CHAPTER 4

The Utility-Value Intervention

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The utility-value intervention is an interactive, classroom-based assignment designed to help students make connections between the content they are learning and their lives. Across numerous randomized field trials, the intervention has increased learning outcomes, including course-specific performance and interest, and longer-term outcomes, such as course taking and persistence in a major. The intervention has proved to be particularly effective for students at risk for poor performance, including students with a history of low performance, less confidence that they will do well in the course, and students from traditionally marginalized groups. In this chapter, we review the origins of the intervention, which is grounded in the expectancy-value framework of achievement motivation and the real-world experience of educators who are trying to increase student motivation and engagement in their courses. We review the seminal studies demonstrating the effectiveness of the intervention, consider variations of the intervention—including versions created with and implemented by teachers—and discuss implications for theory, research, and practice.

BACKGROUND

In most schools in the United States, educators decide what happens in the classroom. They control the content, the learning activities, which students are in the classroom, and how students interact with one another. Although there are many good reasons for this, including making learning developmentally appropriate and sequenced, instructor-centric environments can rob students of opportunities to engage in learning that is meaningful and interesting to them. For example, nearly every student has wondered at some point, "Why are we learning this?!" Decades of research in educational psychology have revealed that students are more motivated to engage in learning, persist longer, and learn more when they find some type of value in what they are learning (Eccles et al., 1983; Wigfield, Rosenzweig, & Eccles, 2017). One study revealed that 90% of middle school teachers reported that one of the top barriers for student motivation was a lack of value for learning (Hulleman & Barron, 2013). This problem might be particularly

pronounced for students already at risk of underperforming, whether due to a lack of confidence, lower levels of prior achievement, or because their cultural backgrounds differ from the educators who have designed the learning context.

Such was the experience of one of us (Hulleman) during his time as an introductory statistics graduate teaching assistant. Most of the students were aspiring psychology majors who could not see why they needed to know statistics to help people. Our intrepid teaching assistant sought to engage students during his weekly discussion sections. He drew on his research focus—motivation—to help his students find value in what they were learning. The expectancy-value framework (Eccles et al., 1983) highlighted three sources of value that helps motivate students: finding an activity enjoyable (i.e., *intrinsic value*); important to one's identity (i.e., *attainment value*); and useful, either now or in the future (i.e., *utility value*). Within the span of a 15-week semester, Hulleman decided to focus on helping students find utility value, connecting what they were learning in the class and their lives. Through the same trial-and-error process that instructors have employed for decades, he developed a series of activities that encouraged students to connect statistics to their lives. He began by encouraging students to look for examples of statistics in popular magazines or online media (e.g., *Redbook, Sports Illustrated,* CNN.com, ESPN.com). He began by setting aside 3–5 minutes each week for students to share their examples. Students struggled at first to make connections, with their lack of confidence in their statistics skills being exacerbated by a lack of value for statistics. But by the end of the semester, students were taking up nearly half the class period talking about the statistics examples they were finding in the popular literature. Students seemed more engaged, confident, and willing to ask questions. The critical insight of this initial work was that students needed to make their own connections between what they were studying and their lives, rather than trying to internalize a message delivered by the instructor. These personally meaningful connections enabled students to find the course content more relevant to their lives, which would energize their learning.

With the help of his colleagues, including his dissertation advisor (one of us: Harackiewicz), these assignments formed the inspiration for what is now known as the utility-value intervention. The utility-value intervention was first formally studied in the lab, where undergraduate students (N = 107) learned a new mental math technique (Hulleman, Godes, Hendricks, & Harackiewicz, 2010, Study 1). Students were randomly assigned to generate examples of how the technique applied to their lives (utility-value condition) or summarized the technique they just learned (control condition). Students who wrote about the utility value of the new math technique reported more interest in learning additional mental math techniques, with strongest findings for students who reported low confidence that they could learn the technique.

We then returned to the classroom to test the intervention in introductory psychology (N = 318; Hulleman et al., 2010, Study 2). Students either wrote a letter to a significant other (e.g., friend, relative) about how something they were learning in class was relevant to the significant other's life or found an example of how a topic they were studying was used in popular media. Both activities prompted students to create their *own* connections between course material and their lives rather than simply telling them how the course is useful. Initially low-performing students who completed either the letter or the media assignment were more interested in psychology at the end of the semester compared to students in the control condition, who lost interest over the semester (Harackiewicz, Hulleman, & Pastor, 2009).

PSYCHOLOGICAL PROCESSES

Utility Value

As outlined in the original (Eccles et al., 1983) expectancy-value framework, perceiving any type of value in an activity is likely to increase motivation to perform the activity. Reflecting on personal connections between course content and students' lives is expected to increase perceptions of utility value, which subsequently increases the likelihood that students will engage in course-related tasks like studying for an exam. To instigate that utility value, students' responses to the intervention need to have three characteristics.

First, *connections need to be personal*. Intervention activities are most empowering when students are able to create their own connections rather than being told about why they should value material (Canning & Harackiewicz, 2015; Durik & Harackiewicz, 2007; Durik, Schechter, Noh, Rozek, & Harackiewicz, 2015; Hulleman, 2007). Second, *connections need to be specific*. Just as specific goals (e.g., "I want to set a detailed budget by June 1") are more likely to lead to goal attainment than general goals (e.g., "I want to spend less"; Locke & Latham, 2002), specific connections between course content and everyday life is more likely to spur motivation and adaptive outcomes. Prior studies suggest that specific examples in intervention essays partially explain intervention effects (Harackiewicz, Canning, Tibbetts, Prinski, & Hyde, 2016; Rozek, Hyde, Svoboda, Hulleman, & Harackiewicz, 2014). Third, *connections need to be content-relevant*. If the goal of utility-value interventions is to support learning in a specific class, then the connections that students make to their lives need to be relevant to current course content. Figure 4.1 outlines how an exemplar quote is personal, specific, and content-relevant; these are the types of responses researchers or practitioners would ideally scaffold students toward in utility-value interventions.

Intervention Prompt

I would like you to think about how what we have been learning about in this class is important to your life in some way. What connection can you find between one of the topics we have been studying and something that is important in your life? Write a few sentences about that connection below:

Exemplary Quote

It is **personal** and specific and is *content-relevant*.

"Playing hockey and friction are connected because in hockey while passing or shooting the puck it *slides on the ice which causes friction, slowing down the puck*. Friction could be important to my life because **I can better understand how much force I need** to get the puck to move with the friction moving against it."

Personal: A personal pronoun is used to reference something specific to the student's interest, hobbies, or goals.

Specific: Discusses how friction impacts a specific action in hockey.

Content-relevant: Indicates a linkage to a specific topic in the course in an accurate way.

FIGURE 4.1. Exemplar student quote for utility-value-intervention mechanisms. Data from Hulleman, Hulleman, et al. (2018).

Other Psychological Processes

As listed in Figure 4.2, these *intervention processes* instigate the cascade of psychological processes, beginning with perceived utility value, that lead to the beneficial effects of the utility-value intervention. Although utility value was originally hypothesized to be the key psychological process instigated by utility-value interventions, our recent research has revealed two related aspects of motivation from expectancy-value theory that utility-value interventions also affect. First, when students become engaged in a learning activity in a way that allows them to realize their knowledge of the content, their confidence in their ability to learn in the course is likely to increase (i.e., *success expectancies*). Second, as students perceive value in a course, particularly a content area that is difficult to master, their perceptions of the negative consequences of being in the course are likely to decrease (i.e., *perceived costs*). Decades of research based in the expectancy-value framework of achievement motivation in education (i.e., Eccles et al., 1983) has revealed that students' success expectancies and perceived utility value are positively related to learning, whereas perceived cost is negatively related to learning (e.g., Barron & Hulleman, 2015).

MECHANISMS

Psychological Mechanisms

Motivation researchers have investigated several psychological mechanisms that could explain the effects of utility value on motivation: identification, involvement, and interest. For example, perceiving the relevance of an activity to one's life or future goals may lead an individual to identify with the activity (*identification*), become more actively involved in learning (*involvement*), and develop an enduring *interest* in the topic (e.g., Dewey, 1913; Eccles & Wigfield, 2002; Hidi & Renninger, 2006). First, perceiving utility value in a topic may lead to an increase in the perceived importance of an activity in general, and eventually to the identification of the activity with the individual's self-concept (e.g., attainment value: Eccles et al., 1983; identified regulation: Deci & Ryan, 1985). For example, finding an application for an activity (e.g., quadratic equations and engineering) opens up the possibility of making connections to things that are personally important to the individual (e.g., a career as an engineer). Once these connections have been made, repeated engagement in the activity can lead to the activity becoming incorporated into the individual's self-concept (i.e., identification). Second, perceiving utility value in a topic may promote active task engagement. For example, perceiving a connection between geometry and life may energize an individual to become more actively involved in geometry class by seeking out learning opportunities, putting forth more effort, and becoming more engaged. When students are active contributors to the learning process, then they are more likely to feel in control (deCharms, 1968), self-determined (Deci & Ryan, 1985), and efficacious (Bandura, 1997). Rather than being passive recipients of education, students perceive that they are active participants and become absorbed in the learning process (Harackieiwicz & Sansone, 1991). Third, students are more likely to engage in activities that they find important, and perceiving utility value in a topic can increase their willingness to seek out the activity over time. Repeated engagement facilitates the acquisition of activity-related skills and knowledge, and enhances the experience

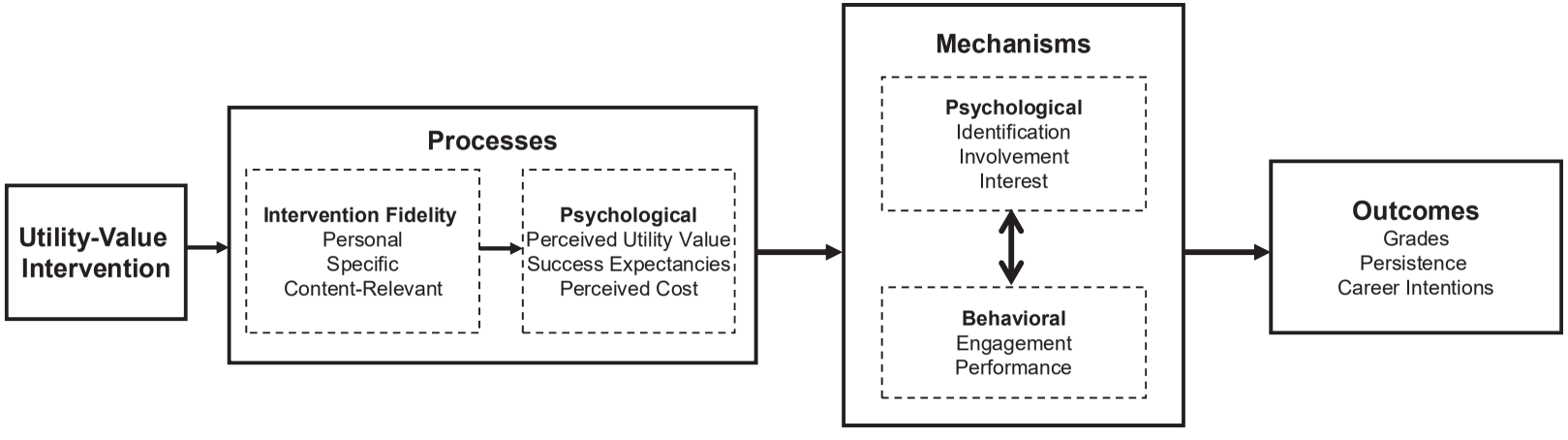

FIGURE 4.2. The utility-value-intervention logic model.

of positive affect. Repeatedly working on an enjoyable, self-relevant task that leads to skill development perfectly defines the necessary antecedent conditions for the development of interest (Hidi & Renninger, 2006). This triad of psychological mechanisms may be particularly empowering when students generate their own examples and connections, because they are personal (instead of regurgitated examples from textbooks and teachers; Dewey, 1913; Hulleman, 2007). Discovering how math applies to life may be especially effective in getting students involved in their learning, and even fostering a sense of identification with the activity, because it supports their autonomy in the classroom. This process may be less likely to occur if the usefulness of the activity is simply explained by a teacher or parent. Furthermore, it's not just that more direct approaches may be less effective; in fact, some research finds that direct approaches may even be counterproductive. In one study, Canning and Harackiewicz (2015) found that experimental utility-value manipulations that emphasized the relevance of a math activity for everyday activities and future careers undermined the interest of students with low ability perceptions.

Behavioral Mechanisms

Co-occurring with the psychological mechanisms outlined above, students who perceive increased utility value are more likely to demonstrate behavioral engagement and increased performance in the activity. In the classroom, behavioral *engagement* includes things like increased attendance, homework completion, and work quality. Increased *performance* includes proximal measures of competence development, such as performance on quizzes, tests, and oral presentations. These behavioral mechanisms work in tandem with the psychological mechanisms. For example, increased attendance can lead to increased learning, which results in increased positive affect toward school. When repeated over time, this can lead to the development of interest. Conversely, experiencing identification with the activity—such as when a student connects learning biology to his or her interest in becoming a paramedic—can lead to an increased interest in classroom activities, which enables the student to complete his or her homework at a higher level. This then leads to better performance on quizzes and tests.

EMPIRICAL EVIDENCE

Outcomes

Since the original intervention studies (Hulleman et al., 2010), the utility-value intervention has been replicated across of a variety of high school and college courses. In a recent meta-analysis of utility-value interventions (Hulleman, Wormington, Tibbetts, & Phillipoom, 2018), we found 33 field studies where 12,478 participants were randomized to a utility-value or control condition. Our meta-analytic results indicated that, on average, the utility-value intervention boosted learning outcomes—such as exam scores, end-of-semester course grades and pass rates, and interest in the topic—by a quarter of a standard deviation (d = 0.24). Table 4.1 presents a representative sample of published utility-value intervention studies. For most of these studies, intervention effects were most pronounced for students most likely to experience adverse learning outcomes, such as students with histories of lower achievement (e.g., Hulleman, Kosovich, Barron,

TABLE 4.1. Representative Utility-Value Intervention Randomized Field Experiments

Study	Sample age and context	Sample size	Student moderators	Outcomes
Hulleman & Harackiewicz (2009)	High school general science	262	Success expectations	Grades, interest
Hulleman, Godes, Hendricks, & Harackiewicz (2010)	4-year college psychology	318	Initial exam performance	Utility value interest
Gaspard et al. (2015)	High school math	1,916	Gender	Utility value interest
Harackiewicz, Canning, Tibbetts, Priniski, & Hyde (2016)	4-year college biology	1,040	Prior achievement, success expectations, underrepresented group membership	Grades
Hulleman, Kosovich, Barron, & Daniel (2017)	4-year college psychology	359	Gender, initial exam performance	Final exam scores
Rosenzweig, Wigfield, & Hulleman (2019)	4-year college physics	99	Initial exam performance	Grades
Kosovich, Hulleman, Phelps, & Lee (2019)	2-year college math	180	Gender	Pass rates
Total		4,174		

Note: For a comprehensive review, see a recent meta-analysis of utility-value interventions (Hulleman, Wormington, Tibbetts, & Philipoom, 2018).

& Daniel, 2017), lower success expectancies (e.g., Hulleman & Harackiewicz, 2009), or from traditionally underrepresented groups in higher education (e.g., Harackiewicz et al., 2016).

Two sets of follow-up studies are important to highlight. In our first follow-up study, we implemented the intervention in 30 high school science classrooms taught by 10 different teachers (N = 262; Hulleman & Harackiewicz, 2009). The writing activities were shortened to make them developmentally appropriate and to fit into a 45-minute class period. Students randomized to the utility-value condition were simply prompted to write one to two paragraphs about how a topic they were studying in science related to their lives. Students randomized to the control condition were prompted to write a one- to two-paragraph summary of a topic they were studying in class. Students completed the writing activities two to five times per semester depending on the teacher. We found that the intervention enhanced both course grades and subsequent interest in science for low-performing students in the utility-value condition compared to the control condition. For example, less confident students increased their semester grade in the course by over three-quarters of a grade point on a 4-point scale (d = 0.50).

In a second set of follow-up studies, Harackiewicz and colleagues (2016; Canning et al., 2018; Priniski et al., 2019; Rosenzweig, Harackiewicz, et al., 2019) implemented a utility-value intervention within a two-semester introductory biology sequence at a research-intensive university. The basic paradigm was the same for all four studies. For each of three units across the semester, students were randomly assigned to receive either a utility-value writing assignment, in which they explained why course material was

useful to them personally (or wrote a letter to a friend or family member about how the course material was relevant to them), or a control assignment, in which they summarized course material. These assignments were part of the course curriculum and were graded for credit by biology graduate students blind to condition. In the first published study, Harackiewicz et al. found that the utility-value intervention had an overall, small positive effect on course grades for all students. They also found that the intervention had a more positive effect for students with a history of lower success expectations in the course (replicating the effects of Hulleman & Harackiewicz, 2009), and for underrepresented students, specifically students who were both first-generation and members of underrepresented minority groups.

Effects over Time

Most of the utility-value intervention studies have examined intervention effects in a single semester. This is because the intervention was designed to promote motivation and engagement within a specific learning context; therefore, it seems unlikely that the intervention should have long-lasting direct effects (Harackiewicz & Priniski, 2018). However, it if promotes performance in foundational courses, it may influence broader outcomes indirectly, by helping students succeed in these classes. It is also possible that the intervention might promote identification processes that have implications for subsequent academic choices. Only two published studies have looked at results in subsequent semesters, both in college biology. In the first study ($N = 577$; Canning et al., 2018), students in the utility-value condition earned higher grades in the course, were more likely to enroll in the second course of the biology sequence, and were less likely to abandon their science, technology, engineering, or math (STEM) major, than students in the control group. In the second study, Hecht, Harackiewicz, et al. (2019) followed students in the original Harackiewicz et al. (2016) study for 2 years after the intervention and examined whether they continued to the next course in the biology sequence and persisted in a bioscience major. They found that the utility-value intervention promoted persistence in the biomedical track for students who entered the introductory biology course with higher levels of confidence in their ability to perform well in the course. In other words, these researchers found a direct effect on long-term persistence, although the pattern of the interaction was different from that observed many times on shorter-term outcomes, such as interest (Hulleman et al., 2010) and course performance (Harackiewicz et al., 2016). Moreover, this effect was mediated through different processes, showing the complexity of understanding long-term effects of a task-specific intervention.

In addition to investigating the extent to which utility-value interventions last over time, and which outcomes are impacted, it is essential to consider how the intervention can have an effect over time. How do the short-term mechanisms translate into broader effects? We can glean some insight from Harackiewicz and colleagues' (2016) college biology intervention. Hecht, Harackiewicz, et al. (2019) found that the process through which the utility-value intervention influenced persistence was distinct from the process through which it promoted course grades. Engagement with the course material was related to course grades, whereas making personal connections to the material was related to persistence in the biology major. These findings suggest that the utility-value intervention may initiate two distinct processes that align with involvement and identification, respectively: (1) helping underperforming students to engage with

course material, thereby improving performance, which had a significant indirect effect on persistence in the major; and (2) increasing reflection on the personal relevance of course material, thereby helping confident students see why pursuing that domain may be important.

Heterogeneity

At present, the majority of published utility-value intervention studies have found that the intervention works best for students who are traditionally underrepresented, underserved, or underprepared in the learning context (e.g., students with lower prior achievement, first-generation college students, racial/ethnic minorities; see Table 4.1). Our initial hypothesis was that concerns about academic performance impeded students' capacity to perceive value through a narrowing of attention (Durik & Harackiewicz, 2007; Hulleman, 2007), and that prompting students to make those connections gave them the opportunity they needed to make some initial connections. However, our more recent research demonstrates that for some students, particularly those students who perform poorly early in the course, the utility-value intervention boosts their success expectancies (Hulleman, Kosovich, et al., 2017; Rosenzweig, Wigfield, & Hulleman, 2020). Students who perform poorly initially tend to be more disengaged from the course. As a result, nudging them to see the value in the course by completing utility-value intervention activities may spark them to reengage with course material. Furthermore, students whose values are not aligned with those of the learning context might feel disconnected from the learning context from the beginning (Stephens, Hamedani, & Destin, 2014; Harackiewicz et al., 2016). For example, students from groups traditionally underrepresented in higher education, such as students who belong to a racial/ethnic-minority group, tend to value interdependent and communal goals more than independent and agentic goals (Diekman, Brown, Johnston, & Clark, 2010). The utility-value intervention provides these students an opportunity to identify their own values rather than being told to connect to goals that are not their own (e.g., more independent than interdependent).

An important reason why moderator effects might vary across learning contexts is that utility-value interventions provide an opportunity for students to articulate how their personal goals and values might align with learning in a specific context, rather than being told to connect to goals that are not their own (e.g., more independent than interdependent). This aligns with the core aspects of the Eccles et al. (1983) expectancy-value framework that explicates how student motivation is dependent upon the learning context. Our current corpus of research makes it difficult to test this context-salient hypothesis because interventions have been implemented in contexts with very few traditionally underrepresented students, which makes it difficult to fully examine students' intersectional identities. For example, Harackiewicz and colleagues (2016) needed to collect data across four semesters to have sufficient numbers of first-generation students and racial/ethnic-minority students to conduct their analyses. Testing interventions in new and diverse learning contexts will provide the opportunity to determine whether the intervention logic model and our hypotheses about intervention moderators hold up.

Second, variation in the social context of learning could influence intervention effects. One way of looking at this is by institutional context. Although the interventions have been tested across different types of institutions (e.g., high school, community

college, and research-intensive universities) and subject areas (e.g., math, psychology, biology), our meta-analytic review of utility-value interventions did not show significant heterogeneity in intervention effects by context (*d*'s from 0.19 to 0.31). Unfortunately, large studies that include many different learning contexts in a single study have not yet been published with the utility-value intervention. Such studies have the potential to uncover important variations in learning context that could contribute to heterogeneity in intervention impacts (cf. Yeager et al., 2019).

COUSINS

The utility-value intervention is related to several other social-psychological interventions, each of which focuses on how students make meaning of themselves in school.

First, it draws on the *saying-is-believing* aspect of many other social-psychological interventions, including growth mindset (Dweck & Yeager, Chapter 1, this volume), social belonging (Walton & Brady, Chapter 2, this volume), and values affirmation (Sherman, Lokhande, Müller, & Cohen, Chapter 3, this volume). The saying-is-believing aspect of these interventions involves asking students to reflect on the intervention message without having to explicitly endorse it as their own (Aronson, 1999; Walton & Wilson, 2018). This reduces reactance and increases the likelihood that students might be open to internalizing some of the intervention message for themselves.

Second, the utility-value intervention is similar to other interventions designed to help students connect their motives for learning with what they are learning in school. The *communal-value intervention* asks students to reflect on how their communal values, such as helping others, might connect with doing research in biology (Brown, Smith, Thoman, Allen, & Muragishi, 2015). The *prosocial purpose intervention* prompts students to think about how getting an education will enable them to help other people or make a difference in the world (Yeager et al., 2014). Instead of focusing on one type of value, the utility-value intervention allows students to make the choice about how the course connects to their lives. In this way, the utility-value intervention offers students more flexibility in terms of what type of utility value they will perceive in the learning content, whereas the communal and prosocial interventions focus students on those specific aspects of utility value.

Third, the utility-value intervention inspired us to develop a *parent intervention*. We developed materials for parents of high school students that highlighted how STEM courses were related to the students' current and future lives, and provided guidance on how parents could talk to their teens about these connections. This intervention enabled parents to have more nuanced and supportive conversations with their teen about how math and science related to his or her current interests and potential future educational and career pathways, and it increased parents' positive attitudes about the importance of STEM, the number of conversations they had with their teen, and most importantly, the number of STEM courses students took in high school and college (e.g., Harackiewicz, Rozek, Hulleman, & Hyde, 2012; Rozek, Svoboda, Harackiewicz, Hulleman, & Hyde, 2017).

Fourth, the *relevance affirmation intervention* is a combination of the utility-value intervention and the value-affirmation intervention (Kizilcec & Cohen, 2017). In