

THE ROLE OF EFFORT PERCEPTIONS IN EVALUATIONS OF SUBJECTIVE TASK
VALUE IN PEERS

by

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(Under the Direction of Michelle R. vanDellen)

ABSTRACT

The situated expectancy-value theory of achievement motivation posits that student motivation can be viewed as a function of expectancies for success and subjective task value. Despite the potential motivational and behavioral consequences of perceptions of others, research has not yet investigated perceptions of the subjective task value of one's peers. In the present study, I examined perceptions of a peer's subjective task value as a function of perceived effort, beliefs about where a person draws effort from, and one's self-knowledge. Results from a pre-registered experiment provide evidence that beliefs about the source of effort and how much effort a person is putting into a task interact to predict perceptions of a peer's subjective task value in the domains of math and English. This research contributes to a broader understanding of the various mental tools people use when making inferences about the motivational states of others.

INDEX WORDS: Self-regulation, Motivation, Person-perception, Situated expectancy-value theory

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CHAPTER 1

INTRODUCTION

People frequently make inferences about the internal states of others and use these inferences as social information to help them determine how to think about and interact with the social world. There are many mental tools or heuristics that people use to make such inferences, including (a) perceptions of another person's behavior, (b) incorporating one's beliefs about the world, and (c) referring to one's knowledge of the self as a reference point. One context in which these inferences occur is self-regulation. People make inferences about the motivational states of others and these inferences have both self-regulatory and interpersonal consequences. In the current study, I examine perceptions of the motivational construct of subjective task value as a function of perceived effort (perceptions of behavior), beliefs about where a person draws effort from (incorporating one's beliefs about the world), and one's own subjective task value (knowledge of the self).

Theories of Motivation in Educational and Social Psychology

The situated expectancy-value theory of achievement motivation (SEVT) posits that a student's intentions, choice, persistence, and achievement outcomes are a function of a) their beliefs about how successful they will be at a given task and b) the subjective value that they associate with that task (Eccles & Wigfield, 2020). A person's subjective task value (STV) has important motivational implications for both intentions and observed behavior. Measures of subjective task value are strong predictors of a person's intentions to engage in a task (Battle & Wigfield, 2003; Perez et al., 2014; Wigfield & Eccles, 2020). For example, in college women, valuation of graduate education relative to other goals (e.g., family-oriented goals), predicted intentions to attend graduate school (Battle & Wigfield, 2003). Additionally, dimensions of STV

(e.g., attainment value, interest value) predict task-related decisions, including choice of high school and college courses, college major, and broader career aspirations (Durik et al., 2006).

Subjective task value has four dimensions—attainment value, interest value, utility value, and cost—each of which play a role in the cumulative value a student associates with an academic behavior. Task values reflect different qualities of a task and the extent to which a task meets a student’s specific needs and desire to engage in a task (Eccles & Wigfield, 2020; Wigfield, 1994). Although researchers utilizing a situated expectancy-value theory framework typically examine these constructs within the academic domain, the importance of the four dimensions of subjective task value are echoed by a rich history of motivational theories across multiple fields. Incorporating situated expectancy-value theory into the study of self-regulation more broadly will provide valuable insights into motivational processes across a variety of domains.

One theory of motivation that consists of constructs similar to situated expectancy-value theory’s dimensions of utility, interest, and attainment value is posited by Touré-Tillery and Fishbach (2018). The researchers outline three sources of motivation in goal pursuit, each of which reflect a different motivational focus or driver of behavior: a) obtaining external rewards, b) obtaining internal rewards, and c) maintaining a positive self-concept (Touré-Tillery & Fishbach, 2018). A motivation to obtain external rewards results in a focus on the outcome of a given task. A motivation to obtain internal rewards facilitates a focus on the process of goal pursuit. Lastly, when one is motivated by a desire to maintain a positive self-concept, they focus on how a task or goal-related behavior is indicative of one’s sense of self (Touré-Tillery & Fishbach, 2018). The extent to which a person’s goal pursuit is being driven by each of these motivational foci has downstream consequences on how motivated they feel to pursue a given

goal-related task, what factors increase their motivation, and in turn their rate of goal progress. For example, a student who is focused on the outcome of goal pursuit (e.g., getting good grades in math class) will be receptive to information about how completing particular tasks will help them achieve their desired outcome (e.g., completing an extra credit assignment will increase their grade by five points). Conversely, a student who is focused on the process of goal pursuit should be more receptive to information about the extent to which the process of studying or completing assignments for math class is enjoyable. The three sources of motivation proposed by Touré-Tillery and Fishbach (2018) are conceptually similar to Wigfield and Eccles' (2020) utility, interest, and attainment value constructs, respectively. In situated expectancy-value theory terms, utility value is determined by the extent to which a task is perceived as useful for achieving one's short or long-term goals (e.g., an outcome focus). Interest value reflects the intrinsic enjoyment one gets from the process of engaging in a task (e.g., a process focus). Lastly, attainment value is defined as the importance of doing well on a task in relation to one's core values and self-perceptions of identity (Wigfield & Eccles, 2020) (e.g., a focus on the self).

A prominent theory of self-regulation similarly highlights three dimensions of motivational orientations as intrinsic, extrinsic, and self-focused (Ryan & Deci, 2019), which are conceptually similar to situated expectancy-value theory's interest, utility, and attainment value constructs. Self-determination theory outlines three psychological needs that are fundamental to each person's growth and wellbeing—autonomy, competence, and relatedness—and the motivational consequences of fluctuations in these basic needs. Ryan and Deci (2019) argue that although the three basic needs do not reflect actual motives in and of themselves, people are sensitive to fluctuations in such needs leading people to modulate their self-regulatory behavior in pursuit of these higher-order psychological needs. Situated expectancy-value theory and self-

determination theory are similar in that both seek to explain goal-directed behavior as a function of a person's needs and values; however, they take somewhat different approaches in the particular relationships they focus on. Situated expectancy-value theory focuses on the compatibility between individual needs and features of a task as drivers of goal-directed behavior, while self-determination theory focuses on three fundamental psychological needs as drivers of goal-directed behavior. Moreover, although situated expectancy-value theorists posit that goal-directed behavior is driven largely by task values reflecting the needs and preferences of the individual, self-determination theory seems to additionally suggest that prioritization of different task values, or types of motivation, occurs in response to fluctuations in three basic psychological needs. Furthermore, Ryan and Deci (2019) posit that there are three *motivational orientations* reflecting a person's tendency to focus on specific needs and their corresponding motives. These three motivational orientations—autonomy, controlled, and impersonal—are functionally similar to Touré-Tillery & Fishbach's (2018) sources of motivation, and reflect a focus on intrinsic, extrinsic, and self-concept related motives, respectively (Ryan & Deci, 2019).

Another theory of self-regulation that incorporates dimensions of motivation similar to the dimensions of subjective task value is goal systems theory (Kruglanski et al., 2002). Kruglanski and colleagues (2002) conceptualize goal pursuit as a function of various cognitive and motivational properties. The cognitive properties of a goal system can be further broken down into *structural*—reflecting the links between goals and means of pursuit, and *allocational*—a principle highlighting that goal pursuit is resource dependent. Within the goal systems framework, intrinsic motivation is conceptualized as one of the structural properties of a goal system, that increases when a task (or means to achieving a goal) is perceived as its own end. This total “means-end fusion” represents one end of a continuum, while the other end is

extrinsic motivation—wherein the action and its goal are viewed as completely separate (Kruglanski et al., 2002; Touré-Tillery & Fishbach, 2018). Although intrinsic motivation is often considered to originate from internal rather than external sources, goal systems theory highlights more specific sources of how people develop such motivation, namely from enjoying the process of goal pursuit itself, as well as how the means of pursuing the goal are connected to its outcome (Kruglanski et al., 2002). Whereas intrinsic motivation as defined by goal systems theory is rather expansive, the foundation of the construct—enjoyment of goal pursuit—is in line with that of situated expectancy-value theory. Additionally, goal systems theorists conceptualize goal commitment as a function of a) the extent to which a person expects to attain a desired end state, and b) the subjective value associated with the desired end state. This is consistent with situated expectancy-value theorists’ conceptualization of academic motivation and behavior as a function of expectancies for success and subjective task value (Wigfield & Eccles, 2020).

An additional motivational construct that is incorporated into many theories of self-regulation is goal conflict: the experience a person has when confronted with two conflicting courses of action—one that advances progress toward a long-term motivation and another that is desirable in the short-term, but will hinder progress toward a long-term goal. Managing goal conflict is an important part of persistent goal pursuit. Consequently, multiple models of self-regulation offer insight on the role of goal conflict in goal-directed behavior (Gillebaart & de Ridder, 2015; Kruglanski et al., 2002; Myrseth et al., 2009; Shah et al., 2002). Goal conflict can be conceptualized as one type of cost, defined by Wigfield and Eccles (2020) as what an individual has to give up or go through to engage in a given task.

In summary, many existing theories of self-regulation in both the educational and social psychological domains seek to understand goal-directed behavior as a function of various

dimensions of value reflecting the extent to which a given means of goal pursuit fulfills a person's needs or aligns with their broader values and self-perceptions. While acknowledging that there are nuanced distinctions between these constructs as they appear in different literatures, I argue that these different perspectives contain a common thread: goal-directed behavior is driven by a variety of forces that reflect a person's needs, values, self-concept, and motivational tendencies. Although these constructs are given different names across the literature, in the present research I will evaluate four dimensions of subjective task value through the lens of situated expectancy-value theory—intrinsic, attainment, utility, and cost.

Perceptions of Motivation in Others

Parsing goal-directed behavior into multiple dimensions of motivation—a common thread in many theories of self-regulation—helps researchers to understand what motivational forces drive goal-directed behavior. Through the current research, I aim to combine this line of research with work from the person-perception literature to advance understanding of perceptions of motivation in others. Although researchers have gathered much knowledge about the various drivers of self-regulation, there remains a need to understand what tools observers use when making inferences about the motivation of others. This is an important gap to fill because perceptions of others have downstream consequences on how people behave toward them (Snyder et al., 1977). For example, people are more willing to offer support to a friend's goal pursuit when they perceive their friend as committed to the goal (vanDellen et al., 2025, manuscript in preparation). In an academic context, prior research has found that peers can influence a student's motivation and academic performance (Burgess et al., 2018; Shin & Ryan, 2014; Zimmerman, 2003), suggesting that students look to peers for social and motivational information. In the present study, I seek to evaluate perceptions of effort, beliefs about effort, and

self-knowledge as potential tools that students use when assessing the subjective task value of a peer.

Inferences Based on Perceived Effort

People frequently make inferences about the internal states of others (Funder, 2012), which are then used to make predictions about another person's behavior (Anderson et al., 2003). Because people do not have access to the cognitive processes of those they interact with many psychological theories exist to attempt to understand what mental shortcuts people use to make deductions about such internal experiences (Carlson et al., 2013; Anderson & Sedikides, 1991; Miller & McFarland, 1987). One way people make such inferences about the internal states of others is by observing the behavior of others (Anderson et al., 2003). Through the present study, I will evaluate whether effort—which can serve as a behavioral cue—influences the inferences students make about the motivation of their peers.

Although in the context of the present study, I operationalize effort as time spent on a task, which is an observable behavior, it should be noted that not all forms of effort are directly observable. Some forms of effort are relatively easy for observers to perceive, such as the number of steps in a task and the amount of time spent on a task (Dunn et al., 2019; Langan & Kumar, 2019; Szekely & Michael, 2024). However, other types of effort—such as how mentally taxing a task was, or how much planning took place before beginning a task—are less apparent to observers, which could lead to discrepancies between self-reports and observer reports of effort. In the present study, I operationalize effort as the amount of time a person spends on a task, with longer time indicating higher effort. Although I will focus on an observable form of effort (i.e., time), it is important to acknowledge that non-observable forms of effort likely also play a role in potential discrepancies between actor and observer perceptions of motivation.

Inferences Based on Self-Knowledge

Another method people commonly employ to make inferences about the internal states of others is to refer to their knowledge about the self (Anderson et al., 2003). People use what they know to be true about themselves as a reference point when thinking about the internal states and looking for meaning in the behavior of others (Dunning & Hayes, 1996). For instance, in the absence of behavioral information, when asked whether a classmate likes math, a student may refer to their own feelings about math in order to make an inference about their classmate's opinion. Unfortunately, this strategy has the potential to facilitate inaccurate perceptions of others because self-representations tend to be idiosyncratic (Karylowski & Mrozinski, 2018). An additional problem with relying on one's self-knowledge is due to the high between-person variation in knowledge, beliefs, and prior experiences, two observers are likely to draw different conclusions about the mental experience of the same actor. In the current study, I investigate whether people use self-knowledge to make inferences about the motivation of others. I pursue this aim by measuring the subjective task value that a student associates with an academic domain and comparing it to their inferences about the subjective task value of a peer in the same domain.

Both of the approaches described above—inferences based on perceived effort and inferences based on self-knowledge—are fallible, and people often make mistakes when using such heuristics to make inferences about the mental states of those around them (Krueger, 2007). Because an observer's perceptions of another person will ultimately influence their subsequent behavior toward that person (Snyder et al., 1977), inaccurate evaluations regarding the motivations of another person have the potential to facilitate interpersonal conflict. In the context of the present study, I aim to explore the strategies (i.e., information obtained from observed

behavior, inferences based on an observer's self-knowledge) students use when making inferences about the subjective task value that a peer associates with a task. One such type of behavioral information students may use when making inferences about the subjective task value and intentions of others is perceived effort.

Sources of Effort: Task-Elicited Versus Self-Initiated

Through the present study, I aim to build on the work of Muenks and colleagues (2016) regarding the role of perceived source of effort in ability evaluations of other students. The two sources of effort outlined in their study were (1) task-elicited, which is caused by the difficulty of the task and (2) self-initiated, which originates from an individual's own motivation. Muenks and colleagues presented participants with multiple vignettes about students completing academic tasks using either low or high amounts of effort that was described as task-elicited or self-initiated and then asked them to evaluate each student's ability in the corresponding academic domain. Across three studies using similar methodology, the researchers found that when effort was framed as task-elicited, participants endorsed an inverse relationship between effort and ability, wherein high levels of effort were associated with low ability evaluations and low levels of effort were associated with high ability evaluations. Conversely, when effort was framed as self-initiated, participants endorsed a positive relationship between effort and ability evaluations (Muenks et al., 2016).

Miele and colleagues (2020) extended this work by measuring instead of manipulating perceived effort source to demonstrate that—in the absence of explicit information about effort source—college students have general beliefs about whether effort tends to be task-elicited or self-initiated. Furthermore, they refer to these beliefs when asked to evaluate the academic ability of themselves and others (Miele et al., 2020). The researchers found that beliefs about

effort source vary between academic domains (specifically, math and English). Consistent with the findings of Muenks and colleagues (2016), Miele and colleagues found that students who tended to perceive effort as being task-elicited rated others who expended relatively low effort as higher in ability than those who perceived effort as being self-initiated (Miele et al., 2020).

Through the current study, I extend these findings to the context of task valuations. Similar to how effort source beliefs moderate the relationship between level of expended effort and ability evaluations (Miele et al., 2020), such beliefs about the source of a target's effort may also play a role in inferences of subjective task value. I test this hypothesis by examining evaluations of a target's subjective task value as a function of an observer's pre-existing effort source beliefs and level of perceived effort expended by the target to complete a task. I expect that, for observers who believe effort to typically be self-initiated, participants will endorse a higher STV when the level of perceived effort expended by a target is high (vs low). This is because self-initiated effort originates from an individual's own motivation, which might suggest to an observer that a person who puts more effort into a task has more personal motivation to complete the task. To an observer, increased personal or self-motivation is likely to be perceived as an indicator that a task is valuable to the actor, which should lead to increased endorsement of perceived subjective task value. I have no particular hypothesis about the relationship between effort level and value perceptions when the effort source is believed to be task-elicited, although I expect the relationship to be weaker. Additionally, although measures of the four types of subjective task value tend to be highly intercorrelated (Arens et al., 2019; Linnenbrink-Garcia et al., 2018), reducing the possibility of detecting such effects, as an exploratory aim, I plan to evaluate ratings of the four dimensions of subjective task value between these two perceived sources of effort. For example, when effort level is high and the source of effort is thought to be

self-initiated, observers may be more likely to endorse a target's interest and utility value associated with a task relative to the other components of subjective task value.

The Present Study

This project, which aims to understand the information people use to make inferences about others, is important to developing an understanding of the nuances involved in interpersonal processes such as day-to-day interactions. Prior work has demonstrated that children as young as four hold the belief that academic performance is a function of effort level and ability (Muradoglu & Cimpian, 2020). The research outlined in the previous section (Muenks et al., 2016; Miele et al., 2020) demonstrates that beliefs about the source of a person's effort is also a part of this equation. In other words, when making peer evaluations, students consider not only the level of effort exerted, but also the source of that effort (either originating from the difficulty of the task or the peer's motivation). The primary aim of the current study was to demonstrate a connection between effort level, effort source beliefs, and evaluations of motivation in others. A relationship between these constructs would suggest that students use both observable behavior (level of expended effort) and their pre-existing beliefs about whether effort tends to be task-elicited or self-initiated (effort source beliefs) as information about the motivation of others. If this is the case, it suggests that people not only make evaluations of others based on how hard someone is trying or how skilled they are, but also whether or not they are perceived as valuing a given task.

Through the current study, I sought to address the following research questions:

1. Do college students use high effort (vs low effort) as evidence of STV when making inferences about another person's motivation?

2. Do college students' beliefs about whether effort tends to be task-elicited versus self-initiated influence how they think about the relationship between effort level and STV in a given academic domain?
3. Does one's own STV influence the STV they infer another person to associate with a similar task?

To address these research questions, I conducted a quantitative experiment in the form of an online survey using Qualtrics software. Effort level of the target (high/low) was manipulated within-subjects and academic domain (math/English) was manipulated between-subjects. There were two measured explanatory variables: (1) effort source beliefs and (2) participant subjective task value associated with a hypothetical task. Participants first read two vignettes—each featuring a student expending high or low effort to complete a task in one of two academic domains (math and English). They rated their perceived STV of each of the two targets. Then, participants completed a measure of effort source beliefs for math or English before reporting on their own STV associated with math or English. The outcome measure was level of participant endorsement of items measuring perceived subjective task value of the target. Through the present study, I tested the following hypotheses:

Hypothesis 1a: I expect to observe a main effect of effort level; targets who are perceived as putting in high (vs low) effort will be perceived as having higher STV (excluding the cost component) than low-effort targets.

Hypothesis 1b: I expect an interaction between effort level and effort source beliefs such that high effort will be associated with more perceived value than low effort when the source of the effort is thought to be self-initiated (vs task-elicited).

Hypothesis 2a: Perceived subjective task value ratings will be positively correlated with the participants' self-reported subjective task value in the same domain.

Hypothesis 2b: I expect an interaction between self-reported subjective task value and effort level of the target such that, when self-reported subjective task value is high, effort level of the target will have a larger effect on perceived task value of the target (i.e., there will be a larger gap between value perceptions in high vs low effort conditions when self-reported subjective task value is high).

Exploratory Aim

Prior work has found interest value and attainment value to be particularly strong predictors of self-reported intentions to engage in a task, relative to utility value and costs, although utility value has been empirically linked to achievement outcomes (Part et al., 2020). A secondary aim of the present study is to extend prior work by examining whether similar or distinct patterns exist in the context of inferences about other people. I will pursue this aim by investigating which of the four components of STV are the strongest predictors of perceptions of the motivation of a peer. The purpose of including all four components of subjective task value is to explore which such dimension(s) observers endorse most strongly when thinking about a peer's motivation and self-regulatory behavior.

CHAPTER 2

METHODS

Participants

Participants were recruited from the psychology department's SONA pool, which consists of undergraduate students majoring in psychology. Although this is a convenience sample, the academic nature of the tasks in the study will be particularly relevant for university students, making this a suitable sample for the present study. The target sample size was 400. An a priori sensitivity power analysis indicated that a sample size of 350 would provide 98.40% power (lower CI = 97.41, upper CI = 99.08) to observe an unstandardized beta coefficient of $-.10$ for the effort level x effort source beliefs interaction term and 98.20% power (lower CI = 97.17, upper CI = 98.93) to observe an unstandardized beta coefficient of $.10$ for the effort level x participant STV interaction term. Data collection took place for the duration of the Fall 2024 term and fell just short of the goal of 400 participants, resulting in a final sample size of 354. The total sample was composed of 71.2% women and 28.2% men; less than 1% of participants identified as non-binary. In terms of race, 66.7% of participants identified as White, 16.4% Asian, 7.6% Black, 6.8% Multiracial, and 1.1% Hispanic/Latine; less than 1% either identified with a race not listed or chose not to respond. The mean age of the sample was 18.67 years old ($SD = 1.14$).

Materials and Measures

Vignettes

Each participant read two vignettes presented in a random order (adapted from Miele et al., 2019). Each vignette describes a student completing an academic task. The student was be

described as expending a high level of effort in one vignette and a low level of effort in the other vignette. Additionally, the academic domain featured in both vignettes was either be math or English (randomly assigned). Sample vignettes are provided in Table 1.

Domain-Specific Subjective Task Value

The subjective task value components of utility value, interest value, and attainment value were measured using items adapted from Eccles & Wigfield (1995) to suit the context of the academic domain referenced in each vignette. A measure of the cost component of STV was be adapted from Flake and colleagues (2015). When completing these measures in relation to their self-reported STV, participants responded to the prompt, “please rate your agreement with the following statements” on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*). When completing these measures in regards to their perceptions of the hypothetical students described in each vignette, participants responded to the prompt “To what extent do you think [target] would agree with the following statements” on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*). Sample subjective task value items are included in Table 2.

Effort Source Beliefs

I used a measure developed by Miele and colleagues (2020) to capture participant beliefs about whether effort in a given academic domain (math/English) tends to be task-elicited or self-initiated. Participants read six vignettes, each featuring two college students who are in the same class completing the same assignment. One of the students was described as expending a high level of effort, while the other student was described as expending a low level of effort. Participants were asked to rate on a 6-point scale the likelihood that the harder working student worked harder due to task-elicited and self-initiated reasons (1 = *very unlikely*; 6 = *very likely*;

see Appendix A for full list of items). In line with Miele and colleagues' approach, a final score for each student was calculated by subtracting their mean judgment of self-initiated effort from their mean judgment of task-elicited effort. The resulting positive scores represent a disposition to perceive effort in others as task-elicited, while negative scores reflect a disposition to perceive such effort as self-initiated (Miele et al., 2020).

Procedure

After random assignment to condition (math or English domain), participants read two vignettes—both featuring a student completing an academic task (one high effort and one low effort). After reading each vignette, participants completed subjective task value measures to evaluate their perceptions of the values of the student described in the passage. Then, participants completed a measure of effort source beliefs (Miele et al., 2020) and reported on their own subjective task value, each of these measures corresponding to the academic domain featured in their vignettes. Finally, participants provided demographic information (gender identity, race, age).

Analysis Plan

To make interpretable comparisons between value perceptions at different levels of effort and effort source beliefs—and because self-ratings of STV tend to be highly correlated with one another—I calculated a composite score for each participant to represent the average of the four STV types (with cost reverse-scored). This was done by calculating the statistical mean of participants' responses to each of the ten questions that assessed subjective task value. The same process was used to create a composite participant subjective task value score, which represents

the participants' average self-reported subjective task value for the domain they were randomly assigned to (math or English).

To test the proposed hypotheses, I utilized a series of linear mixed-effects regression models to account for dependencies in repeated measures data. Because participants were exposed to both the high and low effort conditions, I entered participants into each model as nested random effects. All predictors (i.e., effort level, effort source beliefs, task domain, STV type) were entered as fixed effects. This mixed-effects design will allow me to capture both between- and within-subject variability in the effects of interest. The proposed analyses were conducted using the *lmer* function from the *lme4* package in R (Bates et al., 2015; R Core Team, 2021). I used a two-step process to test each model. In the first step, the outcome variable was regressed onto the main predictors and a random intercept variable nested within participants. In the second step, an interaction term was added to the model and an ANOVA test was used to compare the fit of the full model (main effects and interaction term) to the reduced model (main effects only).

Model 1 was designed to test the hypothesis that college students' pre-existing effort source beliefs account for variation in how they think about the relation between effort level and subjective task value (hypotheses 1a-1b). The dependent variable was the composite perceived subjective task value rating, and the fixed effects included effort level, effort source beliefs, and their interaction. Domain of the task was included as a covariate (math/English). To account for repeated measures and individual differences across participants, I specified a random intercept effect, nested within participant.

Model 2 was designed to test whether participant self-reported subjective task value would predict perceptions of a target's subjective task value in the same domain, and whether

effort level of the target moderated this effect (hypotheses 2a-2b). The dependent variable was the composite perceived subjective task value rating, and the fixed effects included effort level, participant self-reported subjective task value, and their interaction. As in Model 1, domain of the task was included as a covariate (math/English) and I specified a random intercept effect, nested within participant.

As an exploratory analysis, to evaluate whether value perceptions differ across the four types of STV, I examined these constructs individually through two additional linear mixed-effects models. In Model 3, the dependent variable was the perceived value rating, and the fixed effects included subjective task value type (four levels: cost, interest, attainment, utility), effort level, and their interaction. Consistent with the prior models, I will include the domain of the task as a covariate and specify a random intercept nested within participant. Model 4 was identical to Model 3, except the fixed effect for effort level will be replaced with effort source beliefs.

The intraclass correlation coefficient (ICC) is a measure of the total variance in an outcome measure that is due to cluster-level (i.e., within-person) effects. For Models 1 and 2, the intraclass correlation coefficient was equal to .051, indicating that approximately 5% of the variance in mean perceived subjective task value could be explained within subjects. For Models 3 and 4, the intraclass correlation coefficient was equal to .002, indicating that less than 1% of the variance in perceived subjective task value could be explained within subjects. Despite these relatively low intraclass correlation coefficients, I proceeded with mixed-effects modeling to remain consistent with my pre-registered analysis plan and due to the relative statistical benefits of linear mixed-effects modeling over repeated-measures ANOVAs (Brown, 2021).

CHAPTER 3

RESULTS

Descriptive Statistics

The sample average effort source belief score ($M = -0.71$, $SD = 1.11$) was significantly less than zero, $t(353) = -12.03$, $p < .001$, indicating that on average participants considered effort of the target to be self-initiated (vs task-elicited). Additionally, the mean effort source beliefs score for the English group was significantly lower than for the math group, $t(352) = -3.85$, $p < .001$, suggesting that participants viewed effort in the English domain as more self-initiated and less task-elicited than effort in the math domain. This is consistent with findings of Miele and colleagues (2020) who found students tended to view effort in the math (but not verbal) domain as more task-elicited than self-initiated. Correlations between variables of interest are presented in Table 3.

Model 1: Subjective Task Value Perceptions as a Function of Target Effort Level and Participant Effort Source Beliefs

Results from the model regressing subjective task value perceptions on target effort level, participant effort source beliefs, and their interaction while controlling for task domain indicated significant main effects of both effort level, $b = 1.82$, $p < .001$, and effort source beliefs, $b = 0.19$, $p < .001$. These main effects were qualified by an effort level by effort source beliefs interaction, $b = -0.34$, $p < .001$. As Figure 1 shows, targets who were described as putting in more effort were perceived to have higher subjective task value. Simple slopes analyses indicated the effect of effort was larger among people who believed the source of effort to be more self-initiated and less task-elicited (-1 SD of the mean effort source beliefs score; $b =$

-2.44, $p < .001$) compared to people with less self-initiated and more task-elicited (+1 SD of the mean effort source beliefs score; $b = -1.68$, $p < .001$) effort source beliefs. Furthermore, a likelihood ratio test favored the full model (with the interaction term) over the reduced model (main effects only), suggesting that the interaction term contributes meaningfully to explaining variability in subjective task value perceptions, $\chi^2(1) = 171.84$, $p < .001$. The observed main effect of effort level supports hypothesis 1a and the significant target effort level x participant effort source beliefs interaction supports hypothesis 1b.

Model 2: Subjective Task Value Perceptions as a Function of Target Effort Level and Participant Self-Reported Subjective Task Value

Results from the model regressing subjective task value perceptions on target effort level and participant self-reported subjective task value while controlling for task domain indicated significant main effects of both target effort level, $b = 2.01$, $p < .001$, and participant self-reported STV, $b = 0.10$, $p = .001$. However, the target effort level x participant self-reported subjective task value interaction did not reach significance, $b = 0.01$, $p = .721$. Additionally, a likelihood ratio test favored the simpler model (main effects only) over the model that included the interaction term, $\chi^2(1) = 0.13$, $p < .721$, suggesting that the interaction term does not contribute meaningfully to explaining the variance in perceived subjective task value. The finding that participant self-reported subjective task value was positively correlated with perceptions of a target's subjective task value in the same domain provides support for hypothesis 2a (main effect of participant self-reported STV). However, the small coefficient compared to that of target effort level suggests that people in this study relied more on perceptions of how hard the target was working on a task than on their own value associated with that task when making assessments of the target's subjective task value.

Furthermore, the lack of a significant target effort level x participant self-reported STV interaction does not support hypothesis 2b, suggesting that while both factors play a role in peer value perceptions, these effects operate independently of each other.

Model 3 (Exploratory): Subjective Task Value Perceptions as a Function of Target Effort Level and Type of Subjective Task Value

For ease of interpretability, and because the *lme4* package in R does not provide a test of the omnibus effect for categorical factors with more than two categories, I ran the *lmer* model through the *Anova* function in the *car* package (Fox & Weisberg, 2019) to obtain tests of significance for the omnibus effects. Results from the model regressing subjective task value perceptions on target effort level and STV type while controlling for task domain indicated significant main effects of target effort level, $\chi^2(1) = 300.67, p < .001$, and STV type, $\chi^2(3) = 236.59, p < .001$. These main effects were qualified by a significant target effort level x STV type interaction, $\chi^2(3) = 136.33, p < .001$. A likelihood ratio test indicated that model comparison favored the full model including the interaction term over the main-effects only model, $\chi^2(1) = 133.08, p < .001$. As depicted in Figure 2, decomposing the interaction indicated that for all four types of subjective task value (utility, interest, attainment, and reverse-scored cost), targets who were described as putting in more effort were perceived as having higher subjective task value. However, the relationship between target effort level and perceived subjective task value was strongest when attainment value was the STV type being assessed compared to the other three STV types, $b = -2.65, p < .001$. Additionally, the effect was smallest when (reverse-scored) cost was the STV type being assessed, $b = -1.36, p < .001$.

Model 4 (Exploratory): Subjective Task Value Perceptions as a Function of Participant Effort Source Beliefs and Type of Subjective Task Value

Because this model also included a factor with more than two levels, I used the *Anova* function in the *car* package (Fox & Weisberg, 2019) to obtain tests of significance for the omnibus effects. This model was identical to Model 3, except that target effort level was replaced with participant effort source beliefs as a predictor. Results indicated a significant main effect of subjective task value type, $\chi^2(3) = 155.51, p < .001$. There was not a significant main effect of participant effort source beliefs $\chi^2(1) = 1.95, p = .163$, or a significant STV type x effort source beliefs interaction, $\chi^2(3) = 3.80, p = .284$.

CHAPTER 4

DISCUSSION

The goal of the present study was to examine the role of effort perceptions, beliefs about the source of another person's effort, and the value one assigns to a task in perceptions of the subjective task value a peer assigns to a task in the same academic domain. Findings from the present study provide some support for my pre-registered hypotheses. My hypothesis that the targets' level of effort would interact with the participants' pre-existing beliefs about whether effort tends to be self-initiated or task-elicited to predict subjective task value perceptions was supported. These findings provide insight into whether and how students distinguish between effort and value in others. Prior work has found that, as early as elementary school, children are able to differentiate between effort and ability, and this differentiation depends both on how ability is conceptualized (Nicholls, 1978) and contextual factors such as the source of effort (Muenks et al., 2016). The finding that students' ratings of a peer's subjective task value change as a function of both effort level and effort source beliefs suggests that when looking to peers for social information, students not only think about ability and effort, but also the motivation behind a peer's behavior.

I found limited support for my hypotheses regarding the role of participant self-reported subjective task value in perceptions of a peer's subjective task value in the same domain. Although participant subjective task value was positively correlated with perceptions of a peer's subjective task value, this effect was much smaller than the effect of effort level of the target. Additionally, I did not observe the hypothesized participant subjective task value x target effort level interaction. Together, these findings suggest that, although people do seem to refer to their own self-knowledge and preferences when making inferences about the values of others,

behavioral information—such as amount of effort/time spent on a task—holds more weight in peoples’ minds when making such assessments. There are a few potential explanations for the decreased weighting of self-reported subjective task value in perceptions of others. First, people use behavior to inform their inferences about the internal states of others (Funder, 2012). In the case of the present study, participants were given information about the amount of time a peer spent on a task, and from this information, they made inferences about how much value a peer associated with the task. Additionally, contextual factors likely play a role in the inferences people make about the motivation of others. Participants in the current research were asked about academic tasks, and given social norms around commitment to academic success in the participant sample, there may have been limited variability in value inferences from the perceiver’s perspective. It is possible that in the absence of such behavioral and contextual cues, people would be forced to rely more heavily on self-knowledge when asked to report on their perceptions of the task value of others, leading to a stronger correlation between self-reported and perceived subjective task value.

Exploratory analysis revealed differences in the strength of the relationship between target effort level and subjective task value perceptions depending on which of the four types of subjective task value was being assessed. Specifically, this relationship was strongest when attainment value was being assessed and weakest—but still statistically significant—when cost was being assessed. These findings suggest that, when assessing the extent to which doing well on a task is important to another person’s core values and self-perceptions (i.e., whether a task has high attainment value), people rely on their perceptions of how much effort that person is putting into the task. Conversely, when making inferences about what one has to give up or go through to engage in a task (i.e., the costs of a task), observable effort is less important. One

interpretation of the latter effect is that effort can be perceived as having both costs and value (Inzlicht et al., 2018). Effort is often valued by society because of its costs, and accepting large costs in pursuit of a goal could suggest that the end goal is highly valuable to them. Therefore, observers seem to recognize that regardless of how hard someone is working on a given goal pursuit, they will still have to give things up (e.g., manage conflicting goals) to continue making progress. Costs may be an inherent assumption of exerting effort.

Theoretical and Practical Implications

The current research has multiple implications for theory and practice. First, findings from the present study could help to improve classroom dynamics, both for student-student and student-teacher interactions. Research on phenomena such as the Pygmalion Effect (Friedrich et al., 2015) demonstrates that teacher expectations have powerful downstream consequences for their behavior toward students in the classroom. The findings from the current research could inform the design of interventions aimed at teachers to reduce potential bias associated with making inferences about the value that their students assign to education. Similar to mindset interventions, which help teachers to view student ability as flexible rather than static (Dweck & Yeager, 2019), such trainings could encourage instructors to recognize when they are making assumptions about student motivation based on observations of effort. These interventions could increase the likelihood that all students are treated equally and viewed as having the same potential, regardless of prior performance.

Additionally, the present work deepens understanding of how students perceive the self-regulatory behavior of their peers. This has potential consequences for how perceptions of one's peers could influence student motivation. Research on peer influence and social contagion in academic contexts underscores the influential role of student perceptions of the motivation of

others in the classroom to their own self-regulation (Burgess et al., 2018). In the context of the present study, it is possible that if a student perceives their high-achieving peer to find math particularly valuable because of high effort, that student may draw the conclusion that they themselves must not find math valuable because they have not put forth high effort in their math classes. The findings of the current study could inform future work that helps researchers to understand not only how students perceive and behave toward their peers but could also add context to students' own self-regulatory behavior.

Furthermore, the current research has potential implications for how students form their academic self-concepts—beliefs about one's academic ability (Marsh, 1987). Research on social comparisons has found that people compare their own performance to the performance of high-achieving others in relevant domains (Festinger, 1954), and the nature of social comparisons have motivational and emotional implications (Lockwood & Kunda, 1997). In the field of educational psychology, the big-fish-little-pond effect is used to explain the effects of comparing oneself to one's peers on students' academic self-concepts. Specifically, this theory posits that when a student compares their performance to that of a high (low) achieving environment, the result will be reduced (increased) perceived academic ability (Marsh, 1987). The findings from the present study suggest a potential mechanism for such social comparisons could involve not only observations of a peer's effort and performance outcomes, but also beliefs about the motivations behind a high-achieving peer's academic behavior.

Although these patterns of value perceptions have only been empirically evaluated in the context of academic domains, they have potential repercussions for perceptions of other self-regulatory states (e.g., self-control) and social contexts. When thought of in the context of long-term goal pursuit, value is conceptually similar to goal commitment. Goal commitment reflects a

dedication to reaching a desired end state and people often experience greater commitment when the end goal is highly valuable to them (Kruglanski et al., 2018). Prior work on perceptions of goal commitment has found that observers perceive higher commitment in an actor who succeeds (vs fails) to exert self-control (vanDellen et al., 2025, manuscript in preparation) —an act that requires effort and/or willpower. Further, observers’ perceptions of commitment in turn predicted willingness to provide support to the actor’s goal pursuit (vanDellen et al., 2025, manuscript in preparation). These findings have implications for the present research because the processes of inferring goal commitment and subjective task value may be overlapping. This is reflected in the finding that observers use perceptions of effort when making inferences about goal commitment and subjective task value. If these processes are overlapping, discrepancies between self and observer perceptions of task value could lead to divergent expectations of support during goal pursuit, which has potential consequences for interpersonal relationships. Furthermore, future work should examine whether observers hold beliefs about the reason for an actor’s self-control failure (e.g., due to situational/task-elicited vs personal/self-initiated factors) and how such beliefs might play a role in the way observers conceptualize the relationship between observed behavior and perceived motivation. Lastly, future research should investigate the potential downstream effects of subjective task value perceptions and beliefs about the source of a peer’s effort on willingness to provide support to a peer. For instance, it is possible that peers and close others modulate the level or type of support they offer based on perceptions of why a person is pursuing a goal and how important that goal is to them.

Limitations and Future Directions

The finding that the relationship between target effort level and subjective task value perceptions was moderated by the type of subjective task value being assessed suggests that

observers do not just make inferences about a target's motivation in general, but perceive nuanced differences between types of motivation. Future work should investigate whether observers are accurate about such perceptions. Additionally, because the present study was a vignette study, there was no "true" subjective task value to compare to participant perceptions. A follow-up study could recruit students in a real classroom setting and evaluate the accuracy of perceptions of subjective task value of peers putting different amounts of effort into an actual task. This would extend the present findings on tools people use to make inferences about the motivations of others to whether such inferences are accurate.

Although two different academic domains were included in this study (math and English), further research is warranted to evaluate the role of subjective task value inferences in academic domains that were not addressed in the present study. For example, courses that are typically considered to require creativity, such as art and creative writing, were not included. Additionally, such classes are often considered electives for those who do not major in these topics, whereas courses such as math and English may be viewed more as requirements for one's degree. It is likely that students have different perceptions about the values of peers who are enrolled in these types of courses, compared to more "core" college courses. All of these contextual factors likely play a role in the evaluations people make about the motivations of others.

Additionally, it is important to take into account that not all effort is observable. In the current study, I used time spent on a task as an operationalization of effort level; however, there are many other forms of effort that are not apparent to an observer, such as how mentally taxing a task was, or how much mental planning went into a task. The finding that people use an observable form of effort when making inferences about the motivations of others suggests that there could be discrepancies in self and other perceptions of subjective task value due to non-

observable forms of effort. For example, a student could find math class highly valuable and highly mentally taxing, and therefore not dedicate as much time to their math assignments during class. An observer might construe this person as putting in low effort and therefore not valuing math as much as the students who are spending more time on their assignments. This is yet another reason future work is needed to examine the accuracy of perceptions of subjective task value in others.

It should also be noted that in the present study, I did not address expectancies for success or self-efficacy perceptions. The situated expectancy-value theory of achievement motivation posits that a student's intentions, choice, persistence, and achievement outcomes are a function of a) their beliefs about how successful they will be at a given task and b) the subjective value that they associate with that task (Eccles & Wigfield, 2020). Furthermore, one of the antecedents of task value is thought to be prior achievement (Weidinger et al., 2020). In the context of the current research, knowledge of someone's prior successes and failures in a given domain could contribute to perceptions of their subjective task value. Future research should incorporate perceptions of a target's expectancies for success in relation to perceptions of subjective task value and performance outcomes.

Finally, future research should aim to extend the present findings to non-academic contexts. In the current research, I found evidence that effort source beliefs and target effort level interact to predict perceptions of peer task value. A fruitful next step for researchers would be to test this model in the context of other types of tasks. This work would help researchers identify whether the process of perceiving motivation in others looks the same in other interpersonal contexts, such as coworkers, friendships, or romantic relationships.

Conclusion

Through the present study, I examined perceptions of a peer's subjective task value as a function of perceived effort, beliefs about where a person draws effort from, and one's self-knowledge and personal preferences. I found evidence that beliefs about the source of effort and how much effort a person is putting into a task interact to predict perceptions of a peer's subjective task value in the domains of math and English. Additionally, I found evidence that people refer to their own subjective task value when making inferences about the subjective task value of a peer. This research contributes to a broader understanding of the various mental tools people use when making inferences about the motivational states of others.

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TABLES

Table 1

Sample Vignettes

Condition (effort level, domain)	Vignette (adapted from Miele et al., 2020)
High effort, Math	Alex, a college student, is sitting in Calculus class when the professor gives the class a set of problems to work on individually. The class is given 15 minutes to complete the assignment, and Alex spends the full 15 minutes on the problems, concentrating hard, and putting in a lot of effort.
Low Effort, Math	Riley, a college student, is sitting in Linear Algebra class when the professor gives the class a set of problems to work on individually. The class is given 15 minutes to complete the assignment, and Riley spends only 12 minutes on the problems, putting forth relatively little effort.
High Effort, English	Alex, a college student, is sitting in English Literature class when the professor gives the class a writing assignment to work on individually. The class is given 15 minutes to complete the assignment, and Alex spends the full 15 minutes on the assignment, concentrating hard, and putting in a lot of effort.
Low Effort, English	Riley, a college student, is sitting in English Composition class when the professor gives the class a writing assignment to work on individually. The class is given 15 minutes to complete the assignment, and Riley spends only 12 minutes on the assignment, putting forth relatively little effort.

Table 2*Subjective Task Value (STV) Scale Sample Items*

STV Type	Sample Items
Utility Value	“What I learn in math [English] class is very useful to my future goals”; “Compared to most other activities, what I learn in math [English] class is very useful”
Attainment Value	“For me, being good at math [English] is very important”; “Compared to most other activities, being good at math [English] is very important to me”
Interest Value	“In general, I find working on math [English] assignments to be very interesting”; “I like doing math [English] very much”
Cost	“Math [English] class demands too much of my time”; “I have to sacrifice too much to be in math [English] class”

Note. Participants responded to each item on a 7-point scale (1 = Strongly disagree, 7 = Strongly agree).

Table 3*Correlations for Variables of Interest*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Effort source beliefs	-0.71	1.11	-				
2. Interest value perceptions	3.70	1.58	0	-			
3. Attainment value perceptions	4.72	1.69	.03	.81**	-		
4. Utility value perceptions	3.88	1.56	-.04	.79**	.79**	-	
5. Cost ratings (reverse-scored)	4.38	1.34	.06	.72**	.66**	.62**	-

Note. ** $p < .01$

FIGURES

Figure 1

Perceived Subjective Task Value (STV) Predicted by Target Effort Level and Participant Effort Source Beliefs

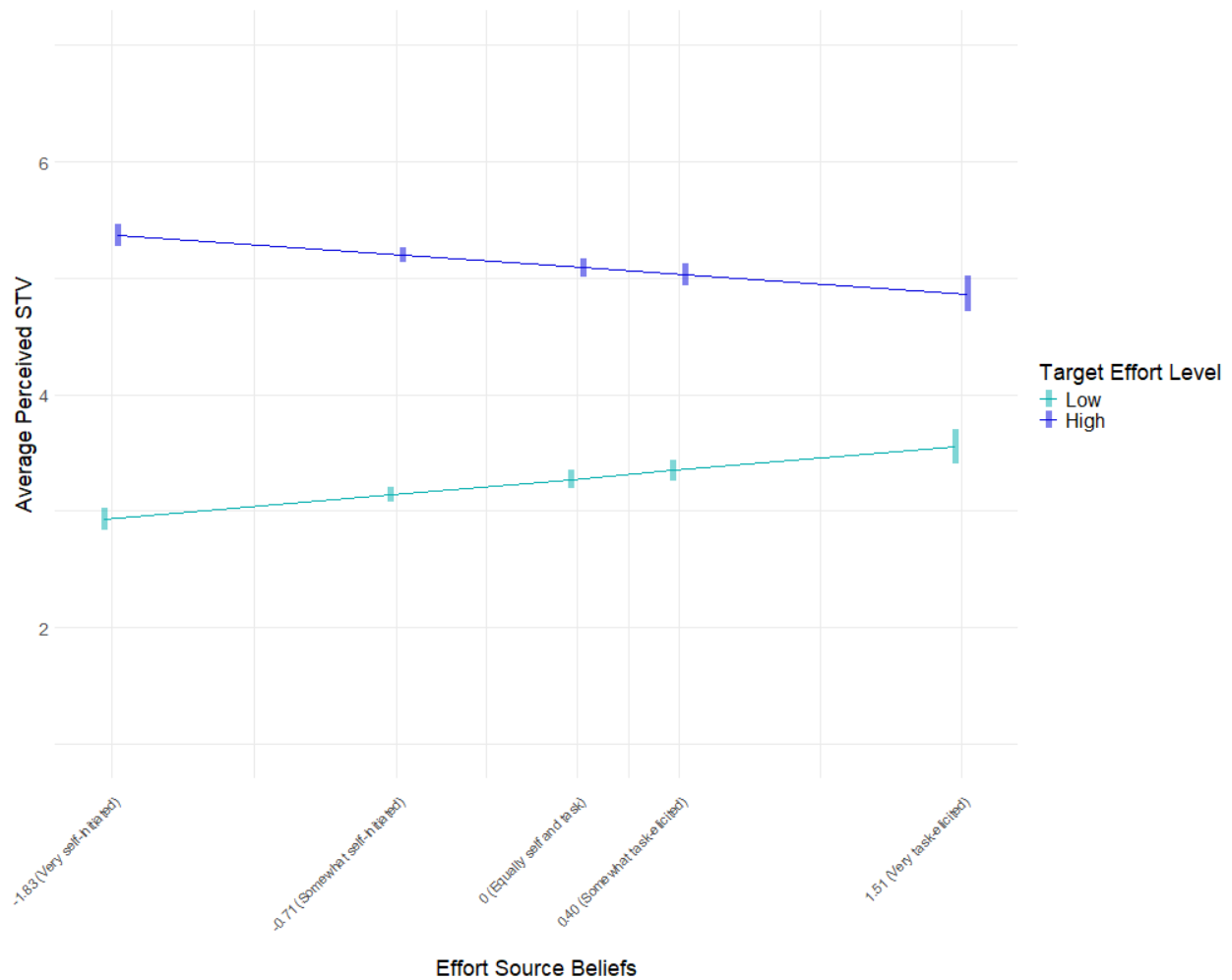
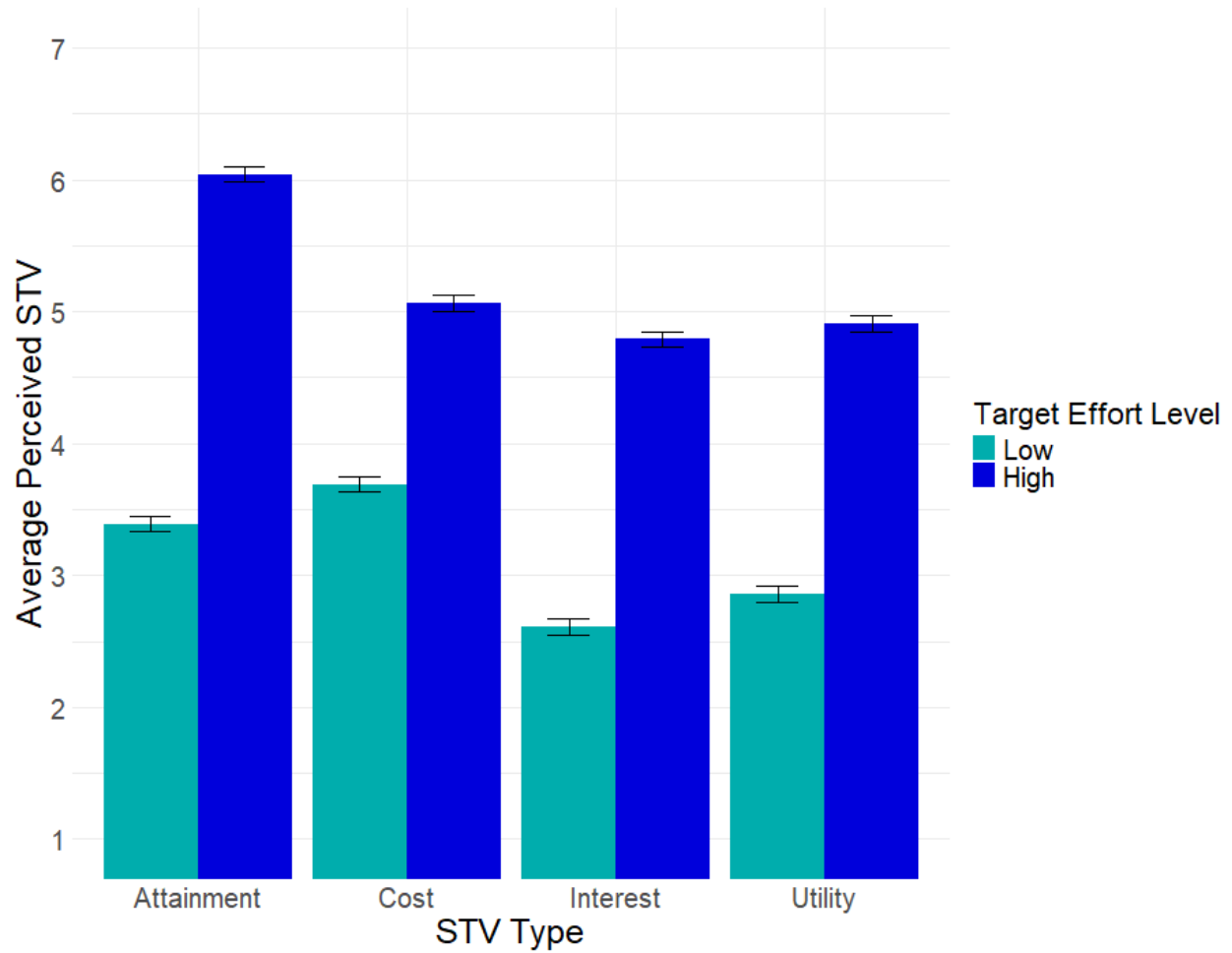


Figure 2

Perceived Subjective Task Value (STV) Predicted by Subjective Task Value Type (cost, utility, interest, attainment) and Target Effort Level



APPENDICES

Appendix A

Effort Source Belief Vignettes

The items below were set in either a math or English context depending on random assignment to conditions. The order in which each item was presented was randomized. Participants responded to items on a 6-point scale (1 = *very unlikely*; 6 = *very likely*).

1. Two college students, Sarah and Lisa, are sitting in a Math [an English] class. The professor gives the class an assignment to work on individually. Sarah works hard on the assignment, while Lisa does not work very hard. How likely is it that **Sarah** worked harder because...?
 - a. ...she found the assignment to be difficult, whereas Lisa found the assignment to be easy. (task-elicited beliefs)
 - b. ...she was motivated to perform well on the assignment, whereas Lisa was not motivated to perform well. (self-initiated beliefs)
2. Two college students, Diane and Rachel, are sitting in a Math [an English] class. The professor gives the class an assignment to work on individually. Diane finishes the assignment in 15 minutes, while Rachel finishes in 10 minutes. How likely is it that **Diane** spent more time on the assignment because...?
 - a. ...the assignment was very challenging for her, whereas the assignment was not particularly challenging for Rachel. (task-elicited beliefs)
 - b. ...she really enjoys working on math [English] assignments, whereas Rachel does not enjoy math [English]. (self-initiated beliefs)
3. Two college students, Nancy and Michelle, are sitting in a Math [an English] class. The professor gives the class an assignment to work on individually. Nancy works on the assignment for the entire class period, while Michelle finishes the assignment ten minutes before the end of class. How likely is it that **Nancy** spent more time on the assignment because...?
 - a. ...she found the assignment to be very complicated, whereas Michelle found the assignment to be simple. (task-elicited beliefs)
 - b. ...she was really motivated to learn from the assignment, whereas Michelle did not care how much she learned. (self-initiated beliefs)
4. Two college students, John and Liam, are sitting in a Math [an English] class. The professor gives the class an assignment to work on individually. John expends a good deal of effort on the assignment, whereas Liam did not expend much effort. How likely is it that **John** expended more effort on the assignment because...?
 - a. ...the assignment was very difficult for her, whereas it was fairly easy for Lindsey. (task-elicited beliefs)

- b. ...she was very interested in the topic of the assignment, whereas Lindsey was not very interested in the topic. (self-initiated beliefs)
- 5. Two college students, Dan and Shane, are sitting in a Math [an English] class. The professor gives the class an assignment to work on individually. Dan puts a lot of effort into the assignment, while Shane does not put in a lot of effort. How likely is it that **Dan** put more effort into the assignment because...?
 - a. ...she found that the assignment to be very demanding, whereas Stacey did not find the assignment to be demanding. (task-elicited beliefs)
 - b. ...she was motivated to do her best on the task, whereas Stacey did not care about doing her best. (self-initiated beliefs)
- 6. Two college students, Eric and Matthew, are sitting in a Math [an English] class. The professor gives the class an assignment to work on individually. Eric is very focused on the assignment for the entire 20 minutes, whereas Matthew finishes well before the time is up. How likely is it that **Eric**, unlike Matthew, used the full time because...?
 - a. ...she found the assignment to be very challenging, whereas Miriam did not find the assignment to be challenging. (task-elicited beliefs)
 - b. ...she was motivated to get a good grade on the assignment, whereas Miriam did not care about getting a good grade. (self-initiated beliefs)

Adapted from Miele, D. B., Browman, A. S., & Vasilyeva, M. (2020). Individual differences in students' effort source beliefs predict their judgments of ability. *Motivation Science*, 6(2), 110–132. <https://doi.org/10.1037/mot0000124>