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# An expectancy-value-cost approach in predicting adolescent students' academic motivation and achievement☆

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ABSTRACT

In the context of learning, cost has mostly been discussed under the expectancy-value framework and defined as the perceived negative consequences of task engagement. The issue of cost has recently attracted growing interest among scholars, because it may provide insights regarding how to predict students' avoidance motivation and behavior. In the present study, we investigated the potential benefits of an expectancy-value-cost approach for predicting outcomes related to adolescent students' academic motivation and achievement in math. Using two data sets ($N$ = 637 and $N$ = 211) of middle and high school students, we found that cost could successfully explain additional variance in multiple different variables related to academic motivation and achievement, beyond what could be predicted by expectancy and value. In particular, cost emerged as an important factor in predicting adolescent students' adoption of avoidance goals, negative classroom affect, maladaptive academic outcomes, and exam scores. Findings of the present study extend the scope of expectancy-value theory by highlighting the importance of using expectancy, task value, and cost together to predict students' academic motivation and educational outcomes.

## 1. Introduction

Among the different antecedents of academic behavior, motivation is one of the most important, playing a crucial role in impacting students' choices, engagement, and achievement in school (e.g., Schunk, Printrich, & Meece, 2008). In educational psychology, Eccles et al.'s (1983) expectancy-value model is one of the most influential frameworks that has been used to investigate students' motivation and how it relates to academic-related choices, learning behaviors, and achievement. In general, researchers working within this theory posit that when students have high competence beliefs and value for an academic task, they are more likely to engage with it and to have higher achievement (Wigfield & Eccles, 2000). Students' competence beliefs, which include their self-efficacy, beliefs about ability, or expectations about future success, have been found to predict positively their engagement and achievement in various academic subjects (see Pajares, 1996; Schunk, 1991, for reviews). Students' perceptions of the value of a task also have been found to predict reliably their intentions and actual decisions to take more courses in specific subjects and to complete activities related to those subjects (e.g., Eccles, 2005; Wigfield, Rosenzweig, & Eccles, 2017). Most expectancy-value researchers posit that task value has at least three components, which refer to the extent to which a student thinks a task is interesting (i.e., intrinsic value), personally meaningful and important (i.e., attainment value) or useful (i.e., utility value).

Although research shows many links between competence beliefs, task value, and students' academic outcomes, these factors do not explain fully whether students engage adaptively with their schoolwork or not. In particular, researchers have recently begun to explore the construct of cost as another potential factor that affects students' academic outcomes in school. Cost refers to students' perceptions regarding the negative consequences of engaging in a task (Wigfield & Eccles, 1992) and captures a dimension of motivation that is more negative in nature than competence beliefs and task value. The construct of cost has not received much attention in empirical research to date. However, cost is likely to predict students' motivation and

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academic outcomes, in particular their maladaptive academic choices and behaviors, in ways that cannot be explained by competence beliefs and task value. In the present study, we explored whether and how adding cost to an expectancy-value model could improve the prediction of a variety of adaptive and maladaptive motivational variables and academic outcomes.

### 1.1. Role of cost in expectancy-value theory

Cost is defined as the negative consequences of engaging in a task. According to expectancy-value theory, cost is a multifaceted construct consisting of effort required to perform a task successfully, forgone opportunities to engage in other valued tasks, ego threats associated with potential task failure, and negative emotions associated with task engagement (Barron & Hulleman, 2015; Eccles et al., 1983; Wigfield et al., 2017).

Cost has always been part of expectancy-value theory, but its role within the theory has been debated in recent years (Barron & Hulleman, 2015; Wigfield et al., 2017). Eccles et al. (1983) wrote about cost originally as an influence on task value, arguing that students "conceptualized the influence of cost on the value of an activity in terms of a cost/benefit ratio." (p. 93). If the cost of a task was too high, an individual would not engage with it. This phrasing indicates that to some extent, cost and task value both have independent influences on students' motivation and behavior in academic settings. In later expectancy-value researchers' writings, however, cost was categorized as a component of task value (Wigfield & Eccles, 1992; Eccles, 2005). Many researchers have adopted this perspective and most researchers who have assessed task value either have excluded cost altogether or have combined cost with other components of task value to create a composite task value score (e.g., Buehl & Alexander, 2005; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Safavian & Conley, 2016). This perspective suggests that cost is one factor that determines value, but it does not have any separate impact on students' motivation or behavior beyond its impact on value.

Considering cost to be part of the task value construct may be problematic, because the nature of cost is negative whereas task value is typically thought to be positive. Researchers have argued that the term "valence" is useful to describe both positive and negative characteristics of a specific task or activity (Feather, 1992, 1995). From an expectancy-value perspective, cost has negative valence, whereas the other components of task value (i.e., attainment, intrinsic, and utility value) have positive valence. In achievement settings, both positive and negative valences influence individuals' approach- or avoidance-oriented behavior, both consciously and unconsciously (Elliot & Covington, 2001; Pintrich, 2003). Thus, students may be affected by both cost and task value, separately, rather than cost impacting students only as a function of its influence on task value. Recently, some researchers have expressed support for this perspective on cost and suggested that cost is a unique construct that differs from task value (Barron & Hulleman, 2015). Also, empirically, in several recent studies cost has formed a separate factor from other dimensions of task value (e.g., Flake, Barron, Hulleman, McCoach, & Welsh, 2015; Gaspard et al., 2015a; Jiang, 2015; Luttrell, et al., 2010; Perez, Cromley, & Kaplan, 2014). However, researchers have not reached clear consensus on the role of cost versus task value to date.

### 1.2. Role of cost in predicting academic motivation and behavior

Compared to task value, which has been extensively investigated, the role of cost in predicting students' academic motivation and achievement remains largely under-explored. Few researchers had developed measures of cost prior to 2010 and thus few researchers included cost in studies that explored motivation from an expectancy-value perspective (Wigfield, Tonks, & Klauda, 2016). The work that has been done suggests that cost predicts students' outcomes. Conley (2012) found that cost assumed a vital role in discriminating middle school students' patterns of motivation for learning math and in predicting their subsequent achievement and classroom affect. Cost also was found to predict college students' drop-out intentions beyond what could be predicted by expectancies and task values (Perez et al., 2014). However, researchers have not systematically explored whether adding cost to the expectancy-value model can predict additional variance in multiple different academic outcomes. This is important to explore because including cost may help predict more variance in these outcomes than could be predicted with only expectancy and task value.

Additionally, if cost is to be included in expectancy-value models, researchers need to explore whether it should be included as its own construct or as part of the task value construct. One aspect of this debate is theoretical, as was discussed above. Another aspect of this debate, the aspect on which we focus in the present study, relates to predictive utility. Considering cost and task value to be separate constructs might increase the predictive accuracy of expectancy-value models. This is because cost and task value might show very different patterns when predicting approach-related versus avoidance-related outcomes. In particular, task value is an affirming motivational construct associated with students' approach motivation, whereas cost is an undermining motivational construct associated with students' avoidance motivation (Atkinson, 1964; Lewin, 1938; McClelland, Atkinson, Clark, & Lowell, 1953). Lack of value would predict a student lacking approach motivation, but this would not necessarily lead to avoidance-related behaviors, because the worst outcome that a low-value task would bring is the absence of a reward. In contrast, perceiving cost would lead to individuals having avoidance motivation. Thus individuals might engage in behaviors to escape the negative consequences they perceive regarding a task. Taken together, this argument would suggest that cost might influence different types of behavior than does task value.

If researchers include cost as part of the task value construct, this might conflate the separate predictive relationships of cost and task value on approach and avoidance behaviors. This would reduce the ability of models to predict accurately behaviors that are related to approach or avoidance in school, compared to if cost was included as a separate construct from task value. For example, procrastination is an avoidance-related behavior that is likely to be most strongly related to students' cost perceptions. A student with moderate task value and high cost may be equally likely to procrastinate as is a student with low task value and high cost. When cost is treated independently from task value, the two students would be found to be equally likely to procrastinate. However, if cost is treated as part of the task value construct, the student with moderate task value and high cost would have a higher overall task value score than would the student with low task value and high cost. That first student would be predicted to be less likely to procrastinate, which in this example would not be an accurate conclusion.

### 1.3. The present study

In this study, we investigated the utility of using an expectancy-value-cost approach to predict a variety of motivation and educational outcomes for adolescent students. We focused on adolescent students because academic motivation declines over secondary school and students' cost perceptions in many subjects increase over this time period (e.g., Gaspard, Häfner, Parrisius, Trautwein, & Nagengast, 2017). These trends put many students at risk for lower achievement and poor school adjustment. We also focused on assessing outcomes associated with both approach and avoidance in school. This was because, as noted above, cost may be particularly strongly related to avoidance-related outcomes and may relate differently to these outcomes than does task value.

Using hierarchical multiple regression, we tested whether adding cost as an independent variable would significantly explain additional