that he or she can reduce the discrepancy. The results of Experiment 1 suggest that directly communicated utility value interventions led learners to become mindful of ought-actual self-discrepancies. This result suggests that, as predicted by Carver and Scheier's self-awareness model, some types of utility value interventions make some types of self-discrepancies accessible to learners. This suggests that Carver and Scheier's self-awareness model may be a viable theoretical framework for understanding utility value intervention effects. However, Experiment 1 neglects to test an important aspect of Carver and Scheier's model. Specifically, Experiment 1 did not examine the extent to which utility value interventions increase objective self-awareness. Experiment 2 was designed to fill this gap.

In Experiment 2, the extent to which utility value interventions increase objective self-awareness was tested. Further, Experiment 2 was designed to investigate the differential

effects of utility value interventions on expectancies for discrepancy reduction. There is some evidence that self-generated utility value interventions boost the learner's expectancies for success (Canning & Harackiewicz, 2015); however, the exact nature of that boost is unclear. It is plausible, as might be expected by Carver and Scheier's model of self-awareness, that self-generated utility value interventions increase the learner's expectancies for overcoming self-discrepancies. Experiment 2 tested this possibility.

Additionally, Experiment 2 investigated how the individual difference variable of trait narcissism relates to the accessibility of discrepancies and expectancies for reducing those discrepancies. Some research suggests that people who are high on the personality trait of narcissism tend to report few self-discrepancies (Raskin & Terry, 1988), and those that are reported tend to be small (Rhodewalt & Morf, 1995). That being said, there is evidence that these associations depend on the type of measures used (Rhodewalt & Morf, 1995). It is possible that those who score high on trait narcissism do not recognize self-discrepancies in the context of performance standards. If so, this might limit the extent to which they are motivated to reduce discrepancies but might also be a buffer against the negative effects of self-discrepancies. As such, Experiment 2 investigated the association between trait narcissism and the measure of accessibility of self-discrepancies used in this particular study.

Experiment 2

In Experiment 2, participants were randomly assigned to one of four conditions in a 2 (Self-Generated Utility Value: present vs. absent) x 2 (Directly Communicated Utility Value:

present vs. absent) between-participants design. Expectancies for success in introductory psychology and trait narcissism were measured as continuous variables.

<div align="center">Experiment 2 Hypotheses</div>

In addition to testing again the hypotheses that were tested in Experiment 1, the following hypotheses were tested in Experiment 2.

Hypothesis 4. Prompting learners to consider utility value information, as in self-generating or directly communicated utility value interventions, increases objective self-awareness.

Hypothesis 5. Different types of utility value interventions have different effects on participants' expectancies for reducing the salient discrepancies. Additionally, these effects depend on participants' initial expectancies for success.

Hypothesis 5a. For learners who have initially low expectancies for success, self-generated utility value interventions increase expectancies for reducing self-discrepancies. This pattern will not be present for learners who have initially high expectancies for success.

Hypothesis 5b. For learners who have initially high expectancies for success, directly communicated utility value interventions decrease expectancies for reducing self-discrepancies. This pattern will not be present for learners who have initially low expectancies for success.

Hypothesis 5c. Regardless of learners' initial expectancies for success, receiving both self-generated and directly communicated utility value interventions together increases expectancies for reducing self-discrepancies.

Hypothesis 6. Learners' accessibility of self-discrepancies is associated with the individual difference variable of trait narcissism. Accessibility of ideal-actual discrepancies and ought-ideal discrepancies is negatively related to trait narcissism.

Experiment 2 Method

Experiment 2 Participants

One hundred and forty-two participants were recruited from the Introduction to Psychology participant pool at a large midwestern university. However, three participants were excluded from analyses (one for answering a phone call during the experimental session, one who was visually impaired, and one who did not speak English fluently). Therefore, 139 participants were included in the analyses.

Participants were mostly women (57.6%) and primarily Caucasian (46.8%, 28.1% African American, 12.9% Hispanic, 7.2% Asian or Pacific Islander, 5.0% other). Participants reported an average age of 19.82 years (SD=4.22, range=18-63 years).

Experiment 2 Procedure

The procedure of Experiment 2 was identical to that of Experiment 1 with two notable exceptions. Namely, trait narcissism was included as a predictor variable in the mass survey. Additionally, three dependent variables were added: situational objective self-awareness, expectancies for reducing ought-actual self-discrepancies, and expectancies for reducing ideal-actual self-discrepancies.

<u>Experiment 2 Measures</u>

The measures were identical to those used in Experiment 1 with the following exceptions.

<u>Trait narcissism</u>**.** The validated 16-item Narcissistic Personality Inventory was used to measure trait narcissism (Ames, Rose, & Anderson, 2006). To complete this scale, participants indicated which of two statements best matched their feelings for 16 pairs of statements. Example items include, A.) "I always know what I am doing" or B.) "Sometimes I am not sure of what I am doing" and A.) "I am no better or worse than most people" or B.) "I think I am a special person."

<u>Situational objective self-awareness</u>**.** The validated Situational Self-Awareness Scale was used to measure objective self-awareness (Govern & Marsch, 2001). This scale includes three subscales of self-awareness. The subscale that is of interest to this experiment includes three items (e.g., "Right now, I am concerned about what other people think of me") responded to on a scale from 1 *(strongly disagree)* to 7 *(strongly agree).* These items were shown to be reliable in past work (α=.78; Govern & Marsch, 2001).

<u>Expectancies for discrepancy reduction</u>**.** After each identified self-discrepancy, participants responded to a single item measuring expectancies for reducing that discrepancy. The item read, "To what extent do you expect that you will be able to achieve this level of understanding," responded to on a scale from 1 *(not at all)* to 5 *(very much).*

Experiment 2 Analysis Plan

Discrepancy scores were calculated in the same fashion as in Experiment 1. Both self-generated utility value and directly communicated utility value were coded as in Experiment 1. The continuous variable, initial expectancies for success, was standardized.

To evaluate Hypotheses 1-5, the data were subject to five separate regression analyses in which self-generated utility value, directly communicated utility value, and initial expectancies for success served as the predictors. All three predictor variables and the interactions among them were entered simultaneously. The first two analyses replicated those that were conducted to analyze Experiment 1, with accessibility of each type of self-discrepancy serving as the dependent variable of interest. In the third regression analysis, situational objective self-awareness served as the dependent variable. In the fourth analysis, expectancies for reducing ideal-actual self-discrepancies served as the dependent variable. In the fifth analysis, expectancies for reducing ought-actual self-discrepancies served as the dependent variable. Follow-up simple slope analyses were conducted for any significant interactions.

To evaluate Hypothesis 6, the bivariate correlation between trait narcissism and both ideal-actual self-discrepancies and ought-actual self-discrepancies were examined. Further, two additional regression analyses in which trait narcissism, self-generated utility value, directly communicated utility value, initial expectancies for success, and the interactions among them served as the predictor variables. For these analyses, each type of self-discrepancy served as the dependent variables of interest.

As in Experiment 1, exploratory analyses were conducted. Specifically, as in Experiment 1, the effects on interest were explored. Additionally, the effects of the order of the utility value interventions on the dependent variables were explored. As was done in Experiment 1, additional analyses were conducted to replicate the findings of Canning and Harackiewicz.

<p align="center">Experiment 2 Results</p>

Examination of Data

As in Experiment 1, the data were examined for evidence of skewness and outliers on expectancies for success prior to analysis. Again, both the Kolmogrov-Smirnov (2.55) and the Shapiro-Wilk (.737) tests of normality were significant (both p's <.001), suggesting that the distribution of expectancies for success was not normal. Similar to the data collected in Experiment 1, expectancies for success were negatively skewed (skewness = -1.73, SE = 0.22). Additionally, the mean score on expectancies for success was 5.25 on a 7-point scale, which suggests that, as in Experiment 1, the sample had high expectancies for success in their Introduction to Psychology course.

As in Experiment 1, the data were examined to test whether the responses of those participants who were exposed to both a directly communicated utility value and a self-generated utility value intervention differed depending on the order in which the interventions were presented. As in Experiment 1, the data of those who were exposed to both types of interventions (n = 55) were subjected to independent-samples t tests. In total, six separate t tests were carried out. In each t test, the order of presentation (self-generated first vs. self-

generated second) served as the independent variable. The dependent variables included objective self-awareness, ideal-actual discrepancies, ought-actual discrepancies, expectancies for reducing ideal-actual discrepancies, expectancies for reducing ought-actual discrepancies, and final interest. Similar to the results of Experiment 1, no effects reached statistical significance, suggesting that the order of presentation did not affect any of the dependent variables included in this study.

As in Experiment 1, the data were inspected for instances of negative discrepancy scores. There were 16 instances in which the discrepancy score was negative for ideal-actual discrepancies. The ideal-actual self-discrepancy score ranged from -4 to 16. Additionally, there were 15 instances of negative ought-actual self-discrepancy scores. The ought-actual self-discrepancy score ranged from a score of -3 to 16. As in Experiment 1, the pattern and significance did not change depending on the inclusion or exclusion of these negative scores, so the results are presented with the negative scores retained.

Additionally, the data included several outliers. Eight outliers (more than 2 standard deviations from the mean) and a single extreme outlier (more than 3 standard deviations from the mean) were identified. As in Experiment 1, the hypotheses were tested both with those outliers included and with those outliers excluded. Because the results of most analyses did not differ dramatically based on the inclusion of outliers, the results presented include all outliers. However, those analyses that did differ depending on the inclusion of outliers are noted below.

Hypothesis Testing

Bivariate correlations between all variables and descriptive statistics are provided in Table 6. See Table 7 for regression models.

In the first model, ideal-actual self-discrepancies served as the dependent variable. This model did not reach statistical significance, $F(7, 107) = 1.21$, $p = .30$. Further, no statistically significant main effects or interactions emerged (see Table 7).

In the second model, ought-actual self-discrepancies served as the dependent variable. This model did not reach statistical significance, $F(7, 107) = 1.25$, $p = .28$. Nevertheless, a statistically significant main effect of directly communicated utility value condition emerged. However, the direction of this effect was contrary to Hypothesis 2 and the results of Experiment 1. This effect suggested that participants in the directly communicated utility-value-present condition expressed fewer ought-actual self-discrepancies than those who were in the directly communicated utility-value-absent condition. No other effects reached statistical significance.

Further, the components of each discrepancy score were analyzed separately as in Experiment 1. In one model, ideal-actual selves served as the dependent measure of interest. This model did not reach statistical significance, $F(7, 107) = 1.6$, $p = .143$. However, unlike in Experiment 1, a statistically significant three-way interaction emerged (see Table 8 for regression information). Follow-up simple-slope tests were conducted to probe for the nature of this three-way interaction (see Figure 3). Simple-slope tests revealed that the only slope that differed significantly from zero was that of participants who were prompted to self-

Table 6

Zero-Order Correlations and Descriptive Statistics for Major Variables in Experiment 2

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Self-Generated Condition	--	.14	.09	.08	.00	.00	.15	-.02	-.04	-.16	-.02
2. Directly Communicated Condition		--	.20*	-.12	-.14	.04	-.03	-.04	-.01	.00	.003
3. Expectancies for Success			--	.00	.04	.02	-.01	-.03	.22*	.04	.03
4. OASD				--	.89**	.14	.17*	.28**	.22*	-.15	-.17*
5. IASD					--	*.19*	.17*	.20*	.26**	-.04	-.18*
6. Exp. For Reducing OASD						--	.35**	.05	.16	.19*	.08
7. Exp. For Reducing IASD							--	.01	.09	.12	.42
8. Objective Self-Awareness								--	.18*	-.05	-.14
9. Final Interest									--	.05	.09
10. Trait Narcissism										--	.24***
11. Gender											--
Mean			5.25	3.8	4.05	3.82	3.84	4.48	3.88	0.33	
Standard Deviation			1.06	4.76	4.16	0.88	0.83	1.04	1.63	0.15	
Conbach's α			.96					.80	.84		

Note. OASD = Ought-Actual Self-Discrepancies, IASD = Ideal-Actual Self-Discrepancies. Self-generated condition and directly communicated condition are coded as -1=utility absent and +1=utility present. Gender is coded as -1=woman and +1=man. $*p<.05$, $**p<.01$

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Table 7

Regression Models for Dependent Variables in Experiment 2

Predictor	Ought-Actual Self-Discrepancies			Ideal-Actual Self-Discrepancies			Final Interest		
	B	t(114)	p	B	t(114)	p	B	t(114)	p
Intercept	3.95	9.54	< .001***	4.11	9.64	< .001***	4.56	45.82	< .001***
SG UV	-0.10	-0.24	.81	0.29	0.68	.50	-0.01	-0.12	.90
DC UV	-0.84	-0.20	.045*	-0.83	-0.19	.06	-0.10	-1.04	.30
ES	0.18	0.44	.66	0.02	0.05	.96	0.21	2.11	.038*
ESxSG	-0.29	-0.69	.49	-0.29	-0.69	.49	0.05	0.48	.86
ESxDC	-0.39	-0.94	.35	-0.11	-0.27	.79	-0.09	-0.89	.64
DCxSG	0.76	1.81	.07	0.62	1.46	.15	0.02	0.18	.38
DCxSGxES	0.37	0.89	.38	0.58	1.36	.18	0.10	0.98	.33

Predictor	Objective Self-Awareness			Expectancies for Reducing Ought-Actual Self-Discrepancies			Expectancies for Reducing Ideal-Actual Self-Discrepancies		
	B	t(114)	p	B	t(114)	p	B	t(114)	p
Intercept	3.83	23.73	< .001***	3.81	46.40	< .001***	3.87	46.82	< .001***
SG UV	-0.09	-0.54	.59	0.13	1.63	.11	-0.04	-0.47	.64
DC UV	-0.12	-0.73	.47	-0.05	-0.63	.53	-0.03	-0.36	.72
ES	0.05	-0.29	.77	0.00	0.02	.98	0.02	0.20	.84
ESxSG	0.07	0.45	.65	0.10	1.23	.22	-0.01	-0.06	.95
ESxDC	0.01	0.09	.93	0.09	1.11	.27	0.00	0.01	.99
DCxSG	-0.02	-0.12	.91	-0.03	-0.41	.68	0.03	0.32	.75
DCxSGxES	0.22	1.37	.17	0.03	0.32	.75	0.13	1.60	.11

Note. SG= self-generated utility value condition. DC=directly communicated utility value condition. ES=expectancies for success. SG UV and DC UV are coded as -1=utility absent and +1=utility present. *p<.05, **p<.01, ***p<.001.

Table 8

Regression Models for the Components of Self-Discrepancies Separately

Predictor	Ought-Selves			Ideal-Selves			Actual-Selves		
	B	t(114)	*p*	B	t(114)	*p*	B	t(114)	*p*
Intercept	15.78	34.40	< .001***	16.12	39.12	< .001***	11.83	26.09	< .001***
SG UV	-0.61	-1.33	.19	-0.11	-0.27	.79	-0.51	-1.13	.26
DC UV	-0.45	-0.99	.33	-0.53	-1.29	.20	0.39	0.86	.39
ES	-0.02	-0.05	.96	-0.08	-0.19	.85	-0.21	-0.45	.65
ESxSG	-0.05	-0.11	.08	0.02	0.05	.96	0.24	0.52	.60
ESxDC	0.23	0.49	.91	0.44	1.08	.28	0.62	1.36	.18
DCxSG	0.82	1.78	.62	0.52	1.26	.21	0.06	0.12	.90
DCxSGxES	0.93	2.02	.046*	1.05	2.56	.012*	0.56	1.23	.22

Note. SG= self-generated utility value condition. DC=directly communicated utility value condition. ES=expectancies for success. SG UV and DC UV are coded as -1=utility absent and +1=utility present. *p<.05, **p<.01, ***p<.001

generate utility value (self-generated present condition) and were not exposed to directly communicated utility value (directly communicated absent condition). For these participants,learners who had low expectancies for success reported more ideal selves than learners who had high expectancies for success, $b = -1.47$, $t(114) = -2.07$, $p = .04$. Importantly, this significant three-way interaction emerged only when the analyses included the nine outliers identified while examining the data.

In another model, ought selves served as the dependent measure. This model also did not reach statistical significance, $F(7, 107) = 1.28$, $p = .269$. Unlike in Experiment 1, a statistically significant three-way interaction emerged on ought selves (see Table 8 for Regression information). Again, follow-up simple-slope tests were conducted to probe for the nature of this three-way interaction (see Figure 4). However, no slopes were significantly different from zero. Again, this significant three-way interaction emerged only when the analyses included the nine outliers.

In a third model, actual selves served as the dependent measure. This model did not reach statistical significance, $F(7, 107) = 0.79$, $p = .60$. Additionally, no main effects or interactions reached statistical significance (see Table 8).

Hypothesis 4 predicted that a significant interaction between utility value conditions would emerge on situational objective self-awareness. However, the model in which objective self-awareness served as the dependent variable did not reach statistical significance, $F(7, 107) = .39$, $p = .90$, and no significant main effects or interactions emerged (see Table 7).
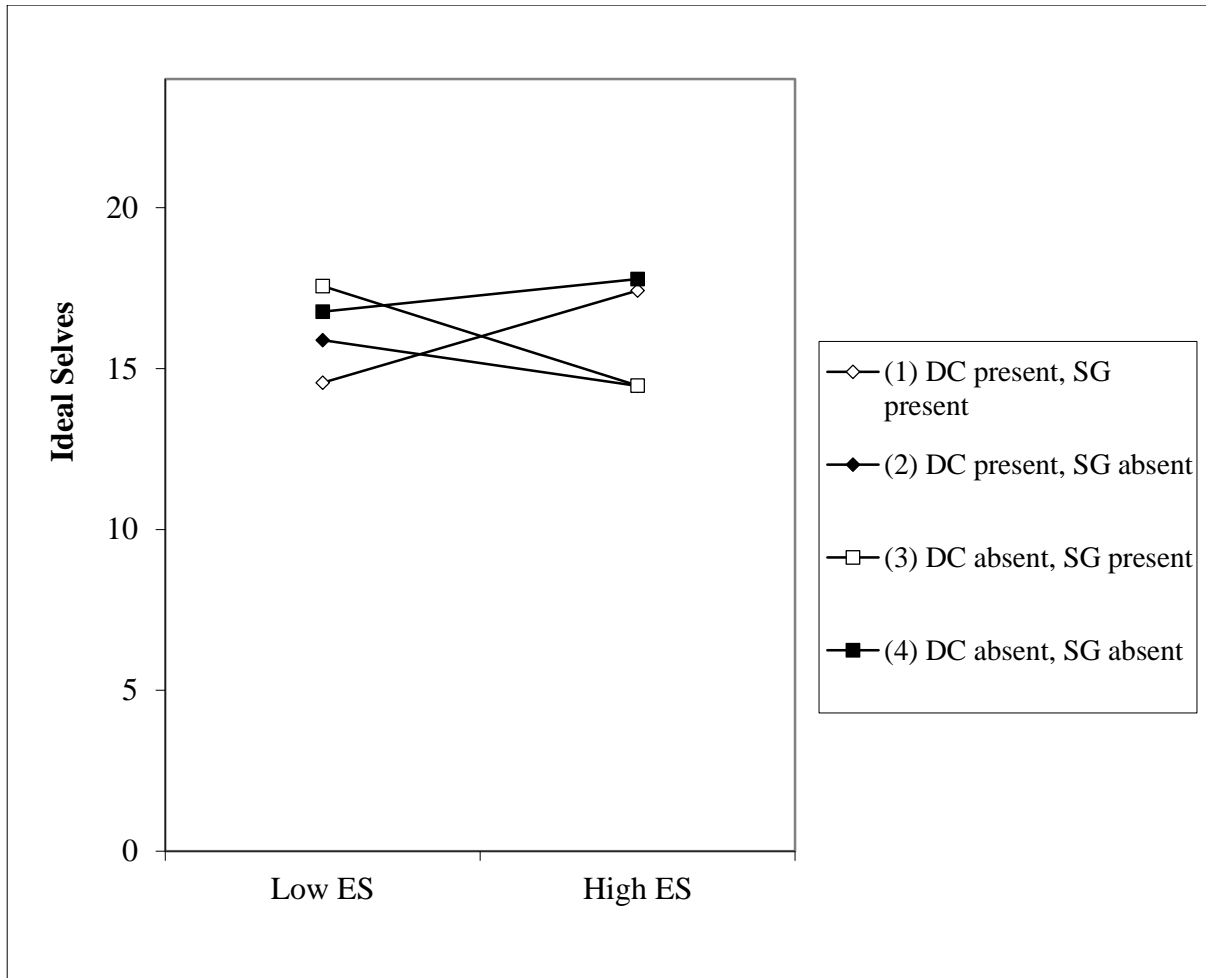
Figure 3: Interaction among directly communicated utility value condition, self-generated utility value condition, and expectancies for success on ideal selves in Experiment 2. Values for expectancies for success are based on 1 standard deviation above and below the mean. ES= expectancies for success, DC=directly communicated utility value, SG=self-generated utility value.
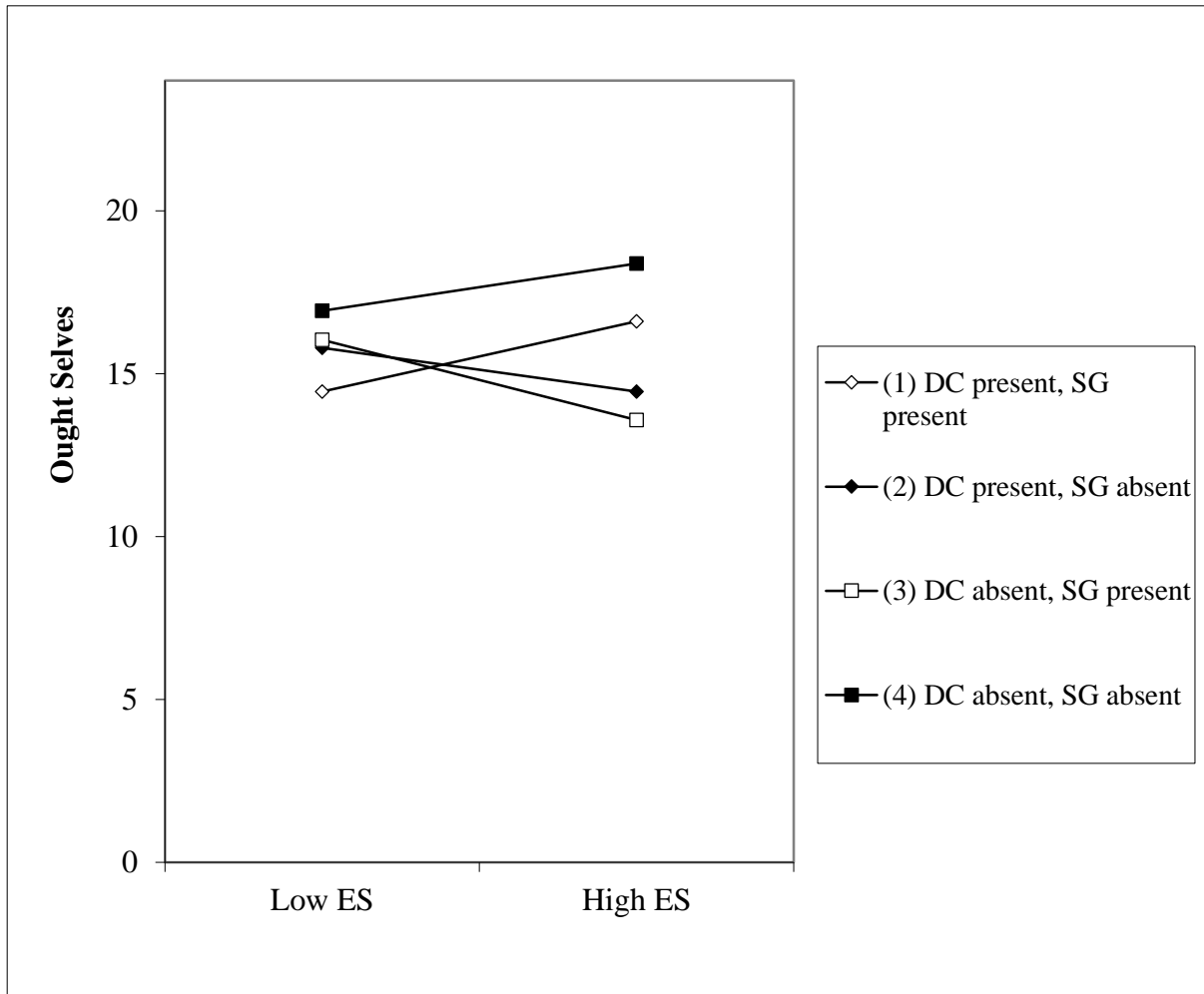
Figure 4: Interaction among directly communicated utility value condition, self-generated utility value condition, and expectancies for success on ought selves in Experiment 2. Values for expectancies for success are based on 1 standard deviation above and below the mean. ES= expectancies for success, DC=directly communicated utility value, SG=self-generated utility value.

Hypothesis 5 predicted that a three-way interaction among self-generated utility value condition, directly communicated utility value condition, and initial expectancies for success would emerge on expectancies for reducing self-discrepancies. However, no such interaction emerged for either expectancies for reducing ought-actual self-discrepancies or ideal-actual

self-discrepancies. The model in which ought-actual self-discrepancies served as the

dependent variable did not reach statistical significance, $F(7, 106) = .89$, $p = .51$. Further, no

significant main effects or interactions emerged (see Table 7). Similarly, the model in which

ideal-actual self-discrepancies served as the dependent variable did not reach statistical

significance, $F(7, 107) = .44$, $p = .88$. Again, no significant main effects or interactions

emerged (see Table 7).

Hypothesis 6 predicted that narcissism would be negatively related to accessibility of

both ideal-actual and ought-actual discrepancies. However, no significant bivariate

correlation between narcissism and either type of discrepancy emerged (see Table 6).

Additionally, two regression models were conducted to further explore the relationship

between trait narcissism and self-discrepancies. In each of these two models, narcissism,

expectancies for success, self-generated utility value condition, directly communicated utility

value condition, and the interactions among them served as the predictor variables. One

model was tested for each type of self-discrepancy. No significant main effects or

interactions with trait narcissism emerged. These results suggest that Hypothesis 6 was not

supported.

Results of Exploratory Analyses

As in Experiment 1, an exploratory model with final interest in psychology as the

dependent variable was tested. This model did not reach statistical significance, $F(7, 107) =$

1.24, $p = .31$. A positive main effect of expectancies for success emerged, but no other effects

reached statistical significance (see Table 7).

Content Analyses

As in Experiment 1, to further explore how the order of utility value information might affect learners' experience of self-generated utility, a content analysis was conducted to explore how order of presentation affected the types of ideas participants self-generated. The coding and analyses were identical to those conducted in Experiment 1, with a one exception. Namely, two separate coders coded the essays and disagreements among coders were resolved by a third trained coder, rather than via discussion. Agreement between raters was moderate (*kappa*=.55) for the number of utility statements and the number of statements borrowed from the directly communicated materials (*kappa* = .52).

Regression analyses identical to those performed in Experiment 1 were used to analyze the coded variables. As in Experiment 1, the number of utility statements generated and the number of statements borrowed from the directly communicated materials served as the outcome variables. As in Experiment 1, no significant effects emerged on either outcome variable (See Table 4). These results suggest that in the current sample, participants generated a similar number of utility statements regardless of whether directly communicated utility value was presented prior to the opportunity to self-generate utility value.

As in Experiment 1, the participants in Experiment 2 generated fewer utility statements overall than participants in the study be Canning and Harackiewicz (2015; see Table 5). Additionally, as in Experiment 1, participants borrowed fewer statements from the directly communicated utility value materials that those in Canning and Harackiewicz's sample.

Experiment 2 Discussion

One goal of Experiment 2 was to replicate the results of Experiment 1. As in Experiment 1, a significant effect of directly communicated utility value condition emerged on ought-actual self-discrepancies. However, unlike the positive effect that emerged in Experiment 1, the effect in the Experiment 1 was negative. This significant negative effect of directly communicated utility value condition suggests that those learners who were exposed to directly communicated utility value reported more ought-actual self-discrepancies than those who were not exposed to directly communicated utility value. This finding was contrary to both Hypothesis 2 and the results of Experiment 1. Additionally, when the components of the self-discrepancies were analyzed separately, an interaction among directly communicated utility value condition, self-generated utility value condition, and expectancies for success emerged on both ought selves and ideal selves. This significant interaction was not present, however, when the nine identified outliers were excluded from analyses.

A second goal of Experiment 2 was to illuminate the extent to which utility value interventions lead learners to experience situational objective self-awareness. If utility value interventions had increased objective self-awareness compared to control, then it would have suggested that Carver and Scheier's model may be a useful theoretical model for understanding the mechanisms underlying utility value intervention effects. However, in this experiment, neither type of utility value intervention increased objective self-awareness compared to the control condition.

A third goal of Experiment 2 was to investigate whether utility value interventions affect learners' expectancies for reducing self-discrepancies. This is an important step for understanding the effects of utility value interventions on expectancies for success. Canning and Harackiewicz (2015) found that participants who self-generated utility value information demonstrated higher expectancies for success than those who did not self-generate utility value information. As such, Experiment 2 further investigated this effect by testing whether utility value interventions increased a specific type of expectancy (i.e., the expectancy to reduce a self-discrepancy). However, no significant effects emerged on expectancies to reduce either type of self-discrepancy.

A fourth goal of Experiment 2 was to investigate how trait narcissism relates to accessibility of self-discrepancies. However, no significant relationship between trait narcissism and either type of self-discrepancy emerged.

As in Experiment 1, several exploratory analyses were conducted to further understand the nature of the data in Experiment 2. As in Experiment 1, no significant effect emerged in the exploratory model on final interest. Additionally, when participants were exposed to both types of utility value intervention, the order of presentation did not affect the dependent variables.

In the analyses that were conducted to replicate Canning and Harackiewicz (2015), no significant effects emerged. In Experiment 1, a marginally significant three-way interaction seemed to emerge on final interest. However, there was no evidence of such a pattern in Experiment 2. In addition, the order of the utility value interventions did not affect the

number of utility statements generated or the number of utility statements borrowed from the directly communicated materials.

Although utility value interventions are traditionally implemented in an attempt to encourage student interest in learning material, neither Experiment 1 nor Experiment 2 focused on the effects on interest. Indeed, in both Experiment 1 and Experiment 2, participants completed measures of interest only after completing all other measures. It is possible that completing these other measures prior to reporting interest may have contaminated participants' responses. Therefore, Experiment 3 attempted to better understand the effects of the manipulations on interest by including only interest as a dependent variable.

Experiment 3

As in Experiment 2, in Experiment 3 participants were randomly assigned to one of four conditions in a 2 (Self-Generated Utility Value: present vs. absent) x 2 (Directly Communicated Utility Value: present vs. absent) between-participants design. Expectancies for success in introductory psychology was measured as a continuous variable.

Experiment 3 was identical to Experiment 2 with one important exception. Namely, only interest in psychology was included as a dependent variable.

Experiment 3 Hypotheses

Hypothesis 7. The effects of utility value interventions depend on the learners' expectancies for success.

Hypothesis 7a. Directly communicated utility value increases interest in psychology for learners who have initially high expectancies for success and decreases interest for learners who have initially low expectancies for success.

Hypothesis 7b. Self-generated utility value increases interest in psychology for learners who have low expectancies for success but not for learners who have initially high expectancies for success.

Hypothesis 7c. When presented in conjunction with self-generated utility value, directly communicated utility value will increase interest in psychology for learners regardless of their initial expectancies for success.

Experiment 3 Method

Experiment 3 Participants

One hundred and thirty-five participants were recruited from introductory psychology courses at four colleges and universities in the Midwest. However, two participants were excluded from analyses (due to a computer error these participants were unable to view the interventions). Therefore, 133 participants were included in the analyses.

Participants were mostly women (50.4%) and primarily Caucasian (53.3%, 15.6% African American, 21.5% Hispanic, 5.2% Asian or Pacific Islander, 3.0% other). Participants reported an average age of 19.91 years (SD=2.50, range=18-30 years).

Experiment 3 Procedure

The procedure of Experiment 3 was identical to that of Experiment 2, with one exception. Namely, only interest in psychology in the introductory psychology course was included as a dependent variable.

Experiment 3 Measures

The same measures of expectancies for success and interest in psychology that were used in Experiment 2 were included in Experiment 3.

Experiment 3 Analysis Plan

The data were subject to a regression analysis. All three variables and the interactions among them were entered simultaneously. Both self-generated utility value and directly communicated utility value were coded in the same way as in Experiments 1 and 2. The continuous variable, initial expectancies for success, was standardized. Interest in psychology served as the dependent variable.

An additional exploratory model was conducted in which trait narcissism was also included as a predictor variable.

Experiment 3 Results

Examination of Data

As in Experiment 1 and Experiment 2, the data were examined for evidence of skewness and outliers on expectancies for success prior to analysis. Once again, both the Kolmogrov-Smirnov (.24) and the Shapiro-Wilk (.869) tests of normality were significant (both $p's$ <.001), suggesting that the distribution of expectancies for success was not normal. Similar to the data of both Experiment 1 and Experiment 2, expectancies for success were negatively skewed (skewness = -1.49, SE = .23). Similar to Experiment 1 and Experiment 2, the mean score on expectancies for success was high ($M = 5.64$, $SD = 0.97$), suggesting that the sample had high expectancies for success in their Introduction to Psychology course.

As in Experiment 1 and Experiment 2, the data included outliers. Two outliers (more than 2 standard deviations from the mean) and one extreme outlier (more than 3 standard deviations from the mean) were identified. As in Experiment 1 and Experiment 2, the hypotheses were tested with those outliers included and excluded, and the results did not differ dramatically. The analyses presented here include all outliers.

Hypothesis Testing

See Table 9 for correlations between variables. See Table 10 for the results of the regression model.

Table 9

Zero-Order Correlations and Descriptive Statistics for Major Variables in Experiment 3

Variable	1	2	3	4	5
1. Self-Generated Condition	--	.18*	-.05	-.15	-.031
2. Directly Communicated Condition		--	.15	-.10	-.031
3. Expectancies for Success			--	.29**	-.106
4. Final Interest				--	-.054
5. Gender					--
Mean			5.64	4.76	
Standard Deviation			0.16	0.92	
Conbach's α			0.89	0.76	

Note. OASD = Ought-Actual Self-Discrepancies, IASD = Ideal-Actual Self-Discrepancies. Self-generated condition and directly communicated condition are coded as -1=utility absent and +1=utility present. Gender is coded as -1=woman and +1=man. *$p<.05$, **$p<.01$*.

Table 10

Regression Models for Interest in Experiment 3

	Final Interest		
Predictor	B	t(114)	p
Intercept	4.90	53.42	< .001***
SG	-0.17	-1.85	.07
DC	-0.17	-1.88	.06
ES	0.27	2.74	.01*
ESxSG	0.02	0.19	.85
ESxDC	-0.01	-0.09	.93
DCxSG	0.03	0.30	.76
DCxSGxES	0.05	0.51	.61

Note. SG= self-generated utility value condition. DC=directly communicated utility value condition. ES=expectancies for success. SG UV and DC UV are coded as -1=utility absent and +1=utility present. *$p<.05$, ***$p<.001$

Contrary to Hypothesis 7, no three-way interaction between directly communicated utility value condition, self-generated utility value condition, and initial expectancies for success emerged on final interest in psychology (see Table 10). Instead, a significant positive

effect of expectancies for success emerged on interest. Additionally, a marginally significant negative effect of directly communicated utility value information emerged on final interest. This effect suggests that those students who received directly communicated utility value information reported lower interest in psychology than those who did not, albeit this effect did not reach statistical significance. Similarly, a marginally significant negative effect of self-generated utility value information emerged on final interest. Keeping in mind that this effect was not significant, the pattern suggests that those students who received self-generated utility value information reported lower interest in psychology than those who did not. Additionally, this analysis was run separately for students drawn from the participant pool from which Experiments 1 and 2 were collected and students drawn from other universities. Neither the significance nor the direction of the effects differed between samples. This suggests that both samples were responding similarly to the manipulations.

Although narcissism did not emerge as a significant predictor of any of the variables included in Experiment 2, we again explored its effects. In this regression model, narcissism, expectancies for success, self-generated utility value condition, directly communicated utility value condition, and the interactions among them served as the predictor variables. No significant effects emerged (all p's < .05). As in Experiment 1, narcissism was not a significant predictor of final interest.

Experiment 3 Discussion

The goal of Experiment 3 was to test how expectancies for success and utility value interventions interact to affect interest in psychology. This is important, given that interest is

an important desired outcome of utility value interventions. However, contrary to expectations, no significant effects of either type of utility value intervention emerged on interest in psychology. That said, the pattern suggested that, if anything, both types of utility value interventions were negatively related to interest in psychology. These results suggest that for some learners, a prompt to consider how learning material is useful may not bolster interest in the material and perhaps may diminish interest.

CHAPTER 3

DISCUSSION, LIMITATIONS, AND FUTURE DIRECTIONS

General Discussion

This series of three experiments was conducted to evaluate whether Carver and Scheier's model of self-awareness would provide a useful framework for understanding utility value intervention effects. As expected, the results of Experiment 1 suggest that the directly communicated utility value intervention increased ought-actual self-discrepancies relative to control. However, an opposite but nonsignificant pattern emerged in Experiment 2. Specifically, the results of Experiment 2 suggest that the directly communicated utility value intervention led to lower ought-actual self-discrepancies, although this trend did not reach statistical significance. Additionally, Experiment 2 also suggested that neither self-generated utility value intervention nor the directly communicated utility value intervention induced a state of objective self-awareness. Finally, in none of the experiments did the utility value interventions increase final interest in psychology.

Although the differential findings between Experiment 1 and Experiment 2 were unanticipated, there were a few notable contextual differences between Experiment 1 and Experiment 2 that may account for the different findings. One notable difference between Experiment 1 and Experiment 2 was the measurement of self-awareness. In Experiment 1, participants reported their self-discrepancies immediately following the study manipulations.

In contrast, in Experiment 2, participants completed the measure of self-awareness immediately following the study manipulations and then reported their self-discrepancies. It is possible that completing the Situational Self-Awareness Scale might have changed the nature of their self-reported self-discrepancies. For instance, it is possible that completing the self-awareness scale led all participants, regardless of condition, to focus on themselves. Then, when some participants were exposed to the directly communicated utility value information, the presence of this external standard was not internalized. Participants in this condition may have rejected the assertions of the utility message when contrasted with internal standards and therefore had lower actual-ought discrepancies than those not exposed to directly communicated utility value. This is extremely speculative, but it suggests that individuals' responses to directly communicated utility value may be very sensitive. For certain, the data were not consistent with the idea that all participants were self-aware given that the presence of directly communicated utility value information did affect participants' ought-actual self-discrepancies, but in the opposite direction that emerged in Experiment 1.

A second difference between Experiment 1 and Experiment 2 was the participant pool from which students were recruited. Although participants for both experiments were drawn from the Introduction to Psychology pool at the same university, there were some differences between the samples. For instance, the data for Experiment 1 were collected in the Spring semester of 2016, whereas the data for Experiment 2 were collected in the Fall semester of 2016. Notably, the faculty member in charge of Introduction to Psychology was different. As such, it is possible that the nature of the Introduction to Psychology course differed. Perhaps this difference altered the way learners thought about the learning material and therefore

caused differences in their reports of self-discrepancies. That said, the means for both expectancies for success and final interest are consistent across Experiment 1 and Experiment 2, so this explanation for differences between the experiments is unlikely.

Although final interest in psychology was explored in both Experiment 1 and Experiment 2, no significant effects on final interest emerged in either. However, in both Experiment 1 and Experiment 2, final interest in psychology was measured after participants self-reported their responses to the other dependent variables. It was possible that participants' responses to the final interest in psychology measure were disrupted by the measures that preceded it. Therefore, a third experiment was conducted to test the effects of the manipulations on final interest in psychology. Unlike Experiment 1 and Experiment 2, Experiment 3 included only final interest in psychology as a dependent variable. Yet, as in Experiment 1 and Experiment 2, no significant effects emerged on final interest in psychology. That said, two marginally significant main effects suggest that, if anything, the presentation of utility value interventions diminished interest in psychology in Experiment 3. Of course, it is imperative to keep in mind that this negative trend was not significant and did not emerge in either Experiment 1 or Experiment 2. That said, it is concerning that the utility value interventions implemented in this series of studies did not lead to beneficial outcomes on interest and, if anything, diminished interest in psychology. Additionally, in the current series of studies, no significant interactions between utility value interventions and expectancies for success emerged.

The negative overall trend on interest seems to be unique to the current series of studies. Also unique is the lack of an interaction between expectancies for success and utility

value interventions. Canning and Harackiewicz (2015) found that the self-generated utility

value interventions positively affected interest, especially when presented with a directly

communicated utility value intervention. Further, Hulleman and Harackiewicz (2009) found

that self-generated utility interventions positively affected interest, especially for learners who

had low expectancies for success. Additionally, Durik et al. (2015) found that directly

communicated utility value interventions positively affected interest for those individuals who

had high expectancies for success. That said, Durik et al. did find that directly communicated

utility value interventions diminished interest for individuals who had low expectancies for

success. In the current study, no such interaction emerged, but a negative trend similar to that

found for students who had low expectancies for success in the study conducted by Durik et

al. did. As such, it is not unprecedented that utility value interventions negatively affect

interest for some learners.

Not only did the effects on interest not replicate past work, but the results of the

content analyses that were performed on the self-generated utility essays failed to replicate

past work. Specifically, Canning and Harackiewicz (2015) found that learners who received a

directly communicated utility value intervention prior to self-generating utility value

generated more utility statements than those who did not. Yet, in the current series of studies,

the number of utility statements that learners generated was not affected by whether or not

learners were exposed to directly communicated utility value prior to self-generating.

There are several notable differences between the current series of studies and

Canning and Harackiewicz's work that may have led to the differential findings. For

instance, Canning and Harackiewicz's work focused on utility value for and interest in a

specific task (a new way to solve math problems). Contrarily, our work focused on utility value for and interest in a college course (introductory psychology). It is possible that the relatively narrow scope of Canning and Harackiewicz's study may have led learners to react differently to the utility value interventions. Specifically, it is possible that asking participants to consider the utility value of a specific math technique led them to think about specific ideas in which the learner might use the technique. Contrarily, it may have been difficult for learners to consider specific instances in which they would use the content from their Introduction to Psychology course in the future. Additionally, Canning and Harackiewicz's work focused on math as a learning domain, whereas the current series of studies focused on psychology as a learning domain. It is plausible that these differences led to the differential findings that emerged in the current series of experiments.

Although the differences between the learning content that was used in the current series of experiments (content from an Introduction to Psychology course) and that which was used by Canning and Harackiewicz (a mental math technique) may have led to the discrepancy between findings, some past research has shown that utility value interventions for introductory psychology led to higher interest in psychology compared to a control group. Specifically, Hulleman et al. (2010) implemented a self-generated utility value intervention for an introductory psychology course and found that those students who wrote about the utility value of the course content reported higher interest in psychology than those in the control condition. Yet, in the current series of experiments, no significant effect on interest emerged. One notable difference between the current studies and the study conducted by Hulleman et al. (2010) that may have led to the discrepant findings is the context in which the

utility value intervention was introduced. Hulleman et al.'s intervention was embedded within the course materials such that it was presented as a regular course assignment. In the current series of experiments, the utility value intervention was implemented outside of the classroom in a research laboratory. Participants received credit towards a research goal for participating, but the activity of considering utility was not directly part of the course. It is plausible that the distance from the course content and materials led participants to divorce the process of self-generating utility value from the course material.

One aspect of the data that may have affected the results was non-normal distribution of expectancies for success. Across all three studies, participants overall reported high expectancies for success, and this variable was negatively skewed. It is possible that participants' expectancies for success were inflated because they were reported at the beginning of the semester. Perhaps participants reported that they expected to achieve a high level of success in their course because they wanted to do well, not because they actually expected to achieve success. Indeed, it is unlikely that a student signs up for a class in which they expect to perform poorly from the beginning. Although the skewed nature of expectancies for success is reason to give pause regarding the absence of interactive effects with this variable, it is important to note that the distribution of expectancies for success that was obtained in the current experiments is similar to that obtained in Hulleman et al.'s (2010) work. It is unlikely that the shape of the expectancies for success distribution is the cause of the discrepant findings given the nature of this variable was similar in the current studies and in Hulleman et al.'s work.

Another aspect of the data that may have influenced the results is the institution at which the data were collected. Given past work has shown that expectancies for success is an important moderator of utility value intervention effects (e.g., Canning and Harackiewicz, 2015) but no such effects emerged in the current series of experiments, it is possible that expectancies for success have different meanings at different institutions. If so, it might explain why Experiment 3, which was similar to Canning and Harackiewicz's design, failed to replicate their findings. Perhaps the learners in Canning and Harackiewicz's used different criteria to set their expectancies for success than the learners in the current set of experiences. It might be possible to understand how the institution at which the data are collected affects utility value intervention effects if a cross-institution collaboration were coordinated. If researchers at several universities conducted the same utility value study, it might be possible to glean which institutional factors are critical for patterns similar to those obtained by Canning and Harackiewicz to emerge. For instance, perhaps those patterns emerge only at those institutions that have similar admission standards (e.g., average ACT score, high school GPA, achievement goals that students tend to hold, demographic differences).

It is possible that limited support for Carver and Scheier's model of self-awareness emerged in this series of experiments because of the way learners think about the self when prompted to consider utility value information. Carver and Scheier's model suggests that when an individual becomes self-aware it affects one's engagement in the present moment, suggesting that self-awareness affects the current self (Carver & Scheier, 1981). However, prompting learners to consider utility value information requires them to consider how they might use learning material in the future, not in the present. As such, Carver and Scheier's

model may not explain utility value intervention effects because learners are thinking about their future selves when prompted to consider utility information, rather than thinking about their current selves. For instance, a learner who is considering how psychology might be useful in the future might think about how one could use this information from child development to know the developmental milestones one's future children should be reaching. If, at present, the learner has no children, one might think that there is a lot of time to learn about child development before needing to use that information. As such, this learner's current behavior might not be affected by considering this utility value given he or she perceives having a great deal of time before knowing that information will become necessary.

Some support for this line of reasoning comes from construal level theory (Trope, Liberman, & Wakslak, 2007). Research from CLT suggests that individuals think about the distant future differently than they think about the present and near future, and these differences affect the extent to which an individual's values and desired outcomes affect one's behavior. For instance, in one study, researchers measured participants' self-reported values and their intentions to engage in behaviors that were consistent with those values either in the near future or in the distant future (Sagristano, Trope, Eyal, & Liberman, 2006, as cited in Trope et al., 2007). The results suggested that the participants' behavioral intentions for the distant future were more related to their values than their behavioral intentions for the near future. This work suggests that when individuals think about a goal for the future, they plan to engage in the behaviors required to accomplish that goal in the distant future rather than engaging in the behaviors required to accomplish the goal in the present or near future. These

ideas might explain why in the current series of experiments considering the future did not affect individuals' engagement in the present.

Although some learners might not see their current behavior as important for reaching long-term goals, others might see their current behavior in the moment as imperative for reaching those long-term goals that the utility value interventions lead them to consider. That is, some learners might perceive their current behavior as imperative for realizing their future selves. Along these lines, some research suggests that how individuals think about their future goals impacts their behavior in the present (Wallace, 1956). In one study demonstrating this tendency, participants wrote about their future goals and rated the extent to which studying hard was instrumental for reaching those goals (De Volder & Lens, 1982). The results showed that those students who had a high grade point average and high study persistence viewed their behavior in the present (studying hard) as more critical for reaching their distant long-term goals than students who had a high grade point average and low study persistence. These results suggest that learners who perceive their present behavior as important for realizing their desired future selves are those who modify their present behavior. As such, it is possible that the individual difference variable of future time perspective might moderate the results of this series of experiments. Future work might measure future time perspective to test this idea.

Limitations and Future Directions

Although the current series of experiments set out to understand the extent to which Carver and Scheier's model of self-awareness would aid in understanding utility value intervention effects, limited support for the study hypotheses emerged. It is possible that support for the study hypotheses failed to emerge simply because the model is not useful for understanding utility value intervention effects. However, there are several notable limitations of the current series of experiments that should be considered prior to dismissing the Carver and Scheier model of self-awareness as a useful tool for understanding utility value intervention effects.

One limitation of the current series of experiments is the setting in which they were implemented. The current series of experiments implemented a utility value intervention in a setting that was peripheral to the course content. Specifically, participants were exposed to the utility value interventions during an experimental session held in a research laboratory. Past utility value intervention work that employed laboratory experiments embedded the utility within the context of a specific learning task in which leaners were involved (e.g., Canning and Harackiewicz, 2015). It is possible that the current design led participants to view the intervention as separate from the course content and their Introduction to Psychology course. Perhaps because of the distance from the course content, the utility value interventions did not affect participants as expected. Future work should investigate these effects when the utility value intervention is embedded within the course materials, like in Hulleman et al.'s (2010) work.

Another limitation of the current series of experiments is the broad scope of the content that was covered. Considering how the material of an entire introductory psychology course might be useful may have been an overwhelming task for learners and as such may have diluted the effects of the utility value interventions. Future work might investigate whether the tenets of Carver and Scheier's self-awareness model fit with utility value interventions that are implemented for a specific task, like the mental math technique that was used by Canning and Harackeiwicz (2015).

Additionally, at present, it is unknown why the results of Experiment 1 and Experiment 2 differed dramatically. Specifically, in Experiment 1 a directly communicated utility value intervention increased ought-actual self-discrepancies relative to control, whereas in Experiment 2 a directly communicated utility value intervention decreased ought-actual self-discrepancies relative to control. A key difference between Experiment 1 and Experiment 2 was the measurement of self-awareness prior to reporting self-discrepancies. As such, it is possible that completing the measure of self-awareness changed the way participants responded to the measure of self-discrepancies. Future work might test this idea by randomly assigning participants to complete the measure of objective self-awareness either before the measure of self-discrepancies or after the measure of self-discrepancies.

Conclusion

It is often assumed that communicating how learning material is useful will lead participants to be interested in the learning domain. However, the current series of experiments, like the existing utility value literature, suggests that the effects of utility value

interventions may not always lead to beneficial outcomes for learners. Research has yet to uncover the theoretical mechanisms responsible for the mixed success of utility value interventions to inspire interest. The current series of experiments attempted to test one theoretical model that might implicate some such mechanisms. Specifically, Carver and Scheier's model of self-awareness was applied to what is known about utility value intervention effects. Although the current series of studies provided limited support for Carver and Scheier's model, future work is necessary to further understand how utility value interventions affect participants' perceived self-discrepancies. Many of the findings that emerged in the present series of experiments were unexpected, yet one important conclusion can be drawn. Educators and researchers alike should be cautious when implementing utility value interventions. Indeed, for at least some students, the results are unlikely to be positive.

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APPENDIX

UTILITY VALUE MANIPULATIONS

Introduction to Psychology

Topics You Will Cover This Semester

Introduction

Taking an introductory course in psychology is required for a variety of majors. Additionally, some students choose to take Introduction to Psychology as an elective course. No matter the reason for taking the course, students cover many psychology topics during the semester.

In this study session, you will be asked about some of the topics you have or will learn in your Introduction to Psychology course. As such, let's first refresh your memory for some of the topics that are covered in your course.

Topics Covered

- The following topics are among those covered in Introduction to Psychology:
  - Research Methods
  - Learning
  - Memory
  - Cognition
  - Child Development

Now, before being asked about your feelings toward learning these topics, let's briefly discuss what they might entail.

Research Methods

The section on research methods will likely include learning about:
- How to develop a research question
- How to develop and test a hypothesis
- How to develop a research design
- Methods of data collection
- Research ethics

Learning

The section on learning will likely include learning about:
- Classical and Operant Conditioning
- What reinforces behavior
- The effects of punishment on behavior
- How animals and humans learn new information
- How people learn from experience

Memory

The section on memory will likely include learning about:

– How we store information in memory
– How we retrieve information stored in memory
– Different types of memories
– How forgetting occurs
– The types of memory mistakes people make

Cognition

The section on cognition will likely include learning about:

– How humans and animal solve problems
– Mental shortcuts people use when thinking
– Biases that humans use when thinking
– How humans learn language
– What different brain areas do

Child Development

The section on child development will likely include learning about:

– The stages of development
– How children learn
– Important developmental milestones
– Problems that can occur during development
– Different styles of attachment between children and their parents

Other Topics Covered

• You might also learn about other topics in your Introduction to Psychology Course. For instance, your course might cover the following:

– History of psychology
– Personality
– Abnormal psychology
– Psychological neuroscience

Now you will be asked about the information covered in your Introduction to Psychology course.

Manipulation of Directly Communicated Utility Value

Now that you've had a short review of the topics covered in Introduction to Psychology, let's consider how they can be beneficial for you in your daily life.
Psychology is Useful!
The information you learn in introduction to psychology can be useful to you in tasks you may encounter in everyday situations. It can also be useful beyond graduation, whether in your adult life, graduate school, or your career.
Your Introduction to Psychology course teaches you important skills, such as critical thinking and the ability to evaluate scientific ideas. Additionally, you will learn information that may be useful to you in the future.

Now let's consider how the topics you will cover may be useful to you.

Let's consider how this course may be useful in everyday situations:
- You might use the information you learn about child development to guide your interactions with your own children or other children you know.
- You might use information about how memory works to develop tricks for remembering your shopping list when you are at the store.
- You might use the information you learn about cognition to inform your methods of studying for exams.
- You might use your knowledge of research methods to evaluate scientific findings that you hear about on the news. For example, knowing that correlational studies do not prove causation can keep you from being misled.
- You might use information from the learning section to train a new dog. For instance, knowing how to reinforce good behavior may be helpful.

Let's consider how this course may be useful in your future:
- If you plan to go on to graduate school, you may use the information you learn in research methods when you design your thesis.
- If you pursue a career in human services, you may use the information from child development to assist your clients who are parents.
- If you ever need to assist with training new employees at your future job, you may use information about memory to understand how to present the information so that it sticks in their memory.
- If you are ever a supervisor you may use the information from the section on learning to understand how to motivate your employees. For example, from your learning chapter you will know that some types of rewards are less helpful than others.

Manipulation of Self-Generated Utility Value

Self-Generated Utility Value Present Condition

Instructions: Type a short essay (1–3 paragraphs in length) briefly describing the potential relevance of the material of introductory psychology to your own life, or to the lives of college students in general. Of course, you'll probably need more practice with the material to really appreciate its personal relevance, but for purposes of this writing exercise, please focus on how the material in introductory psychology could be useful to you or to other college students, and give examples.

Self-Generated Utility Value Absent Condition

Instructions: Type a short essay (two paragraphs) describing the objects that you see in both pictures; simply describe in detail the objects that you see. First, in one paragraph, simply describe in detail the objects that you see in the picture on the left. Second, in one paragraph, simply describe in detail the objects that you see in the picture on the right.