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Value Reappraisal as a Conceptual Model for Task-Value Interventions

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ABSTRACT

We discuss task-value interventions as one type of relevance intervention and propose a process model of value reappraisal whereby task-value interventions elicit cognitive-affective responses that lead to attitude change and in turn affect academic outcomes. The model incorporates a metacognitive component showing that students can intentionally self-regulate their subjective task values. Two potential moderators of this process are proposed: baseline individual differences and classroom-level factors. We review evidence for the proposed relationships in the model and identify gaps in the literature. Drawing from models of persuasion and self-regulation, we discuss theoretical foundations of the value-reappraisal model and propose value-reappraisal strategies involved in the modification of subjective task values and reasons for (or against) task engagement. We also outline implications for designing task-value interventions and future research directions. The value-reappraisal model could help inform the continued development of task-value interventions and explain intervention effects.

KEYWORDS

Achievement; attitudes; expectancy value theory; interest; motivation; reflective thinking; self-regulation

STUDENTS OFTEN WONDER, "Why am I being asked to learn this subject? How is this used in the real world? What will learning this do for me?" Students' answers to these questions can affect their motivation and the extent to which they learn. To foster students' learning and motivation, researchers have developed and investigated interventions designed to help students find *personal relevance* (i.e., the extent to which an object, for example, an academic task, is perceived to be personally meaningful or significant; Priniski, Hecht, & Harackiewicz, this issue) in their coursework. Some relevance interventions have focused on modifying course content so that it is more appealing, relevant to students, and applicable to the real world (see Harackiewicz, Smith, & Priniski, 2016; Walkington, 2013; Woolley, Rose, Orthner, Akos, & Jones-Sanpei, 2013). Other relevance interventions, such as utility-value interventions (e.g., Hulleman, Godes, Hendricks, & Harackiewicz, 2010) and value-reappraisal interventions (Acee & Weinstein, 2010) have focused on modifying students' perceptions about the value of academic tasks without changing the content students are being asked to learn. We refer to this latter category of relevance interventions as *task-value interventions*.

These interventions involve (a) *task-value messages,* which communicate reasons for why academic tasks may be relevant to students, and/or (b) *task-value activities,* which ask students to generate responses, often through writing, about why academic tasks are relevant to them. Expectancy-value theory (Eccles & Wigfield, 2002) has been used to help operationalize the *subjective task values* targeted in these interventions. For example, researchers have targeted students' perceptions about the usefulness of academic tasks to their own lives (Hulleman et al., 2010) and the importance of academic tasks to aspects of their identity (Johnson & Sinatra, 2013). In general, research has found positive effects of

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these interventions on students' subjective task values, continued interest, and achievement (Acee & Weinstein, 2010; Hulleman et al., 2010). However, much less is known about the mechanisms through which these interventions work.

Although expectancy-value theory emphasizes factors involved in the development of subjective task values over time, such as the cultural milieu (Eccles & Wigfield, 2002), it does not adequately explain the cognitive processes involved in reappraising the value of academic tasks. Researchers (e.g., Gaspard et al., 2015; Hulleman et al., 2010) have suggested that generating personal relevance connections is critical to modifying subjective task values, and Acee and Weinstein (2010) have proposed value-reappraisal strategies that students could use to make these connections. Moreover, Wolters and Benzon (2013) have found that students report intentionally modifying their own subjective task values in order to increase their motivation, and they have proposed facets of motivational regulation that could be targeted through instruction.

In addition, there is a long history of theory and research in social psychology focused on understanding how people's attitudes change in response to messages (e.g., Greenwald, 1968; Hovland, Janis, & Kelley, 1953). Models of persuasion (e.g., Chaiken, 1980; Petty & Cacioppo, 1986) share a general framework that suggests that the effect of a message on attitude change is mediated by a person's cognitive responses to the message. The more actively one processes a message, the more likely one's attitude is to change. This implies that the more actively a person thinks about why an academic task is relevant, the more likely their subjective task values are to change. Based on our review of literature, however, we found no theoretical model that incorporates all of these perspectives and emphasizes the importance of elaboration, or active processing, in the modification of subjective task values. Furthermore, given the various intervention approaches used and variables studied within task-value-intervention research, there is a need for a conceptual model that organizes independent, dependent, mediating, moderating, and contextual variables studied within task-value-intervention research.

The purpose of this article is to propose the value-reappraisal model of task-value intervention effects (value-reappraisal model, for short) and discuss its theoretical foundations, which are rooted in models of persuasion, self-regulation, and expectancy-value theory. The value-reappraisal model (a) identifies and organizes key variables within task-value-intervention research, (b) delineates the process through which task-value-interventions influence academic outcomes, (c) emphasizes strategies for regulating subjective task values, and (d) provides a blueprint for designing task-value interventions and conducting future research.

After providing an overview of the value-reappraisal model, we briefly describe expectancy-value theory, review research on task-value interventions, summarize evidence supporting proposed relationships in the value-reappraisal model, and identify gaps in the literature. To help address some of these gaps, we review models of persuasion (Greenwald, 1968; Petty & Cacioppo, 1986) that emphasize the importance of effortful elaboration in attitude change. Then, we propose three general categories of value-reappraisal strategies students could use to engage in effortful elaboration and regulate their attitudes and motivation toward academic tasks (Acee & Weinstein, 2010). Moreover, we discuss facets of motivational regulation (i.e., meta-level knowledge, monitoring, and control; Wolters & Benzon, 2013) that could be addressed in instruction aimed at teaching students to use value-reappraisal strategies. We end by discussing the implications of the value-reappraisal model for designing task-value interventions and conducting future research.

Overview of the value-reappraisal model

The value-reappraisal model shows the process through which task-value interventions affect academic outcomes (see Figure 1). This process model begins with the implementation of a task-value intervention. We have divided task-value interventions into four main parts: task-value messages (e.g., videos with quotes from students about why they think engineering is relevant), task-value activities (e.g., prompts that ask students to generate rationales about why learning engineering is personally relevant), internal structure of the intervention (e.g., the order in which students receive task-value messages and activities), and administrative procedures (e.g., when the intervention is administered during the

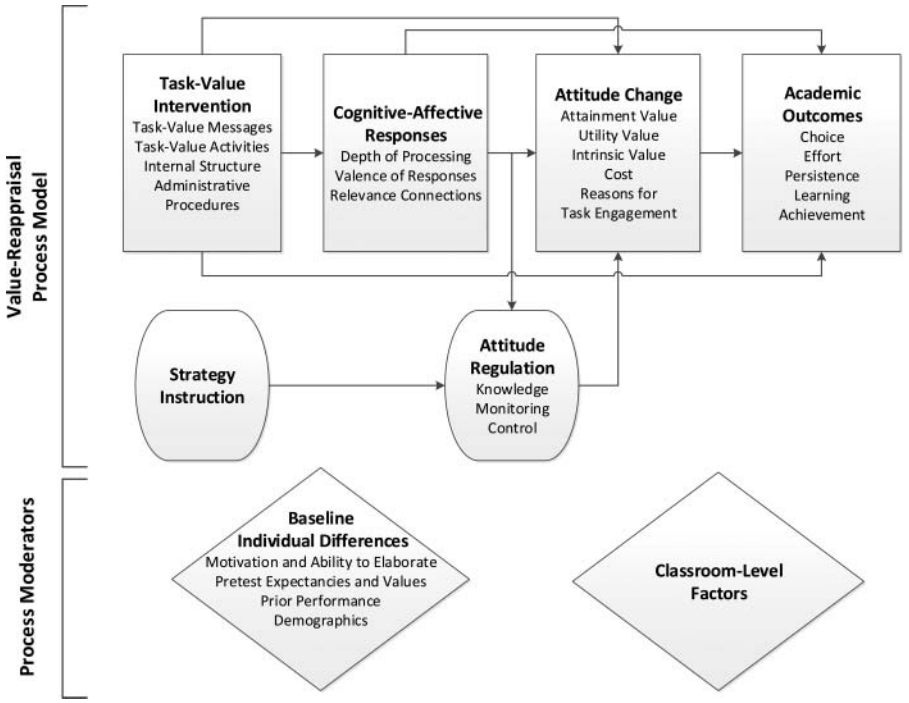

Figure 1. The value-reappraisal model depicts a process whereby task-value interventions elicit cognitive-affective responses that induce attitude change and in turn affect academic outcomes. The model also shows that strategy instruction could be incorporated within task-value interventions to help students self-regulate their own attitudes. The value-reappraisal process assumes temporal precedence of each model component, moving chronologically from left to right. Arrowed lines indicate possible direct and indirect relationships among model components involved in this process. Two moderators of the value-reappraisal process are shown: baseline individual differences and classroom-level factors.

semester). These parts of the intervention are under the researcher's control and can be manipulated to investigate different intervention approaches.

When students receive a task-value intervention, it in turn elicits immediate *cognitive-affective responses* (i.e., overt and covert thoughts and feelings) in students. Students' cognitive-affective responses that are recorded as part of a task-value activity, or measured later retrospectively, can be used to help predict the magnitude and direction of students' attitude change. We have incorporated into the model three characteristics of students' cognitive-affective responses as potential mediators of attitude change: depth (i.e., the degree to which students actively processed information about the value of the academic task or domain), valence (i.e., the ratio of positive to negative appraisals and affect regarding the academic task or domain), and relevance connections (i.e., the quantity and quality of relevance connections made within different categories, for example, the number of connections made with intrinsic versus extrinsic goals).

For the purposes of this model, *attitude change* refers to the extent to which students' attitudes about academic tasks, courses, and disciplines change from baseline over time; this includes changes in students' subjective task values (Eccles & Wigfield, 2002; Eccles et al., 1983) and other related constructs that address students' reasons for task engagement, such as perceived instrumentality (Husman, Derryberry, Crowson, & Lomax, 2004). The model also shows that attitude change influences academic outcomes, such as effort, choice, persistence, learning, and achievement. Both students' cognitive-affective responses and attitude change are thus viewed as key mediators of intervention effects on academic outcomes. Other paths are also included in the model to indicate direct effects of the intervention on academic outcomes and direct effects of the intervention on attitude change.

The value-reappraisal process thus comprises task-value interventions, cognitive-affective responses, attitude change, and academic outcomes, but we have also imposed a metacognitive layer to

the value-reappraisal process to show that students can proactively and intentionally regulate their attitudes. Applying the three facets of motivational regulation proposed by Wolters and Benzon (2013), we have included an *attitude regulation* component to the value-reappraisal model that involves (a) developing meta-level knowledge of one's attitudes, how attitudes influence motivation, and strategies for regulating attitudes; (b) monitoring one's attitudes and motivation; and (c) taking action to control one's attitudes to enhance motivation and learning. Moreover, we have added a *strategy instruction* component to show that attitude regulation could be taught to students as part of a task-value intervention. Therefore, the metacognitive layer of this model includes three facets of attitude regulation and strategy instruction for attitude regulation. Finally, the model includes two moderators of the value-reappraisal process to show that the effects of task-value interventions may depend on students' baseline individual differences (e.g., pretest expectancies, pretest values, prior performance, and demographics) and classroom-level factors (e.g., instructor differences and classroom climate). In sum, the value-reappraisal model helps to identify, organize, and describe key variables within task-value-intervention research and possible relationships among these variables.

Expectancy-value theory

A major tenet of expectancy-value theory (Eccles & Wigfield, 2002; Eccles et al., 1983) is that motivation for an academic task is a function of students' expectations about successfully performing the task and the degree to which they value the task. The theory describes the development of students' expectancies for success and subjective task values and identifies a number of factors that influence this development, such as the cultural milieu, socializer's beliefs and behaviors, and previous achievement-related experiences (see Eccles & Wigfield, 2002). In this theory, expectations of success and subjective task value are the most proximal determinates of achievement-related choices and performance. Research has found that students' expectations for success and subjective task values predict their motivation and achievement (Simpkins, Davis-Kean, & Eccles, 2006; Wigfield & Eccles, 2000). More specifically, studies have shown that students' subjective task values tend to be stronger predictors of continued interest in an academic discipline and expectancies tend to be stronger predictors of academic achievement (Wigfield & Eccles, 2000). The four components of subjective task value outlined in expectancy-value theory are *attainment value* (i.e., the extent to which a task is generally important or important for expressing or confirming one's identities), *utility value* (i.e., the usefulness of a task to current and future goals), *intrinsic value* (i.e., the extent to which a task is interesting and enjoyable), and *cost* (i.e., perceived costs of task engagement such as time, effort, negative emotions, and lost opportunities; Eccles & Wigfield, 2002; Eccles et al., 1983). Subjective task values thus constitute the reasons students have for and against task engagement, and task-value interventions function to help students endorse reasons for task engagement.

Task-value interventions

In this section, we review different types of task-value interventions conducted with students in post-secondary and secondary educational contexts and highlight evidence of direct, indirect, and moderating relationships outlined in the value-reappraisal model. Much of the research on task-value interventions has specifically targeted utility value, because it is believed to be amenable to change through educational intervention (Harackiewicz et al., 2016) and instrumental to the development of individual interest (Hidi & Renninger, 2006). However, interventions have also targeted attainment value (Johnson & Sinatra, 2013), multiple subjective task values (Acee & Weinstein, 2010), and other student perceptions concerning their reasons for task engagement (Eccles & Wigfield, 2002), such as endogenous instrumentality (Acee & Weinstein, 2010), communal and agentic utility value (Brown, Smith, Thoman, Allen, & Muragishi, 2015), and autonomous and controlled motivation (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004).

For the purposes of this paper, it is sufficient to understand the difference between directly communicating and asking students to self-generate task value (for further review, see Priniski et al., this

issue). Task-value activities that ask students to self-generate utility value have typically asked students to write a rationale, with specific examples, that explains why learning course concepts could be personally useful or relevant. Research has found positive effects of self-generated utility-value interventions on students' perceptions of utility value (e.g., Hulleman et al., 2010). Intervention effects on performance, however, have been found to be moderated by students' baseline individual differences such as perceived competence (Hulleman & Harackiewicz, 2009) and racial/social class (Harackiewicz, Canning, Tibbetts, Priniski, & Hyde, 2016). Findings from these studies suggest that self-generated utility-value interventions may be more effective for students who are at risk of low performance.

Task-value messages communicate the potential value of specific academic tasks and domains to students. The effects of interventions that directly communicate utility value have been found to depend on other factors including the rationales used within the message and the individual differences of the students receiving the message. For example, Shechter, Durik, Miyamoto, and Harackiewicz (2011) found that emphasizing proximal, everyday uses of learning a mental multiplication technique had positive effects on interest and self-reported effort for students from Western cultures. However, for students from Eastern cultures, emphasizing distal, academic and career uses had stronger effects. This suggests that some rationales might be more or less persuasive for particular groups of students. Research conducted using a self-determination theoretical framework has found that framing a task in terms of its usefulness to intrinsic goals (e.g., personal growth and bettering society), and not in terms of its relation to extrinsic goals (e.g., wealth and image), can help students endorse personally meaningful reasons for task engagement and improve task performance (e.g., Vansteenkiste et al., 2004).

Research that combines task-value messages and activities has shown that presenting students with task-value messages before completing task-value activities may yield stronger effects on attitude change and academic outcomes than using either approach alone. For example, Canning and Harackiewicz (2015) analyzed the main and interactive effects of directly communicated and self-generated utility value on students' attitude change, interest, and performance on a mental multiplication task. For students with low perceived competence, they found that self-generated utility value had positive effects on students' interest and task performance. Directly communicated utility value, which included messages about the relevance of the mental math technique to different careers and everyday activities, yielded negative effects for this group of students. However, combining both directly communicated and self-generated utility value had positive synergistic effects for students with low perceived competence on utility value, task performance, and interest. Content analysis of students' written responses suggested that the combined intervention seemed to help students with low perceived competence to generate more responses related to everyday leisure activities. The authors suggested that making connections with everyday leisure activities might be more relevant and less threatening to students with low confidence than making connections with future careers.

Acee, Flaggs, Hoang, Scanlon, and VanderLind (2016) found that a combined intervention yielded stronger effects on attitude change compared with an intervention that used only task-value activities. To explain these results, these researchers speculated that providing students with task-value messages could give students various ideas about a task's relevance and make engagement in the subsequent task-value activity more fruitful, because it may be easier to retrieve and elaborate reasons for why learning course content is personally relevant. Similarly, Gaspard et al. (2015) suggested that combined interventions could help elicit reflection processes and lead students to generate more relevance connections.

Researchers have also developed interventions that combine task-value messages and activities with other approaches, such as instruction for self-regulating attitudes (Acee, 2009; Acee & Weinstein, 2010), threat inoculation and role models (Gaspard et al., 2015), and task-value inductions using fictional narratives (Johnson & Sinatra, 2013). For our purposes, however, we will review only value-reappraisal interventions. Acee and Weinstein (2010) developed a value-reappraisal intervention for college students in introductory statistics courses. The intervention included task-value messages and activities and incorporated instruction designed to help students generate awareness of their attitudes and self-regulate their attitudes by using strategies. The task-value messages addressed attainment, utility, and intrinsic value in developing knowledge and skills in statistics. The task-value activities asked students

to use various *value-reappraisal strategies*. For example, the intervention involved the students' brainstorming and generating rationales about the relevance of developing knowledge and skills in statistics, imagining themselves in future situations in which having learned statistics would be valuable, and contrasting the pros and cons of learning statistics. The authors found positive effects of the intervention on task value and a choice-behavior measure of continued interest. The intervention had a positive effect on exam performance in one section of the course but not the other. The authors speculated that these interventions may have stronger effects in academic contexts that do not adequately support students' learning and motivation, because the need for such interventions may be higher. These findings suggest that the particular combination of approaches used in the value-reappraisal interventions was effective at inducing attitude change in task value and continued interest and that classroom-level factors may function to moderate the effects of task-value interventions.

Summary

Task-value messages, activities, and their combined effects can help students find personal relevance in their coursework and facilitate academic success. Our review highlights some evidence regarding direct and moderating relationships outlined in the value-reappraisal model. In general, research supports that task-value interventions can induce positive attitude change in students' perceptions of task value. Studies have also suggested that the effects of task-value interventions on academic outcomes can be moderated by classroom-level factors and baseline individual differences. However, several studies also reported direct effects of interventions on academic outcomes such as choice behaviors (Acee & Weinstein, 2010), free-choice persistence (Vansteenkiste et al., 2004), conceptual change (Johnson & Sinatra, 2013), and test performance (Vansteenkiste et al., 2004). There has been much less research examining indirect effects; however, some studies have found that intervention effects on academic outcomes were mediated through attitude change in utility value (Hulleman et al., 2010), autonomous motivation (Vansteenkiste et al., 2004), and communal utility value (Brown et al., 2015).

Gaps in the research

Theory and research on task-value interventions have not adequately addressed strategies students can use to modify their subjective task values and instructional approaches for teaching students to self-regulate the use of these strategies. In addition, because elaboration is a key variable in social psychological models of persuasion (Petty & Cacioppo, 1986), more attention should be given to the instrumental role of elaboration in attitude change. Although researchers have emphasized the importance of searching for and elaborating personal-relevance connections through task-value writing activities (Gaspard et al., 2015; Hulleman, Kosovich, Barron, & Daniel, 2016), elaboration has not been integrated within expectancy-value theories. In addition, the mediating role of students' cognitive-affective responses to interventions has been understudied. The value-reappraisal model incorporates theory and research on persuasion and motivational regulation to help address these gaps.

Theoretical foundations of the value-reappraisal model

In this section, we review models of persuasion and emphasize the importance of effortful elaborative processing for creating lasting attitude change. Drawing from social psychological research, we propose three general types of value-reappraisal strategies that can facilitate changes in students' subjective task values and reasons for task engagement. We conclude the section by reviewing facets of motivational regulation that help to explain students' proactive, intentional use of strategies for modifying their attitudes and motivation.

Elaboration likelihood model of persuasion

An *attitude* has been defined as an evaluation (e.g., positive versus negative, favorable versus unfavorable) of an object of thought and may concern anything a person can think of including people, places,

things, and ideas (Bohner & Dickel, 2011). Dual-process models (e.g., Chaiken, 1980; Petty & Cacioppo, 1986) of persuasion concern attitude change through information processing, typically in response to persuasive messages. These models emphasize active, effortful processing of message content as a key mediator to attitude change, but they also include hypotheses about attitude change through superficial, less effortful processing. The elaboration likelihood model (ELM; Petty & Cacioppo, 1986) is one dual-process model of persuasion. A full description of the ELM and the plethora of research conducted using the ELM is beyond the scope of this article (see Petty & Briñol, 2012, for a review). Here, we summarize major tenets of the ELM and highlight ideas from persuasion research we believe may be particularly useful for educational research on personal relevance.

A key construct in the ELM is elaboration (Petty & Cacioppo, 1986). Within this model, *elaboration* is the extent to which people actively reflect about and scrutinize issue-relevant information in a persuasive message. Emphasis on elaboration in attitude change originated from a long history of research dating back to Hovland et al.'s (1953) message-learning approach; Janis and King's (1954) research on role-playing; and somewhat later, the cognitive-response approach to persuasion (Greenwald, 1968). This early work helped to show that idiosyncratic thought—elaborating, transforming, and self-generating arguments—was critical to attitude change (Vogel & Wanke, 2016), whereas attention to and learning of message content were weakly associated with attitude change (Eagly & Chaiken, 1993). For example, Janis and King (1954) found that participants who were asked to play the role of a sincere advocate of a given perspective and to present arguments in support of that perspective had stronger attitude change compared with participants who were asked to listen to messages containing identical arguments (Vogel & Wanke, 2016). Janis (1959) pointed to the selective searching of information to support one side of an argument and the process of self-generating arguments as explanations of attitude change in role-playing paradigms. However, later research suggested that self-generating arguments was only an effective self-persuasion strategy when the arguments felt easy to generate (see Wanke, 2013).

Accordingly, the *ease-of-retrieval effect* suggests that when people make an appraisal of an attitude object, they are more likely to endorse arguments that are easy to retrieve and less likely to endorse arguments that are harder to retrieve (Vogel & Wanke, 2016). For example, research has found that asking participants to retrieve a large number of arguments favoring a position can undermine persuasion attempts when participants find it difficult to come up with that many arguments (see Wanke, 2013). In addition, research on the *mere-thought effect* (Tesser, 1978) has shown that just thinking about an attitude object, even in the absence of a persuasive message, can result in stronger attitudes. Early research on persuasion, thus, helped to establish the critical role of elaboration in attitude change, which remains central to more-contemporary models, such as the ELM.

Building from this previous research, the ELM (Petty & Cacioppo, 1986) incorporates assumptions of the cognitive-response approach to persuasion (Greenwald, 1968; Petty, Ostrom, & Brock, 1981) as follows: (a) effortful elaboration of a message increases the potential for attitude change; (b) the cognitive responses elicited through elaboration mediate the effect of the message on attitude change; (c) cognitive responses can be favorable, unfavorable, or neutral to the position advocated in the message; and (d) to the extent that a greater proportion of favorable responses outweighs a smaller proportion of unfavorable responses, attitude change should occur in the direction advocated in the message and vice versa (Vogel & Wanke, 2016). The thought-listing technique was developed and used to study cognitive responses as mediators of attitude change (Greenwald, 1968). In this technique, participants are asked to freely list any thoughts that they have while being exposed to a persuasive message. Then, the researchers use content analysis methods to categorize the cognitive responses listed by participants, typically as favorable, unfavorable, or neutral. Using this technique, numerous studies have shown that attitude change can be predicted by the valence of participants' cognitive responses to a persuasive message (see Eagly & Chaiken, 1993). Whereas effortful elaboration can increase the likelihood and strength of attitude change, the valence of one's cognitive responses is critical to explaining the direction of attitude change.

To address limitations in the cognitive-response approach due to its sole reliance on explaining attitude change through effortful processing, the ELM postulates two routes to persuasion (Petty & Cacioppo, 1986). The *central route* refers to attitude change that occurs through effortful elaboration of issue-relevant arguments contained in the message, whereas the *peripheral route* refers to attitude

change that occurs through less effortful processing of factors peripheral to the content of the message (e.g., the attractiveness and trustworthiness of the message source). Examples of peripheral-route processes include evaluative conditioning (i.e., change in the perceived valence of an attitude object because of its pairings with another stimulus; Walther, Nagengast, & Traselli, 2005), heuristic processing (i.e., judgmental rules that can be quickly activated and used, for example, "experts make good arguments"; Chaiken, 1980), and mere exposure (i.e., favoring things that are familiar; Zajonc, 1968). Therefore, elaboration is on a continuum from high to low, and persuasion can occur at either end of the continuum. Furthermore, peripheral cues should play a stronger role in persuasion under low-elaboration conditions, whereas issue-relevant message content should play a stronger role under high-elaboration conditions (Petty & Cacioppo, 1986).

Supporting ELM hypotheses about the consequences of these two routes to persuasion, research has found that persuasion through the central route is more likely to result in lasting attitude change that is more resistant to counterpersuasion and predictive of behavior, whereas persuasion through the peripheral route is more likely to promote temporary attitude change (Ajzen & Cote, 2008; Bohner, Erb, & Siebler, 2008). In addition, effortful elaboration has been found to depend on a person's motivation and ability to process a message, making lasting attitude change less likely for those with lower motivation and ability to process a message. The ELM assumes that people are motivated to hold "correct" attitudes that have adaptive utility (Bohner et al., 2008; Petty & Cacioppo, 1986). However, because people have a limited capacity to engage in effortful processing, they often rely on peripheral cues to process persuasive messages. Motivation and ability to process the messages are, thus, two important individual differences that help to determine elaboration likelihood.

The ELM has more recently incorporated *self-validation*, which involves metacognitive, or secondary, evaluations about the validity of one's own thoughts and attitudes (Petty & Briñol, 2015). For example, a student might have an attitude that mathematics is useless but also evaluate this attitude as incorrect and undesirable to maintain. A key notion of self-validation is that thoughts evaluated as cognitively valid (or correct) and affectively valid (or likable) are more likely to be used in making judgments than thoughts evaluated as incorrect and unlikable (see Petty & Briñol, 2015, for a review).

In sum, the ELM postulates that attitude change can occur under high- and low-elaboration conditions but that high elaboration leads to stronger attitudes. In addition, the likelihood that an individual will engage in high or low elaboration is a function of the characteristics of the persuasive message (e.g., argument quality and message source) and characteristics of the individual receiving the message (e.g., motivation and ability to process the message). Finally, the magnitude and direction of attitude change is mediated by the depth and valence of people's cognitive responses to the message and their evaluations of the validity and likeability of their own thoughts and attitudes.

The ELM offers important insights for research on personal relevance and points to a number of variables that may be worth investigating, such as elaboration likelihood, cognitive responses, argument quality, message source, and motivation and ability to engage in the intervention. Based on the ELM and its underlying research, we have incorporated into the value-reappraisal model cognitive-affective responses as key mediators of task-value intervention effects on attitude change. We have also highlighted the critical role of effortful elaboration in the value-reappraisal process. However, the ELM does not differentiate strategies people use to engage in effortful elaboration, nor does it address instructional approaches that could be used to guide people in using such strategies. Next, we review value-reappraisal strategies students could use to actively consider the potential value of academic tasks and thereby change their attitudes about those tasks.

Value-reappraisal strategies

One way to encourage central-route processing is to ask students to complete activities that instruct them to actively reflect on an attitude object and produce an elaborate response. A primary strategy used in task-value activities has been to ask students to self-generate arguments explaining why an academic task is useful or personally relevant (Gaspard et al., 2015; Hulleman et al., 2010). Similarly, persuasion research considers arguing and counterarguing to be critical processes instrumental to attitude

change (Petty & Cacioppo, 1986). However, Acee and Weinstein (2010) suggested that other strategies may also be instrumental to attitude change. Based on a review of social psychological literature, they identified three general categories of value-reappraisal strategies and incorporated them into their intervention. *Value-reappraisal strategies* refer to active approaches to processing that facilitate changes in an individual's subjective task values or reasons for (or against) task engagement. The following is a brief review of literature on three strategies: generating rationales, imagining future possible selves and situations, and contrasting pros and cons of task engagement.

Generating rationales

Gawronski and Bodenhausen (2006) have suggested that propositional reasoning is a fundamental mental process involved in the formation and change of explicit attitudes. Propositional reasoning involves making syllogistic inferences about issue-relevant propositional information to inform evaluations about attitude objects (Bohner & Dickel, 2011; Gawronski & Bodenhausen, 2006). Using information stored in an associative network, propositions are formed (e.g., a pleasant experience writing a paper may be transformed into the proposition "I enjoy writing"). The validity of these propositions is assessed, via syllogistic reasoning, by checking the consistency of each proposition with other propositions pertinent to the evaluation of the attitude object.

Reasoning processes are also instrumental in assigning utility value to an object. For example, goal-based reasoning involves identifying actions that can lead toward one's goals, evaluating the utility of these actions relative to alternative actions, and reevaluating the utility of these actions when changes occur in one's circumstances or goals (Walton, 2015). Generating rationales about the personal relevance of academic tasks should help facilitate students' engagement in reasoning processes and thereby lead to attitude change. Accordingly, this strategy has been shown to help students make relevance connections and positively reappraise the utility value of academic tasks (e.g., Gaspard et al., 2015; Harackiewicz et al., 2016; Hulleman et al., 2010). In these studies, students are typically asked to generate an argument favoring only one side of the issue (i.e., why an academic task is personally relevant). The selective searching of information to support this one side combined with effortful elaboration involving reasoning and the self-generation of arguments may help to explain the effectiveness of this strategy. Gaspard et al. (2015) also tested another approach that asked students to evaluate the personal relevance of arguments that were given to them, and this approach was also found to induce positive changes in subjective task values.

Imagining future possible selves and situations

Singer's (1975) early work on daydreaming suggested that humans commonly engage in imaginative processes and that these processes help to integrate cognition, emotion, and motivation. Since then, there have been a number of theoretical developments and empirical investigations on *mental simulation*, the process of imagining and generating alternative realities and other constructs that have been associated with or subsumed under this term, such as daydreaming, transportation, perspective taking, and possible selves (Markman, Klein, & Suhr, 2009). Here, we briefly review research on possible selves and argue that imagining future possible selves is instrumental in shaping attitudes and motivating behavior.

Generating *possible selves* involves envisioning one's self in future states (Oyserman & James, 2009). Markus and Nurius (1986) suggested that imagining possible selves can shape identities and build schemata that serve to motivate people toward the futures they envision. Exploring different possible selves can help individuals gain insights about which future roles and identities they value and who they want to become, or who they fear to be, in the future. For example, imagining one's self as an engineer might feel "right" and induce a positive attitude toward this career path, or envisioning one's self as a career musician might feel conflicting and give rise to reasons for why this career path is not worthwhile.

In addition, desired and feared possible selves can serve as a basis for assigning value to task engagement (Oyserman & James, 2009). For example, imagining oneself putting effort into studying and graduating with honors, a future self as a "good student," or envisioning oneself on academic probation, a future self as a "bad student," can add personal relevance to a potential course of action (e.g.,

saying no to hanging out with friends and instead studying). Research has suggested that imagining an academic possible self can increase its saliency and motivate students toward academic goals (see Oyserman & James, 2011). For example, Ruvolo and Markus (1992) found that students assigned to imagine being successful on a task because of hard work persisted longer and put more effort into the task than students assigned to a positive-mood-inducing control condition and three other imagery manipulations (success due to luck, failure due to luck, failure despite hard work). Moreover, students who imagined a "success due to hard work" future self were quick to endorse descriptions that aligned with this envisioned self and reject those who did not.

These findings show that imagining a possible self can make it more saliently accessible and influence motivation. However, research has also suggested that merely imagining future states that are rosy and easy to reach or ruminating about negative future states is insufficient to motivate students and may even demotivate them (Kappes, Oettingen, & Mayer, 2012). Oyserman and James (2009) argued that possible selves are more likely to activate self-regulatory behavior when it comprises detailed and concrete imagery, aligned with one's identities, perceived to be proximal in temporal distance to one's current self, and associated with strategies that can be enacted in the present to obtain the desired future (for a review of research, see Oyserman & James, 2011). The body of research on possible selves suggests that the process of envisioning oneself in the future may be a powerful strategy for shaping attitudes and directing behavior in academic contexts. Adapting this strategy for task-value interventions might involve designing activities that ask students to imagine themselves in future situations in which having developed knowledge and skills in an academic discipline could be useful or relevant (Acee & Weinstein, 2010).

Comparing pros and cons of task engagement

Social psychological researchers studying mental simulation (Markman & McMullen, 2003; Oettingen, Pak, & Schnetter, 2001) and decision-making (Kardes, 2013; Payne, Bettman, Coupey, & Johnson, 1992) have recognized that comparative processing can influence attitude change and motivation. Comparing the pros and cons of different alternatives is commonly regarded as one part of the decision-making process (Payne et al., 1992; Yates & de Oliveira, 2016). However, persuasion research suggests that comparative processing is more effortful than selective processing (Kardes, 2013), and people do not tend to carefully compare the various attributes of different alternatives unless they are motivated to engage in effortful processing (Sanbonmatsu, Vanous, Hook, Posavac, & Kardes, 2011) or asked to do so (Wang & Wyer, 2002). Often, people examine a single alternative or attribute and evaluate it based on its own worth (Kardes, 2013; Sanbonmatsu, Posavac, Kardes, & Mantel, 1998). For example, making a decision about how much effort to expend on a lab report for a chemistry course could be approached using less-effortful selective processing (e.g., only considering the costs of exerting moderate effort to inform one's decision) or using more-effortful comparative processing (e.g., comparing the benefits and costs of exerting moderate versus high effort).

Although research has identified a number of decision biases that can occur under selective- and comparative-processing conditions (Kardes, 2013), research has also suggested that effortful decision-making that incorporates comparative processing can result in more-accurate decisions (Payne et al., 1992) and positively predict one's desire to enact behavior toward a goal (Bagozzi, Dholakia, & Basuroy, 2003) and goal realization (Dholakia & Bagozzi, 2002). Bagozzi et al. (2003) differentiated between *goal desire* (i.e., wanting an end state) and *implementation desire* (i.e., wanting to implement action targeted as a means to an end state). *Decision-process effort investment* (i.e., effortful comparison of alternatives and time invested in the decision) positively predicted implementation desire in one model and positively predicted goal realization in another model when implementation desire was excluded. This implies that asking students to engage in more-effortful comparative processing of their reasons for and against pursuing academic goals may help them move more thoroughly through the decision-making process and lead them to generate stronger commitments to the goals they endorse. Using comparison strategies within task-value-intervention research might involve asking students to generate arguments for and against the personal relevance of learning course material and to choose which argument is truer for them (Acee & Weinstein, 2010).

Markman and McMullen (2003) postulated that comparative thinking involves *reflection* (i.e., imagining the self in an alternative reality) and *evaluation* (i.e., comparing the envisioned alternative reality, as the reference point, to one's current standing). One strategy that involves comparative thinking is mental contrasting. *Mental contrasting* involves first envisioning a desired future (e.g., being accepted to a nursing program) and then imagining the realistic obstacles standing in the way of that future (e.g., maintaining at least a 3.0 GPA; Oettingen, Kappes, Guttenberg, & Gollwitzer, 2015). This strategy helps to make the future and reality simultaneously accessible for comparison (Oettingen et al., 2001). Elaborating the desired future first establishes it as the reference point from which the present reality appears as something that needs to be acted on in order to realize the desired future.

In a study focused on helping males excel in mathematics in vocational school, Oettingen et al. (2001) asked students to contrast a desired future pertaining to excelling in mathematics with current obstacles standing in the way of that future. They found that mental contrasting induced students with high expectations to feel more energized to act toward the desired future and achieve at higher levels compared to students who only imagined a desired future or current obstacles. In addition, mental contrasting led those with low expectations to put in less effort compared to their student counterparts in the other two groups. These findings support the hypothesis that mental contrasting effects are moderated by success expectations and that mental contrasting can provoke individuals to adopt and commit to goals that are feasible and abandon goals that are not. Research on this strategy has found similar patterns of results across various domains (e.g., education and health), cultures, and age groups (see Oettingen, 2012). Although mental contrasting has not been found to affect people's values or expectations, these findings suggest that mental contrasting may lead people to place greater emphasis on their success expectations as a reason for (or against) task engagement and goal pursuit.

In sum, generating rationales and imagining possible selves are two strategies that students could use to promote positive attitudes toward academic tasks. In addition, comparing the pros and cons of task engagement (e.g., through comparative processing or mental contrasting) could help students strengthen their commitment to the task when the result of the comparison suggests to them that the task is desirable and feasible (Heckhausen & Kuhl, 1985). Next, we discuss the intentional use of value-reappraisal strategies to regulate one's attitudes and motivation.

Motivational regulation

Self-regulated learning refers to the proactive, intentional regulation, and cyclical adaptation, of one's thoughts, feelings, and behaviors to more effectively and efficiently reach learning goals. According to Zimmerman (2000), there are three cyclical phases to self-regulation: forethought, performance/volitional control, and self-reflection. In the forethought phase, students set goals and strategically plan how to reach those goals. In addition, various motivational beliefs, values, and goals that underlie goal-setting and strategic planning may be activated. During the performance/volitional control phase, students implement their strategic plan and monitor and control their attention, effort, and use of task strategies for reaching their goal. In the self-reflection phase, students evaluate their goal progress, identify the causes of their success or failure, and experience various affective reactions and self-judgments. As a cyclical process, self-reflection informs future goal setting and planning and helps individuals learn from their mistakes and capitalize on their strengths. Pintrich (2004) suggested that during each phase of self-regulation, students could intentionally regulate four areas: cognition, motivation/affect, behavior, and context. Much of the research on self-regulated learning has focused on students' self-regulated use of cognitive learning strategies; however, much less attention has been given to motivational regulation strategies.

Motivational regulation strategies

Wolters (2003) described *motivational regulation strategies* as any procedure that is used intentionally to influence one's own motivation. Through a synthesis of research, Wolters identified various strategies such as goal-oriented self-talk, interest enhancement, environmental restructuring, self-handicapping, attribution control, efficacy management, emotion regulation, and self-consequating. Some of the

strategies he identified involved activating and/or modifying subjective task values. For example, Wolters (1998) found that students reported using strategies to enhance their interest (e.g., making studying into a game) and increase the personal relevance of a task (e.g., thinking about how it is related to one's career path).

Regulation of situational interest and self-consequating strategies add a new layer to our discussion, which has thus far primarily focused on strategies that involve searching for and elaborating authentic personal relevance connections between course content and one's self. Using these strategies, students might also intentionally modify the structural features of a task (e.g., making it into a game) or modify means-end connections (e.g., making watching a movie contingent on studying) to artificially increase subjective task values for the purpose of generating and sustaining motivation. Self-regulating value involves similar thought processes to self-generating utility-value connections (Hulleman et al., 2010). However, the self-regulation approach adopted in the value-reappraisal model specifically seeks to teach students to purposefully use strategies to manage their attitudes and motivation.

Strategy instruction for motivational regulation

Wolters and Benzon (2013) suggested that motivational regulation involves at least three facets: knowledge, monitoring, and control of motivation. *Knowledge* refers to students' metacognitive understanding of their own motivation under different circumstances; their theories or beliefs about what motivates and demotivates them across different situations; and their declarative, procedural, and conditional knowledge about strategies they could use to regulate their motivation. *Monitoring* involves observing motivational processes unfold during a task and gathering feedback that could be useful for understanding and regulating one's motivation. *Control* refers to the intentional regulation of motivation through the use of strategies (e.g., targeting the activation or modification of attitudes, beliefs, and goals).

These three facets of motivational regulation could be targeted when teaching students to use motivational regulation strategies. Weinstein and Acee (2013) described a similar framework for teaching cognitive and motivational strategies in learning-to-learn courses. Similarly, their framework emphasized strategy knowledge and metacognitive processes. They also highlighted the importance of using guided practice with feedback. Consistent with these perspectives, teaching students to use value-reappraisal strategies might involve (a) asking students to reflect about their attitudes, how their attitudes influence their motivation, ways in which their attitudes are malleable, and reasons why they might want to modify their attitudes; (b) teaching them about value-reappraisal strategies (to build declarative knowledge), instructing them how to use these strategies (to develop procedural knowledge), and helping them consider future conditions in which these strategies might be worth using (to expand conditional knowledge); and (c) providing students with opportunities to practice monitoring and regulating their attitudes and motivation and using guided practice with feedback to scaffold their strategy development. Finally, the overall tone of strategy instruction should be autonomy supportive (Deci & Ryan, 2008).

In sum, strategy instruction for motivational regulation may involve (a) engaging students in metacognitive processing to help them develop knowledge of motivation, monitor their motivation, and control their motivation; (b) fostering the generation of declarative, procedural, and conditional strategy knowledge; (c) using guided practice with feedback to scaffold strategy learning; and (d) infusing autonomy support throughout.

Implications for future research

A growing body of research on personal-relevance interventions and long history of research on persuasion provide a wealth of insights for designing task-value interventions. Here, we briefly discuss some of these insights for designing task-value messages and activities. Our review of research shows that the rationale used within a message matters. One type of rationale that has been found to yield effects on autonomous motivation and academic outcomes regardless of students' baseline individual differences is to emphasize the usefulness of a course task to intrinsic goals (see Vansteenkiste et al.,

this issue). Perhaps one reason this type of rationale resonates well with students is because it targets universal psychological needs for autonomy, competence, and relatedness. Other rationales, however, may work better for some students and worse for others. For example, emphasizing future careers may rouse negative reactions in students with low-success expectations, but facilitate interest for those with high-success expectations (Canning & Harackiewicz, 2015). Pretesting various arguments with members of a target population and then using the arguments that participants most strongly and consistently endorse has been one approach used to develop quality arguments in persuasion research (Vogel & Wanke, 2016). For example, researchers have asked people to rate the quality of arguments (Axsom, Yates, & Chaiken, 1987) or report their thoughts about the arguments (Petty & Cacioppo, 1986) to determine which arguments were stronger. In-depth pretesting of different arguments could help researchers figure out which arguments are generally favorable across groups and why particular subgroups favor certain rationales over others.

Using an autonomy-supportive rather than a controlling communication style may be another important strategy for designing task-value messages. For example, Vansteenkiste et al. (2004) found that using controlling phrases such as "you should" and "you must" undermined intervention effects; whereas using autonomy-supportive language such as "you can" and "if you choose" enhanced intervention effects. Finally, research on persuasion and conceptual change have found that the characteristics of the message source such as the source's similarity (Thompson & Malaviya, 2013), likeability (Chaiken & Eagly, 1983), trustworthiness, and expertise (Lombardi, Seyranian, & Sinatra, 2014) can influence persuasion. Message sources such as parents (Harackiewicz, Rozek, Hulleman, & Hyde, 2012), pictures of career professionals embedded within a message (Durik, Shechter, Noh, Rozek, & Harackiewicz, 2015), and quotes from young adults (Gaspard et al., 2015) have also been incorporated within task-value interventions. In sum, the message rationale, communication style, and message source are three characteristics that might be targeted to improve task-value interventions and studied in future research.

A key to designing task-value activities is to engage students in effortful elaboration about the personal relevance of an academic task, course, or discipline. Strategies to facilitate effortful elaboration include asking students to generate rationales with specific examples (Hulleman et al., 2010), evaluate the personal relevance of given arguments (Gaspard et al., 2015), imagine future possible selves and situations, and contrast pros and cons of task engagement (Acee & Weinstein, 2010). Self-persuasion has been found to occur through generating arguments to convince another person (e.g., role-playing) and by trying to convince oneself. However, these approaches may work differently depending on the amount of effort one believes one must exert to convince oneself or another, as effort may increase elaboration likelihood (Briñol, McCaslin, & Petty, 2012). Prompting people to metacognitively evaluate how much they like and how confident they are in the validity of their own thoughts and attitudes may also influence attitude change (Petty & Briñol, 2015).

The value-reappraisal model could help to serve as a guide for future research because it organizes important factors studied in task-value-intervention research and specifies direct, indirect, and moderating relationships among these factors. An understudied component of this model is students' cognitive-affective responses. Persuasion research suggests that the depth and valence of these responses are key predictors of attitude change (Petty & Cacioppo, 1986). Some researchers have coded students' written responses to task-value activities and used these data to examine mediation (Harackiewicz et al., 2016) and compliance (Nagengast et al., this issue), and we believe these are two promising areas of future research.

One challenge to accurately measuring the valence dimension of students' cognitive-affective responses is that most task-value activities ask students to generate responses in favor of the personal relevance of a task. This makes it difficult to know the extent to which students' counterargued or felt resistant during the intervention. Asking students to generate arguments for and against the personal relevance of a task (Acee & Weinstein, 2010) could help capture this phenomenon. Another approach is to use self-report measures of counterarguing and resistance. Thought-listing techniques (Greenwald, 1968) could also be used to measure students' cognitive-affective responses to task-value messages.

Conclusion

In this article, we proposed the value-reappraisal model of task-value intervention effects. This model outlines causal paths through which task-value interventions may impact academic outcomes, identifies process moderators, and incorporates a metacognitive layer that emphasizes attitude regulation. To build a theoretical basis for this model, we synthesized theory and research on expectancy-value theory, task-value interventions, models of persuasion, and motivational regulation. We summarized findings from task-value interventions, highlighted evidence supporting some of the proposed relationships in the value-reappraisal model, and emphasized the role of task-value messages, activities, and combined approaches in helping students to find personal relevance in their coursework.

We demonstrated how attitude formation and change are applicable to scholarly inquiry on fostering personal relevance in academic contexts. Drawing from models of persuasion, we emphasized that effortful elaboration is critical to producing lasting attitude change and that cognitive responses are key predictors of the direction of attitude change. Synthesizing social-psychological research on reasoning, decision-making, and mental simulation, we proposed three general categories of value-reappraisal strategies that could be used to modify subjective task values and reasons for task engagement: generating rationales, imagining future possible selves and situations, and contrasting pros and cons of task engagement. These strategies show some of the different ways in which students might engage in effortful elaboration and influence their attitudes about academic tasks, courses, and disciplines. Integrating theory about facets of motivational regulation and strategy instruction, we outlined an instructional framework that could help inform how to teach students strategies for intentionally regulating their attitudes and motivation.

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