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Measuring Cost:
The Forgotten Component of Expectancy Value Theory
Jessica Kay Flake

A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Master of Arts

Department of Graduate Psychology

May 2012

Acknowledgments

I would like to acknowledge those who have supported me through this process. First, I would like to thank my fellow quantitative cohort students. They lent their ears and advice regarding very important thesis matters, such as formatting tables and creating tables of contents. Furthermore, I am grateful to my committee members, Dr. Hulleman and Dr. Pastor, who took time to read my drafts and provide me with the necessary guidance and feedback. Finally, I would like to thank Dr. Barron, my advisor and committee chair. He served as my second coder for the qualitative study and went beyond the call of duty as the chair of my committee. I can't imagine this project coming to completion without the hours he put in to encourage, guide, coach, code, and listen. I feel extremely fortunate to have had the support of him and my other committee members during my time at JMU.

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Abstract

Expectancy-Value Theory (EVT) (Eccles et al., 1983) offers one of the most influential models for understanding motivation. One component of this theory, cost, can be defined as how much a student has to sacrifice to engage in a task. However, EVT researchers appear to have forgotten the component of cost. Though cost has been theorized as an important component of EVT, empirical work has neglected to measure and study it (Wigfield & Cambria, 2010). As a result, cost and its relationship with student outcomes is largely unknown (Wigfield & Eccles, 2000). The focus of the current study is to address this shortcoming in the literature by reviewing what is currently known about cost and proposing a new scale to measure it. Scale development for cost was an iterative process, guided by Benson's framework for construct validation (Benson, 1998). The first iteration adopted a top-down approach by conducting an in-depth analysis of the history of EVT and its measurement in educational psychology, as well as cost-related constructs in other literatures in psychology. I used theory and past literature to determine the initial theoretical structure of cost. In the second iteration of scale development, I adopted a bottom-up approach by evaluating data from an exploratory, qualitative study. In the final iteration, the content validity of the proposed scale was investigated using input from a panel of experts. The conclusion of this project offers 36 items to measure numerous components of cost. I offer suggestions for future research to determine the structural and external validity of the scale.

Introduction

Imagine hearing these remarks from students about their least motivating course in college:

“It was ridiculously hard and the assignments took forever to do”

“There was lots of work, but that would be ok if it was interesting”

“I had to study so much for this class that I had to sacrifice work for other classes”

“The class was at 8am and I had to walk all the way across campus”

What is it that these students were describing? Can we capture it systematically? How is it related to students’ expectations for success or interest in their course? How is it related to their performance and willingness to take more courses in the subject? And, what could teachers do to optimize student motivation if they knew students were experiencing it?

Motivation theory offers many options for understanding student motivation, however one theory stands out in offering an explanation of what the students quoted above are talking about: Expectancy-Value Theory (EVT) (Eccles et al., 1983). In particular, one component within EVT, known as cost, captures what these students are describing. In general, cost can be defined as how much a student has to sacrifice to engage in a task. Though cost has been theorized as an important component of EVT, empirical work has neglected to measure and study it (Wigfield & Cambria, 2010). As a result, cost and its relationship with student outcomes is largely unknown (Wigfield & Eccles, 2000). EVT researchers appear to have forgotten the component of cost. Recent exploratory studies (Chen & Liu, 2009; Chiang, Byrd, & Molin, 2011; Watkinson, Dwyer, & Nielsen, 2005) have attempted to measure cost by developing new items and

collecting qualitative data, however no scale currently exists to cover the breadth of the original construct theorized in the contemporary Expectancy-Value model (Eccles et al., 1983).

The focus of the current study was to address this shortcoming in the literature by reviewing what is currently known about cost and proposing a new scale to measure it. Scale development for cost was an iterative process, guided by Benson's framework for construct validation (Benson, 1998). The first iteration adopted a top-down approach by conducting an in depth analysis of the history of EVT and its measurement in educational psychology, as well as cost-related constructs in other literatures in psychology. I used theory and past literature to determine the initial theoretical structure of cost. In the second iteration of scale development, I adopted a bottom-up approach by evaluating data from an exploratory, qualitative study conducted with current students. In the final iteration, the content validity of the proposed scale was investigated using input from a panel of experts.

Framework of the Current Study

This study will utilize Benson's (1998) construct validation framework to investigate cost and begin the process of understanding its importance. Benson's model outlines a multi-phase approach for gathering validity evidence for a measure of a construct. Benson's model calls for three phases of construct validation: substantive, structural, and external. These phases provide an outline for how to answer the questions I posed at the outset of the introduction.

The substantive phase begins the process of evaluating how the construct is defined, operationalized, and measured. It is during the substantive phase that researchers thoroughly examine theory and previous research to define the construct (Benson, 1998). During this phase, researchers can take a top-down, theoretical approach to understanding a construct, a bottom up, data-driven approach, or a combination of both. It is also during this phase that scales are created and evaluated for their representation and relevance to the theoretical definition. For example, Messick (1995) recommended that items written to measure a construct be reviewed by a panel of experts to ensure full representation of the theoretical content. This phase aims to answer the first question I posed earlier about the students' comments, "What is it that these students were describing?"

The structural phase of Benson's model calls for a psychometric investigation of the scale used to measure the construct. Research conducted during the structural phase has an internal focus, where the scale's psychometric properties and internal consistency are scrutinized. Measures of reliability, such as Cronbach's Alpha, are used to evaluate how items on the scale function as a set. In addition, exploratory and confirmatory analytical techniques are used to understand whether the intercorrelations among items align with the proposed structure of the construct. The second question posed at the outset, "Can we capture it systematically?" is of primary concern during the structural phase. A scale that exhibits properties of reliability and a stable structure can continue on into the external phase.

The final phase, external, focuses on how the construct relates to other constructs. This phase provides the opportunity to understand the importance of the psychological construct of interest. Theorized relationships between constructs are tested in this phase using such analyses as correlation or regression. This phase aims to answer the remaining questions I posed earlier, “How is it related to students’ expectations for success or interest in their class? How is it related to their performance and willingness to take more courses in the subject?”

Benson’s recommendations for building a strong program of construct validation are meant to proceed developmentally. In other words, I cannot begin to answer questions from the external phase until I properly answer the ones posed in the substantive and structural phase. Therefore, the focus of the current study will be on the substantive phase of Benson’s framework and on creating a pool of items to measure the forgotten component of EVT, cost. The primary goal of this study is to answer the first question I posed, “What is it that these students are describing?”, but it also begins the process of answering the second, “Can we capture it systematically?”

To follow Benson’s recommendations for the substantive phase, I have adopted an iterative approach. In the first iteration, I briefly reviewed the history of EVT, and then thoroughly reviewed the contemporary version of the theory. Then I continued to explore the literature to gain a better understanding of cost. This entailed a review of cost related research within educational psychology, but also a review from other domains, such as industrial/organizational psychology and behavioral economics. This review was used to create a theoretical rationale for the structure of my scale. In the second iteration, I

conducted a qualitative study that allowed students to speak openly about their motivation and discuss cost specifically. This further informed scale structure and item writing. Finally, I presented my scale to a panel of experts in motivation theory. This panel participated in a mapping exercise that linked items to my proposed factors. These experts provided feedback about the wording and relevance of specific items. The last iteration of this project used expert feedback to revise the scale and propose a final scale for pilot testing. The outcome of this project was a scale that can progress through the latter phases of Benson's model.

Literature Review

Review of Early Expectancy-Value Theory

Contemporary EVT's roots stem from Lewin's concept of a Level of Aspiration (Lewin, Dembo, Festinger, & Sears, 1944). The construct of a Level of Aspiration captured the cognitive nature of motivation and provided the first link between expectancies and values to choice behavior. Lewin et al. defined the level of aspiration as a goal someone sets regarding a specific task. They believed that the person's past experience with the task shaped their level of aspiration. Lewin and colleagues found that participants in laboratory tasks changed participants' level of aspiration based on how many times they had attempted the task and how much value was placed on completing the task successfully. Later application of this theory further supported the notion that prior experience with a task is related to higher levels of aspiration. The typical task for these experiments involved a ring toss game conducted in a laboratory setting. The distance from the peg was varied and the participants set a goal of how many times they could place a ring around a peg. Though this research provided a basis for Expectancy-Value Theory, an application to real world, choice behavior was needed.

John Atkinson expanded on the ideas that came from the lab by incorporating them into theories about achievement behavior. Atkinson attempted to explain behavior as a function of motives, probability for success, and incentive value (Atkinson, 1957). Those notions laid the framework for the equation that commonly describes modern EVT; $Motivation = Expectancy \times Value$. Atkinson posited a multiplicative relationship between the probability for success (Expectancy) and the incentive value (Value) for the task. The idea that motivation is a function of a person's subjective evaluation of his or

her ability to be successful at a task and some form of value is the driving force behind the application of EVT to educational psychology.

Contemporary EVT has been shaped by the work of Jacquelynne Eccles and her colleagues over the past 30 years. Eccles et al. (1983) outlined a model for achievement motivation as it related to the study of gender differences in math achievement. This model goes beyond the theory proposed by Atkinson and integrates other psychological constructs and achievement related research. Eccles and colleagues proposed that it is not reality that shapes a student's academic behavior, but a student's perception of that reality. In particular, Eccles et al. (1983) argued for a more in-depth analysis of students' expectancies and values; with each having specific sub-components. One of these theorized subcomponents was discussed as cost.

Eccles and her colleagues' study of student motivation has proved a useful endeavor. Their research displayed the importance of expectancy and value components for academic performance and course taking behavior. They have found, in numerous studies, that students' expectancy beliefs were strong predictors of grades, even when taking previous grades and values into account (Eccles et al., 1983; Eccles et al., 1989; Meece, Wigfield, & Eccles, 1990; see Wigfield & Eccles, 2000 for a review). In contrast, value has been consistently related to students' interest and future course taking. However, because EVT researchers have neglected to measure cost in their studies, the relationship between cost and student outcomes is unclear.

Review of Eccles' Model of Expectancy-Value Theory

To better understand the history of both the theory and measurement behind EVT, I will review Eccles' work by providing a summary of the initial model (Parsons, 1980¹; Eccles et al., 1983), their only publication that addressed the measurement properties of their scale (Eccles & Wigfield, 1995), a more recent review (Wigfield & Eccles, 2000), and a chapter that provides more detail about cost specifically (Eccles, 2005). This will present an in-depth look at how Eccles and colleagues have defined and measured expectancy, value, and cost over time.

Eccles et al. (1983) provided a detailed theoretical rationale for their contemporary model of Expectancy-Value Theory. They proposed that expectancies and values are multifaceted, each having numerous components. Eccles et al. (1983) stated that expectancies were comprised of self-concept of ability, perception of task difficulty, perceptions of other's expectations, causal attributions, and locus of control. The task value components were specified as intrinsic value/interest, attainment value, and utility value. Over the years, the labels of these value components have changed slightly, so during this review I will reference the labels that were adopted for the particular article I am discussing. This allows for a clearer picture of how these constructs have changed over time, not just in their measurement, but also in what they were titled. In addition, other concepts were theorized to determine task value; Eccles et al. discussed these as costs. Table 1 includes definitions of these components and provides a real world example to explain them in context. I will address each in more detail.

¹ Parsons is Jacquelynne Eccles's maiden name. Citations for Parsons and Eccles refer to the same author.

1. *Table 1*

2. *EVT Component Definitions from Eccles et al. (1983)*

Component	Construct Definition	Example
Expectancy- Self Concept of Ability	Expectancy to succeed at the task is based on the perception of ability	I can complete these math problems because I am good at math
Expectancy- Perception of Task Difficulty	Expectancy to succeed at the task is based on how difficult the task seems to be	I can complete these math problems because they don't seem very hard;
Value- Intrinsic/Interest	Task is valued because it is inherently interesting or fun	I find solving math problems to be enjoyable;
Value-Attainment	Task is valued because it is important for the sense of self	I think being able to solve math problems is a part of who I am;
Value-Utility	Task is valued because it is important for meeting future goals	I want to learn how to solve math problems so I can do well in my future math classes;
Cost- Effort	The task is not valued because the effort is not worth the gain	All the effort I put into doing math problems doesn't justify what I get out of it.
Cost-Loss of Valued Alternatives	The task is not valued because it requires giving up other valued tasks	Because I have to spend so much time to understand math problems, I can't hang out with my friends.
Cost-Psychological Cost of Failure	The task is not valued because of fear regarding performance on the task	I'm not going to try to solve math problems because I am scared I won't be able to.

Though Eccles et al. (1983) details many contributors to a student's level of expectancy, such as teacher and parent perceptions, I will focus on the student's self-perceptions. Eccles et al. (1983) argued that expectancy theoretically contained two components: self-concept of ability and perception of task difficulty. Self-concept of ability was defined as students' subjective appraisal of their level of ability to succeed at the task, whereas perception of math difficulty was defined as students' subjective

appraisal of how difficult it is to be successful at the task. I will use a running example of students taking a math course to demonstrate the meaning of these constructs. Students with a high self-concept of ability would think they are capable of doing well in their math course (e.g., because they have done well in the past), whereas students with high perceived task difficulty would think their math course was challenging and hard to be successful in. The self-concept of ability and perceived task difficulty components work together to answer the question “Can I do this task?” (Shunk, Pintrich, & Meece, 2007).

In contrast, Eccles et al. (1983) argued that value theoretically contained three components: intrinsic value/interest, attainment value, and utility value. Eccles and colleagues defined intrinsic value/interest as the inherent enjoyment one gets from engaging in a task. They defined attainment value as the importance of doing well at a task for purposes of supporting one’s sense of self. Finally, utility value was defined as the importance of a task because of its relationship to a future, desired goal. To continue with the example of students taking a math course, students with high intrinsic value/interest would find the work in their math course enjoyable to complete. Students with high attainment value would think taking math is important because it affirms who they think they are. Finally, students with high utility value would think taking math is important because they have to pass the current math course to go on to the next grade in school. The components of value work together to answer the question, “Do I want to do this task, and why?” (Shunk, Pintrich, & Meece, 2007).

A mediator of value is also discussed in Eccles et al. (1983). Eccles et al. stated that, “intuitively, three clusters of variables seem to be particularly important mediators

[of task value]: sex roles, perceptions of the cost of success, and previous affective experiences with similar tasks.” It is during the explanation of these mediators that Eccles et al. introduced cost and explicitly discussed it. However, in later work cost is just discussed as an unexplored type of value. They present the cost of success or failure as a mediator for the value placed on a task. The level of cost associated with a task is further explained and hypothesized to be influenced by three factors: perceived effort, loss of valued alternatives, and the psychological cost of failure.

Eccles et al. (1983) describes perceived effort as students’ perception of how much effort is needed to be successful at the task, but states that cost will be high if that effort is not deemed worth the benefit. The second factor, loss of valued alternatives, was expressed as the perception that desired activities have to be given up to be successful at the task. Finally, the psychological cost of failure was described as the anxiety related to the potential of poor performance at the task. The example used earlier can further illustrate the meaning of these components. Students who perceive math to take a lot of effort would feel as if they spent more time on math problems than they were worth. Students who perceive a loss of valued alternatives might feel that they have to give up a desired activity (e.g., hanging out with friends to work on their math homework) to be successful at the task. Finally, students who perceive a high psychological cost of failure might elect not to take an advanced math course for fear of failing it. Eccles and colleagues proposed that with greater levels of these three cost factors come lower levels of value. This initial conceptualization of cost sets the stage for cost as a type of anti-value that subtracts from the overall level of value a student has for the task.

After introducing the theoretical conceptualization behind each component of contemporary EVT, the next step is to consider how Eccles and her colleagues have empirically measured these constructs. Although Eccles et al. (1983) provided one of the first major theoretical summaries of their EVT model, the items written to measure the constructs were not included in this introductory work. In order to understand how they measured each component, one must access an earlier 1980 grant, summary report made available by Eccles on her website (see Parsons, 1980).

Parsons (1980) used two years of data to refine the initial measurement tool for the conceptualization of Expectancy-Value Theory. Scales were constructed to measure students', parents', and teachers' perceptions of a variety of constructs. I will focus on the measurement of the students' perceptions, as they relate to Eccles' et al. (1983) proposed components of EVT. In addition, items were written to address students' perceptions for taking math, so the items are domain specific. The original scale included three factors: self-concept of math ability (aka, expectancy), perception of math difficulty, and concept of math value (aka, value). Parsons evaluated the factor structure of this scale using confirmatory factor analysis (CFA), and final analyses were conducted using only subscales that had Cronbach's Alpha reliability coefficients greater than .60. Unfortunately, few details are provided about the CFA analyses, so it is unclear what models were evaluated or how analyses were conducted. Parsons concluded that self-concept of math ability included items that measured future expectancies, current expectancies, math ability, and performance in math (see Table 2). Perception of math difficulty included items that measured required effort, actual effort, and current

difficulty (see Table 3). Finally, math value included items that measured basic and advanced utility of math, importance of math, and interest in math (see Table 4).

3. Table 2

4. Parsons (1980) Self-Concept of Math Ability Items

Future Expectancies $\alpha=.79$	Current Expectancies $\alpha=.83$	Math Ability $\alpha=.79$	Performance in math $\alpha=.76$
How successful do you think you'd be in a career which required mathematical ability?	Compared to other students in your class, how well do you expect to do in mathematics this year?	How good at math are you?	In math, most of the time, how well do you do in the following things? a. When the teacher calls on you for an answer b. When taking a test I studied for c. When doing math homework problem
How well do you think you'll do in your mathematics course next year?	How well do you expect to do on your next math test?	If you were to order all of the students from worst to the best in math, where would you put yourself?	
How well would you expect to do in Trigonometry and pre-calculus?	How well do you think you will do in your math course this year?	In comparison to most of your other academic subjects, how good are you at math?	
How well would you expect to do in this course (Calculus)?			How have you been doing in math this year?
How well do you think you'll do in advanced high school mathematics courses (like Algebra II, Trig, or Calc)?			
How well do you think you would do in your mathematics course next year?			

Note. Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Not at all to Very much, Very easy to Very Hard, Not at all useful to Very useful)

5. *Table 3*6. *Parsons (1980) Perception of Math Difficulty Items*

Effort $\alpha=.76$	Difficulty of current Math $\alpha=.81$
How hard to do you have to try get good grades in math?	In general, how hard is math for you?
How hard do you have to study for math tests to get a good grade?	Compared to most other students in your class, how hard is math for you?
To do well in math, I have to work: much harder in math than in other subjects to much harder in other subjects than in math	Compared to most other school subjects that you have taken or are taking, how hard is math for you?
How much time do you spend on home work?: an hour or more to I rarely do any math homework	
How hard do you try in math?	
Compared to most other students you know, how much time do you have to spend working on your math assignments?	

Note. Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Not at all to Very much, Very easy to Very Hard, Not at all useful to Very useful)

7. Table 4

8. Parsons (1980) Concept of Math Value Items

Utility of basic math $\alpha=.61$	Utility of advanced math $\alpha=.75$	Importance of math $\alpha=.74$	Interest in math $\alpha=.80$
How useful is learning basic math for what you want to do after you graduate and go to work?	How use is what you would learn in high school math (like trig or calc) for what you want to do when you finish school and go to work?	I feel that, to me, being good at solving problems which I involve math or reasoning mathematically is: not all important to very	In general, I find working on math assignments: very boring to very interesting
How useful do you think the things you have learned in basic math are for your other school courses?	How useful is what you would learn in advanced high school math for your daily life outside of school?	How important is it to get good grades in math?	In general, I find working on math games
		How upset would you be if you got a low mark in math?	How much do you like doing math?

Note. Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Not at all to Very much, Very easy to Very Hard, Not at all useful to Very useful)

Parsons (1980) also attempted to measure cost in this study. But once again, the description of how cost was included in the final model and how it relates to other EVT components isn't clear. For example, a subscale titled 'Cost.adv' is listed at one point in the report under a type of value, but specific items are not provided. In another section of the report, three items were included that measure the cost of effort. Two of these items assess if the amount of effort is worthwhile and the third addresses the concept of loss of valued alternatives (see Table 5 for items), representing two of the three domains that

Eccles et al. (1983) theorized as cost. However, more perplexing is that even though Eccles et al. (1983) defined the amount of effort required as a cost, separate effort subscales were included under the perception of math difficulty factor. Thus, it is unclear from Parsons (1980) and Eccles et al. (1983) if and how effort is related to cost in their theoretical model. From this information, it is hard to say if cost is a component of value that detracts from the overall level of value the student perceives, if it contributes to expectancy, or if it is a separate construct from expectancy and value.

9. *Table 5*

10. *Parsons (1980) Cost items*

Cost of Effort to Do Well in Math $\alpha=.72$
Is the amount of effort it will take to do well in your math course this year worthwhile to you?
Is the amount of effort it would take to do well in advanced high school math courses worthwhile to you?
How much does the amount of time you spend on math keep you from doing other things you would like to do?

Note. Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Very worthwhile to Not at all worthwhile)

Eccles and colleagues used the original scale discussed above, or some form of it for years. Their work then focused on the predictive ability of these scales, not their internal measurement properties. With more support for the importance of the constructs of expectancy and value, Eccles and Wigfield (1995) formally revisited the structure of EVT constructs and the measurement properties of their scale. The focus of this particular work was to evaluate the factor structure of their scale and how the components of expectancy and value were related. The authors used exploratory factor analyses to

refine the item pool and confirmatory factor analyses to investigate the structure of the different EV components.

Once again, Eccles and Wigfield (1995) defined expectancy as a construct consisting of two components: self-concept of ability and perceived task difficulty. Eccles and Wigfield (1995) proposed that self-concept of ability was further comprised of perceived competence, perceived performance, and expectancy indicators. Perceived task difficulty was proposed to be comprised of required and actual effort indicators as well as perceived task difficulty. The conceptualization of the value components remained the same from 1983 to 1995, except they now cited cost as a type of value not just a mediator of value.

Eccles and Wigfield (1995) began with a 29-item instrument written to measure components of expectancy, value, and difficulty. The authors stated that the items were established in the early 1980's and their earlier work established good psychometric properties for their scale. However, as noted in my earlier review of Parsons (1980), it is not clear from the earlier papers that Eccles and Wigfield cite (Eccles et al., 1983; Parsons, 1980) what structural work was done or exactly what items were used in their studies between 1980 and 1995. Their 1995 work is their first publication that provides sufficient detail to judge the structural properties of their scale.

Exploratory factor analyses (EFA) of the scale supported a 3-factor structure that aligned with the items written to measure expectancy, value, and difficulty. Although the authors state that this EFA supported previous structural work done on the scale in the early 80's, ten items were identified as not functioning appropriately (e.g., items with

high cross loadings or low factor loadings). Thus subsequent confirmatory factor analyses were conducted on a 19-item scale, and this 19-item version of the scale was titled the Self and Task-Perception Questionnaire (see Table 6-8 for items).

11. Table 6

12. Eccles and Wigfield (1995) Items for Ability/Expectancy

$\alpha = .92$
Compared to other students, how well do you expect to do in math courses this year
How well do you think you will do in your math course this year?
How good at math at you
If you were to order all of the students in your math class from the worst to the best in math, where would you put yourself?
How have you been doing in math this year?
<i>Note.</i> Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Very poorly to Very well, The worst to The best)

13. Table 7

14. Eccles and Wigfield (1995) Items for Task Value

Intrinsic Value $\alpha = .76$	Attainment Value/Importance $\alpha = .70$	Extrinsic Utility Value $\alpha = .62$
In general, I find working on math assignments (very boring to interesting)	Is the amount of effort it will take to do well in advanced high school math courses worthwhile to you? (not very worthwhile to very worthwhile)	How useful is learning advanced high school math for what you want to do after you graduate and go to work? (not very useful to very useful)
How much do you like doing math (not very much, very much)	I feel that, to me, being good at solving math problems which involve math or reasoning mathematically is (not at all important to very important)	How useful is what you learn in advanced high school math for your daily life outside of school? (not at all useful to very useful)
	How important is it to you to get good grades in math (not at all important, to very important)	

Note. Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Very boring to Very interesting, Not very useful to Very useful)

Table 8
 15. Eccles and Wigfield (1995) Items for Perceived Task Difficulty

Task Difficulty $\alpha=.80$	Required Effort $\alpha=.78$
In general, how hard is math for you (very easy, very hard)	How hard would you have to try to do well in an advanced high school math course? (Not very hard to very hard)
Compared to most other students in your class, how hard is math for you (much easier, much harder)	How hard do you have to try to get good grades in math? (A little to a lot)
Compared to most other school subjects that you take, how hard is math for you? (my easiest course, my hardest course)	How hard do you have to study for math tests to get a good grade? (a little to a lot)
	To do well in math I have to work (much harder in math than in other subjects, to much harder in other subjects than in math)

Note. Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Much easier to Much harder, A little to A lot)

Eccles and Wigfield (1995) were then concerned with expectancy, value, and task difficulty at a multi-dimensional level and used confirmatory factor analysis to test their theory about the dimensionality of these items. They hypothesized a two-factor structure for expectancy, distinguishing between current ability and future expectancies for success, and a three-factor structure for value, distinguishing between intrinsic, attainment/importance, and extrinsic utility value. Though they discussed these value components in the same way as Eccles et al. (1983), they renamed the value subscales with longer labels. Specifically, attainment value was labeled attainment/importance and utility value was renamed extrinsic utility. Finally, they proposed a two-factor model for the perceived difficulty component that included items written to measure effort and the difficulty of the subject area. Once again, it is unclear if they meant for these task difficulty items to measure cost. Although cost was a theorized component of EVT, and

is mentioned in this work, Eccles and colleagues have not explicitly labeled items under a cost subscale since Parsons (1980).

For the value and task difficulty components, their hypotheses were supported using confirmatory factor analysis. However, a one-factor model best fit the data for the expectancy factor. Looking at expectancy as a unidimensional construct, value as a three-factor construct, and task difficulty as a two-factor construct, they further investigated the relationships among the components. Expectancy and the value components had a negative relationship with task difficulty, but the relationship between expectancy and task difficulty was stronger. They found expectancy and values to have moderate, positive relationships. Furthermore, the relationships between expectancy and attainment/importance and interest values were stronger than extrinsic utility value. The authors report moderately negative relationships between task difficulty and value components. Task difficulty and expectancy were also negatively related, but this relationship was stronger than those observed with the value components. The authors also discussed the relationships between the different types of value, but note that the value components were strongly interrelated.

This work provided evidence that expectancy and value components are different. Though not explicitly discussed, the effort component of task difficulty is similar to what Eccles et al. (1983) theorized to be a cost. This work also provides evidence that some of these theorized cost components are separate from expectancy and value and relate to them differentially. However, one item included on the attainment/importance value scale (regarding amount of effort) was originally listed as a cost item in past work

(Parsons, 1980). This is quite curious given that lack of theoretical connection between attainment/importance value and cost. Although Eccles and Wigfield (1995) provided more information about their items and structure of their scale, it is still unclear how cost has been measured and how it relates to other constructs in their work.

In 2000, Wigfield and Eccles were asked to review EVT and provide an overview of the expectancy and value components as part of a special issue in the *Contemporary Educational Psychology*. Patricia Alexander, a guest editor for the journal, found terminology and constructs confusing in the realm of academic motivation, so she asked authors of influential theories of motivation in educational psychology to review their work with an emphasis on defining their constructs (Alexander, 2000). Wigfield and Eccles defined the components of EVT and offered additional clarification. For example, expectancy was divided into two constructs: *ability beliefs* focused on being able to do the task in the present and *expectancies* focused on being able to do the task in the future (Wigfield & Eccles, 2000). Further definition of the component of cost was also given. Cost was explained as students' perceptions of how much effort they think is needed, how engaging in one activity limits their ability to be involved in other activities, and the emotional costs of the activity. The third factor describing cost had been described as the psychological cost of failure in the past. This publication presents a broader definition of "emotional costs." General emotional costs could encompass other mood states outside of anxiety (e.g., sadness or anger), but this definition is not expounded upon. It remains unclear what the authors meant by "emotional costs."

In addition to conceptually defining each of their constructs, Wigfield and Eccles (2000) listed the items used to assess each of their subscales. The expectancy items are presented together in Table 9 as they appear in the 2000 paper, and despite the theoretical distinction between ability beliefs and expectancies, Wigfield and Eccles noted that empirically the two types of expectancy are highly related with items typically loading on a single factor. The value items are presented together in Table 10 as they appear in the 2000 paper, however new labels are given which include usefulness, importance, and interest. It is not clear if the value components are meant to be treated as one combined factor or as three separate factors. Finally, while cost is once again described as a type of value, they do not include any items related to cost. Wigfield and Eccles stated that their discussion of the value components excluded cost because their empirical work has not included the study of cost.

Table 9

16. Wigfield and Eccles (2000) Items for Expectancy

Ability Beliefs	Expectancy
How good in math are you?	How well do you expect to do in math this year?
If you were to list all the students in your class from the worst to the best in math, where would you put yourself?	How good would you be at learning something new in math?
Some kids are better in one subject than in another. For example,. You might be better in math than in reading. Compared to most of your other school subjects, how good are you in math?	
<i>Note.</i> Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Not at all good to Very good)	

Table 10

17. Wigfield and Eccles (2000) Items for Value

Usefulness, Importance, and Interest Item Stems		
Some things that you learn in school help you do things better outside of class, that is, they are useful. For example, learning about plants might help you grown a garden. In general, how useful is what you learn in math?	For me, being good in math is	In general, I find working on math assignments
Compared to most of your other activities, how useful is what you learn in math?	Compared to most of your other activities, how important is it for you to be good at math?	How much do you like doing math?
<i>Note.</i> Response options for items were on a 7-point scale with anchors at the low and high extreme (e.g., Not at all useful to Very useful, Very boring to Very interesting [fun])		

In another effort to challenge motivation researchers to clarify key constructs,

Elliot and Dweck invited researchers whose theories had endured over the years to

explain their theories in an edited book titled *Handbook of Competence and Motivation*. Eccles authored one of the chapters where she discusses the value component of EVT in detail. In particular, Eccles (2005) provided a detailed explanation of cost and offered more description than seen in her earlier work. She proposed that value depends on one's beliefs about the cost of participating in a given activity. The total cost someone feels in regards to participating in a certain activity is hypothesized to be dependent on two primary factors: loss of time and energy for other activities and anxiety or fear of the social and personal consequences of failure or success. This explanation provides two reasons someone might perceive a task to have high cost. However, once again, no items or discussion of how to measure cost were included in this chapter.

The first reason discussed by Eccles (2005) is how much energy or time is consumed by the task at hand. Eccles discussed this concept as a cost/benefit analysis that requires students to think about the amount of effort they will need to exert, the effect of that effort on the outcome for the task, and the outcome for other valued tasks. Because time and energy are limited, a decision to engage in one activity may limit the ability to engage in another activity. The extent to which one has to give up other desired activities to be successful in a given activity is a type of cost: the loss of valued alternatives. To continue with the earlier example, students might not value taking a math course because homework for the course is time consuming, which forces students to work on homework instead of being able to spend time with friends. As an activity consumes more time and energy, it leaves less time and energy for other tasks. In addition, students may not feel that the amount of effort is worth the outcome. Loss of

valued alternatives aside, students may confirm, via a cost/benefit analysis, that the benefit is not worth the all of the time and energy required of the task. Eccles hypothesized that this cost detracts from their overall level of value for the math course.

Another contributor to perceived level of cost is the anxiety or fear of consequences of engaging in an activity. Eccles (2005) likens this concept to the theory of self-worth maintenance. Covington (1992) hypothesized that people wish to maintain their sense of self-worth, especially in an academic environment, and will avoid engaging in activities that might challenge their self-perception of ability. Further, students may have a fear of what others will think of them if they fail. Eccles operationalized this idea as a type of cost. This type of cost would result in a student avoiding the challenging task altogether. However, educational requirements do not allow students to avoid certain courses. If students perceive the psychological cost of failure as high, but engaging in the task is required, they might resort to reducing their amount of effort. When students do perform poorly, blame is placed on their lack of effort, not innate ability. Eccles proposed that this anxiety driven cost can decrease value for the task and ultimately motivation to take more courses. This review of cost displays its theoretical importance and complexity. Cost seems to have numerous components that relate to student motivation and behavior.

Summary of Eccles' EVT model. Over the last thirty years, Eccles and colleagues have greatly contributed to the understanding of student motivation by suggesting student motivation is a product of expectancy and value components. They have generally defined expectancy as students' subjective judgments of their ability to

succeed, and expectancy has been consistently linked to course performance. Value has been generally defined as the level of importance placed on succeeding at a task and has been consistently linked to course choice and interest. However, a systematic review of their measurement work revealed a number of issues that are perplexing and potentially problematic. I do not feel confident in the validity or reliability of existing measures to capture expectancy and value components, especially for the component of cost.

First, although Eccles and colleagues described cost as an additional factor that can thwart motivation, empirical work measuring and linking cost to outcomes is lacking. The exclusion of cost is briefly discussed in numerous papers published by Eccles and colleagues (Eccles & Wigfield, 1995; Wigfield & Eccles, 2000; Wigfield & Cambria, 2010), but little rationale for why it has been neglected is given.

Second, the construct labels and items used to measure them have also changed over time. Tables 11, 12, 13, and 14 list the items used to measure expectancy and value components to provide a comparison of how measures remained similar or changed over time. The table shows how the labels for these constructs have been transformed over time with additional terms and slashes added along the way. As can be seen, some items are the same, however some of the items have slightly different wording or are completely different across Parsons (1980), Eccles and Wigfield (1995), and Wigfield and Eccles (2000). Wigfield and Eccles (2000) do state that the items reported in 2000 are the ones used to measure the expectancy and value components, but these items are different from the ones seen on the initial scale from 1980 and the scale used for structural work in 1995. Perhaps these are new items, but the authors do not clearly state

why these changes occurred or if any measurement work was done to examine their reliability or validity once the changes were made.

Table 11
 18. *Eccles and Colleagues Measurement of Expectancy Components Over Time*

1980	1995	2000
Self-Concept of Math Ability	Ability/Expectancy-related Items	Ability Beliefs and Expectancy
Compared to other students in your class, how well do you expect to do in mathematics this year?	Compared to other students, how well do you expect to do in math courses this year?	None
How well do you expect to do on your next math test?	None	None
How well do you think you will do in your math course this year?	How well do you think you will do in your math course this year?	How well do you expect to do in math this year?
How good at math are you?	How good at math are you?	How good at math are you?
If you were to order all of the students from the worst to the best in math, where would you put yourself?	If you were to order all of the students from the worst to the best in math, where would you put yourself?	If you were to list all the students in your class from the worst to the best in math, where would you put yourself?
None	How have you been doing in math this year?	None
None	None	How good would you be at learning something new in math?
In comparison to most of your other academic subjects, how good at math are you?	None	Some kids are better in one subject than in another. For example, you might be in math than in reading. Compared to most of your other school subjects, how good are you in math?

Note. Rows include similar items, items in bold are the same.

Table 12
 19. Eccles and Colleagues Measurement of Utility
 Value

Utility Value over Time		
<u>1980</u> Utility of Advanced Math	<u>1995</u> Extrinsic Utility	<u>2000</u> Usefulness, Importance, and Interest
How useful is what you would learn in high school math (like trigonometry or calculus) for what you want to do when you finish school and go to work?	How useful is learning advanced high school math for what you want to do after you graduate and go to work?	None
How useful is what you would learn in advanced high school math for your daily life outside of school?	How useful is what you would learn in advanced high school math for your daily life outside of school?	None
None	None	Something that you learn in school help you do things better outside of class, that is, they are useful. For example, learning about plants might help you grow a garden. In general, how useful is what you learn in math?

None	None	Compared to most of your other activities, how useful is what you learn in math?
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Note. Similar items are located on each row, items in bold are exactly the same

Table 13

20. Eccles and Colleagues Measurement of Attainment

Value

Attainment Value Over Time		
<u>1980</u>	<u>1995</u>	<u>2000</u>
Importance of Math	Attainment/Importance	Usefulness, Importance, and Interest
I feel that, to me, being good at solving problems which involve math or reasoning mathematically is: not at all important to very important	I feel that, to me, being good at solving problems which involve math or reasoning mathematically is: not at all important to very important	None
How important is it to get good grades in math?	How important is it to get good grades in math?	None
Item is in 1980 but coded as cost of effort	Is the amount of effort it will take to do well in advanced high school math courses worthwhile to you?	None
None	None	For me, being good in math is: not at all important to very important

None	None	Compared to most of your other activities, how important it is for you to be good in math?
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Note. Similar items are located on each row, items in bold are exactly the same

Table 14
 21. Eccles and Colleagues Measurement of Intrinsic Value

Intrinsic Value over Time		
<u>1980</u>	<u>1995</u>	<u>2000</u>
Interest in Math	Intrinsic	Usefulness, Importance, and Interest
In general, I find working on math assignments: very boring to very interesting	In general, I find working on math assignments: very boring to very interesting	In general, I find working on math assignments: very boring to very interesting
How much do you like doing math?	How much do you like doing math?	How much do you like doing math?

Note. Similar items are located on each row, items in bold are exactly the same

Finally, the initial scale from 1980 is the only one that explicitly attempts to measure cost. One cost item appears in Eccles and Wigfield (1995), but the item is oddly included in the attainment value subscale. Some of their effort items appear to be theoretically linked to the effort component of cost, but they remain labeled as a component of task difficulty, which is less theoretically grounded in their model.

In short, Eccles and her colleagues' work does not paint a clear picture of how to measure cost or how cost relates to other components of EVT or student behavior. To better understand this construct, I will look to literature within educational psychology that explores cost in more detail.

The Study of Cost by other Educational Psychologists

Motivation researchers within educational psychology have begun to explore cost and its effects on student motivation (Chen & Liu, 2009; Chiang, Byrd, & Molin, 2011; Luttrell et al., 2010; Watkinson, Dwyer, & Nielsen, 2005). Their research suggests that cost does contribute to student motivation and is separate from other value components. I will review the work of these researchers to the extent that it helps further understand the construct of cost.

Watkinson et al. (2005) conducted a qualitative study to investigate students' motivation regarding physical activity during recess. They interviewed 10 third grade students with a range of reported activity levels during recess. The researchers showed students pictures of children engaging in various recess activities (swinging, kicking a ball, talking to friends, playing tag) and asked the students to explain why they thought the children were engaging in those activities. Students were also asked to explain why

they engaged in their own recess activities. During this process, students talked about the cost of engaging in activities without being prompted. They talked about physical costs of engaging in an activity (fatigue or being cold) and psychological cost (being teased by friends or facing scrutiny). Students also talked about values and expectancies, confirming the structure of Eccles' model of EVT. Though these findings come from a small sample, it provides some evidence that students consider cost when thinking about engaging in activities.

Chen and Liu (2009) conducted a mixed-methods study of adolescents' motivation for physical activity using the Eccles' model of EVT with students from numerous Chinese universities. They used items from the Self and Task-Perception Questionnaire (Eccles & Wigfield, 1995) to investigate students' expectations and values in their physical education curriculum, and due to the lack of measurement and research regarding cost, opted to collect qualitative data on cost. They examined the factor structure of the expectancy and value items from Eccles and Wigfield (1995), responses about cost from interviews, and the relationship between those responses and course choice.

Confirmatory factor analysis of the items supported the factor structure proposed by Eccles and Wigfield (1995), with separate factors for items measuring expectancy, intrinsic value, attainment value, and utility value. However, due to moderate relationships between the value components, a composite score was created for those subscales. Because the authors felt that cost was not studied enough for them to create a scale to measure the construct, they asked students the open ended question, "If there is

anything that would make you dislike physical education, what is it, and why?" Four themes were present in these interviews. Students remarked about their distaste of the curriculum, teacher, learning context (where and when courses were offered), and the assessments used in the classes. A majority of responses centered on the lack of autonomy students had in classes and boredom. The researchers also asked students, "If you have a choice whether to take physical education, would you rather not take it or [would] you still want to take it, why?" Most indicated they would, but those who responded that they would not cited other demands on their time and heavy workload as reasons why.

The need for further study of cost is apparent in this study. Chen and Liu's (2009) use of qualitative data to explore this construct displays a need for a measurement tool for cost. Relatedly, the attainment subscale for value component had a low reliability ($\alpha=.63$), which may be due to the inclusion of a cost item as was found in Eccles and Wigfield (1995). This provides some support that cost items do not fit with items meant to measure other components of value. The response themes observed in Chen and Liu's work did not support Eccles' et al. (1983) proposed components of cost. However, the phrasing of the question used during interviews may be to blame for this. The researchers asked students what they disliked, and many of these responses included the lack of certain values or expectancy (e.g., lack of interest or poor performance on assessments). Some students responded about lack of time, but most of the responses did not include mention of cost components. Additional data collection regarding what students have to sacrifice to engage in physical education or barriers to optimal

motivation is necessary to understand how students experience cost and if it does relate to their motivation.

Inspired by the earlier work of Watkinson et al. (2005), Chiang, Byrd, and Molin (2011) studied children's motivation to engage in physical activity. Children were surveyed about their expectancy, interest value, importance, and cost. They also reported how much they engaged in physical activity. The researchers used items to measure expectancy, interest value, and importance from Fredricks and Eccles (2002). These items are a subset of items included in Parsons (1980; see Tables 2-4 for items). Chiang et al. (2011) acknowledged that prior work by Eccles and colleagues omit cost, but they felt that it was important to include. They cited Wigfield and Eccles (2000) when defining cost and described it as what is given up or negatively experienced by pursuing an activity. They wrote three items to measure cost, which are included in Table 15. Cronbach's Alpha was only .57 for the three cost items. They used exploratory factor analysis to investigate the structure of the scale. This analysis revealed that a two-factor structure best fit the data, with one factor including items for expectancy, interest, and importance (they titled this factor "beliefs") and the other including the cost items. They observed a weak, negative relationship between the beliefs factor and cost.

Table 15

22. Chiang, Byrd, and Molin's (2011) Cost Items

When you exercise, how much are you missing out on doing other things?

How hard is it for you to exercise?

Does exercising make you feel worn out and tired, so you don't want to exercise again?

Note. Response options were on a 5 point scale with anchors at the low and high extreme (e.g., Not hard at all or Very Hard)

They also investigated the relationship between the EVT components and students' self-report of physical activity. Differences were found between levels of exercise and the EVT components. Students reporting less exercise reported higher levels of cost. Conversely, students reporting more exercise reported higher levels on the beliefs subscale. Gender and grade differences were also investigated. They found an interaction between grade and gender for levels of cost. Specifically, girls reported higher cost for exercise from 4th to 5th grade, but boys did not. This suggests that different groups may experience cost differentially. Overall, Chiang et al. (2011) observed cost to be separate from expectancy and value components. In addition, they observed differential outcomes for cost, whereas this was not observed for the other components.

Chiang et al.'s (2011) study provides some evidence that cost is important for determining student behavior, however their study suffers from some methodological issues. The low reliability coefficient of cost suggests that the three items used to create a subscale score may not be appropriate. Perhaps those three items are measuring different facets of cost, and cost should not be treated as unidimensional. Further, for the analysis of the relationship between exercise and EVT components they used ANOVA. Their exercise measure included three responses: 'very little', 'some', or 'a lot' and they tested for mean differences across those responses. Level of exercise could be measured as continuous, instead of categorical. When a construct is truly continuous, but split into categories, information is lost and statistical power decreased (see MacCallum, Zhang, Preacher, & Rucker, 2002 for a review). Despite some of the methodological issues in

this study, the preliminary results regarding cost speak to the need for further investigation of cost components of EVT.

Although much of the recent research that includes cost is centered on student motivation for physical education, Luttrell et al. (2010) developed and included a cost measure in their Mathematics Value Inventory (MVI). They offered a construct definition of cost and collected initial validity evidence for their scale. In addition, the researchers observed relationships between types of value and cost for students who took three or more math courses.

Luttrell et al. (2010) set out to measure values, personal cost, and need for high achievement in a mathematics context. They also conducted a multi-phase study to define the constructs and refine the item pool. Their construct definition for personal cost is rooted in the Eccles' model of EVT. They defined personal cost as an estimate made by the student of what losses are suffered as a result of trying to be successful in a math course. Further, they proposed that as losses associated with understanding math outweigh the benefits, the value of math is decreased. The items they used to measure cost are included in Table 16. A principal components analysis with oblique rotation was used to examine the structure of their scale. Four components were extracted from the data that included items to measure interest, utility, attainment, and personal cost. The cost items formed a distinct component and had adequate reliability with Cronbach's $\alpha=.87$. Mean scores for the value components and personal cost were compared across different levels of math participation. Students reported if they had taken 0, 1, 2, or 3 or more courses. Using ANOVA, the authors found that students who took 3 or more math

courses reported significant lower mean levels of personal cost and higher mean levels of interest and utility value. Interest and utility value were positively correlated with each other but negatively correlated with personal cost.

Table 16

23. Luttrell et al. (2010) Cost Items

Math exams scare me
Trying to do math causes me a lot of anxiety
Taking math classes scares me
I worry about getting low grades in my math courses
I have to study much harder for math than for other courses
Mathematical symbols confuse me
Solving math problems is too difficult for me
<i>Note.</i> Response options were on a 5-point scale, with descriptors for each point (Strongly disagree to Strongly agree)

The initial validity evidence for the MVI further supports the notion that cost is a separate factor from other types of values and has a relationship with course taking behavior. The items used to measure personal cost on the MVI are largely addressing negative affect components of developing math skills. Four of the items used describe anxiety; the other items describe the difficulty of math. These items tap into some of the theorized components of cost; however, they do not address the effort or loss of valued alternatives. Also, these items pull in difficulty components that have been linked to expectancy in Eccles' work. This work suggests that the affect component linked to cost is important to consider and is related to student course taking behavior. Specifically, students who perceive less negative affect and difficulty are more likely to take more courses.

Summary. A broader search of the educational psychology literature for studies that used Expectancy-Value Theory and included cost revealed only a handful of studies. The four studies reviewed above indicate the need for an understanding of cost and its impact on motivation. Specifically, these studies highlight that the construct of cost is

salient to students, separate from other components of EVT, and related to course taking behavior and intention. Further, the different ways in which these researchers have operationalized cost suggest that the different components originally theorized by Parsons (1980) are relevant to student motivation. Unfortunately, none of these studies measured the breadth of the construct, or provided sufficient validity evidence, so it is still unclear the impact that cost has on student motivation. Looking to this work and the work of Eccles and colleagues sheds more light on the construct of cost, but is limited to the contemporary EVT paradigm posited by Eccles and colleagues.

The Study of Cost from Other Literatures

The review of literature within educational psychology is an important part of understanding cost. However, to more fully understand this construct, I also investigated other areas of psychology. In particular, industrial/organizational (I/O) psychology and behavioral economics can provide additional insights into cost. Below I highlight examples from each domain and how it sheds additional light onto the construct.

Industrial/Organizational Psychology. Motivation is widely researched within I/O psychology. The application of motivation theory to this endeavor has fueled a body of research that investigates how motivation is related to desired outcomes in the work place. For example, Sheppard (1993) provided a review of how motivation theory can apply to the business world. He argued that loss of productivity in the workplace is a result of diminished motivation and offered EVT as one framework that could explain the effects of motivation on job productivity. However, in the I/O world, EVT is not defined using Eccles' model, but another model described by Vroom (1964). Sheppard described

three sources of productivity loss in relation to this expectancy-value model: no perceived benefit to engaging in the work, no perceived need for personal effort, and physical and psychological costs exceeding the benefit. This review paper clearly implicates the importance of cost in work motivation.

In addition, recent research by Van den Broeck, De Cuyper, and De Witte (2010) investigated the relationship between different types of cost and vigor in the workplace. The theory they utilize, the job demands and resources (JD-R) model (Bakker & Demerouti, 2007), has a component called job demands that resembles Eccles' conceptualization of cost. Bakker and Demerouti (2007) defined job demands as workload and emotional demands placed on employees and regarded demands as health impairing. However, some follow up studies using the JD-R model found some job demands to be positive in nature (Mauno, Kinnunen, & Ruokolainen, 2007) and related to engagement.

To address the contradiction in the JD-R model, Van den Broeck et al. (2010) split job demands into two parts: job challenges and job hindrances. Job challenges encompass aspects of the job that are energy depleting and stimulating, such that they appeal to competence and curiosity, whereas job hindrances include workload that interferes with employees achievement and well-being. Both job challenges and job hindrances involve energy depleting aspects, but job hindrances were negatively related to vigor, whereas job challenges were found to be positively related to vigor. These are just a couple of examples of the different ways in which we can think about cost when looking to the I/O literature.

Behavioral Economics. Behavioral economics (BE) is described as a subset of economic research that centers on predicting and controlling human behavior (Kagel & Winkler, 1972). Though much of this research focuses on consumer behavior and clinical applications, it also can be telling to apply BE when thinking of students' academic decisions. BE researchers use different terms and concepts from educational psychology, so I will briefly discuss the tenets of BE, define common terms, and then describe how I think these principals apply to student motivation and cost.

The lexicon of BE describes behavior in terms of how people consume certain goods or services and what influences that consumption. Anything that motivates behavior and increases the probability of a behavior is termed a reinforcer (Madden, 2000). Behavioral economists measure the amount of consumption of a reinforcer to ascertain its demand. The term spending in BE refers to the amount of money, work, or time one will give to obtain a reinforcer. The demand law in BE states that all else being equal, consumption of a reinforcer will decrease as its price increases. However, in the real world it is never the case that reinforcers are available in isolation. To the contrary, there are usually numerous reinforcers in competition for a persons' time or money. Consumption is influenced by the complex set of circumstances surrounding it.

Elasticity describes the extent to which a price increase will result in a decrease in consumption. Demand for a reinforcer is considered elastic if a 1% change in price produces greater than 1% change in consumption, however if consumption does not change that much, proportional to price, it is considered inelastic (Madden, 2000). In contrast, something that is inelastic does not cause significant changes in consumption.

When demand is inelastic, consumption may decrease, but spending will increase. In other words, if people feel they need a certain good, they will spend more to get it, even if they cannot get as much of that good. Exploration of what variables can influence inelasticity of demand is paramount for behavioral economists.

Different types of reinforcers and the amount of resources a person has to spend on them can provide further understanding of demand elasticity. Madden (2000) discussed income as a finite amount of resources one possesses to obtain reinforcers. Income can become depleted when spending must be increased to obtain reinforcers that have an inelastic (or inflexible) demand. Because reinforcers are concurrently available, the finite nature of our income causes differential consumption across those reinforcers based on how elastic the demand for each is. Reinforcers that have an inelastic demand will continue to be consumed, but those who do not will be consumed less as income becomes scarce. This paradigm offers a different way to think about student motivation, particularly cost.

To bring these terms to life for the current project, think of students in the education environment as consumers of their coursework. Success in coursework may reinforce students in different ways, but how much they are willing to spend is related to their fixed level of income. Spending from BE is like the construct of cost, and income can describe the total amount of time and resources a student has to engage in a task. If students' demands are inelastic, or nonnegotiable, for a certain reinforcer they may not be able to spend as much on their coursework, even if they value it. Also, reinforcers compete with one another. If students need to feel successful in their classes they have

numerous classes that could reinforce them, and could direct their spending to classes where the cost of obtaining that reinforcement is less. Further, if the price of other reinforcers outside of the education environment increases, then the student may have to reallocate spending away from education. This theory speaks to the importance of understanding student spending on tasks, not just academic tasks, but other reinforcing tasks, such as social life, family life, and work. If researchers only know what one class demands of the students, they are not getting the full picture of student motivation.

Summary. Industrial/Organization psychology and behavioral economics provide a different lens with which to view student motivation. This literature provides support for facets of cost beyond what theorists in educational psychology have focused on. I/O psychology views cost in two dimensions, where it can hinder or challenge an employee. This research suggests that stimulating or challenging cost can increase vigor and productivity in the workplace.

Behavioral economics also compliments educational psychological research. It suggests that student behavior is a result of how much students have to spend to get reinforced in numerous contexts. Eccles' idea of the loss of valued alternatives hits on this principal, but it is also important to recognize that cost can entail having to spend resources on other tasks regardless of how much they are valued. The amount of reinforcers (in and out of the classroom) that students feel they have to consume can limit their ability to spend time on given task. To consider tasks outside of the academic task might give us a more complete picture of how students allocate their resources.

Measuring Cost

Eccles et al. (1983) provided an outline for the major components of a scale to measure cost specific to the task: task-related effort, loss of valued alternatives, and psychological/emotional cost. However, given the work of Van den Broeck et al. (2010) from I/O psychology, I will initially not limit the construct definition of cost to one that is negative in nature, but define cost as what is invested, exerted, or given up to engage in a task. This broad definition, which is not bound by a negative or positive valence, will allow me to explore how these investments are described by students during the qualitative study. In addition, based on the BE literature, I think it is important to consider effort that is unrelated to the task. The proposed components and their definitions of the construct of cost are listed in Table 17.

Table 17

24. Coding Structure Definitions

Component	Definition
Not Cost	Response consists of ideas unrelated to the general cost definition provided above
Cost-General	Any response that is a description of what is invested, exerted or given up to engage in a task. The response can describe physical, emotional, mental, or social costs
Effort-Class Related	Description of time, effort, or amount of work put forth for the class
Effort-Class Unrelated	Description of time, effort, or amount of work put forth for other tasks that are outside of the class
Loss of Valued Alternatives	Description of giving up other tasks to engage in course work, not being able to do other things, missing out on other activities
Psychological/Emotional	Description of a psychological or emotional state, expressing a feeling, or mental state
Other	Description that does not fall under effort (related or unrelated to the class), loss of valued alternatives, or psychological/emotional cost, but meets the general cost description

The next step in the development process was to use qualitative data to inform the theoretical structure of cost. While coding the qualitative data to create the second iteration of the scale, I looked for responses that meet the definition of: a description of what is invested, exerted or given up to engage in a task (physical, emotional, mental or social). The data will then be coded for the components of *Effort-Related*, *Effort-Unrelated*, *Loss of Valued Alternatives*, and *Psychological/Emotional*. Responses that do

not fall within those components will be coded as *Other*. This process will allow the theoretical structure to be amended based on student data

Methods and Results

Overview

As highlighted in the introduction, the current study unfolded in iterations. I summarized the first iteration of the substantive phase for scale development in the literature review. In that iteration, I used theory to outline the substantive structure of cost. The next iteration compares how well this substantive structure of cost fits with student responses generated from a qualitative study of student motivation. Focus group data that were collected as a part of a larger study on motivation theories were used for this study. These data were recoded to focus specifically on cost. This iteration resulted in an item pool for a scale to measure cost. In the final iteration, a backwards translation further informed the scale and refined the item pool. I will present the method, results, and short discussion for each portion of the qualitative study, followed by a larger discussion of the second iteration. Then I will offer the method, results and a short discussion of the backwards translation analysis for the final iteration.

Iteration 2-Qualitative Study

Participants. Students taking introductory psychology courses were recruited to participate in the study via an online system at a medium sized, southeastern university. One-hundred and twenty-three students participated in this study. The sample was mostly female (71%) and Caucasian (89%) with an average age of 19.45 ($SD= 2.80$). Participants received class credit for their participation.

Procedure. Researchers conducted focus groups in a small conference room. These rooms consisted of a table that seated 6-10 people, a computer, and projector screen. Focus groups were conducted with a minimum of two people and a maximum of

six people. If only one person was present they were interviewed, but their data were excluded from this analysis. In all, researchers conducted 29 focus groups. Two researchers were present for each focus group. One provided instruction and facilitated discussion; the other typed shared responses into an electronic document that was projected on the screen. Students sat around the conference table, with the researchers seated near the computer.

Each session followed a detailed protocol and script, with the lead researcher reading from the script. This script is included in the appendix. Researchers began with a brief overview of the purpose of the study and proceedings of the focus group. Students were told their participation was voluntary and asked to sign a consent form if they agreed to participate. All students agreed to participate. Researchers led students through a series of prompts in a printed packet. Each participant was provided with a packet that included space for them to write their responses to each prompt. Three prompts were of particular interest in evaluating the substantive structure of cost for the current study:

- 1) Think of the college class (past or present) in which you were the most motivated. List reasons as to why you were motivated.
- 2) Think of the college class (past or present) in which you were the least motivated. List reason as to why you were unmotivated.
- 3) Cost refers to anything that you have to sacrifice or give up to be successful in a class. List specific things that you see as a cost that prevent you from being motivated in your college classes.

To answer the first prompt, researchers asked students to think of the college course (current or past) in which they were the most motivated (MM). Then the researchers asked students to think of why they were motivated and to list the reasons for their increased motivation. After students finished writing their responses independently, they took turns sharing with the group. If students' responses were vague, the lead researcher asked a probing question, for example, "Can you elaborate a bit more on your idea so I know why it was motivating?" Care was taken not to lead respondents, asking specifically for elaboration. The assisting researcher confirmed that each response was correctly typed before other students shared their ideas. Students continued sharing ideas until they generated no new ideas.

To answer the second prompt, researchers followed the most motivated (MM) portion of the focus group with a least motivated (LM) portion. Students were instructed in the same manner as the MM portion, but this time they were asked to think of the course in college in which they were the least motivated. Again, researchers provided students with the opportunity to brainstorm reasons for their decreased motivation and then to share their ideas with the group. The second researcher continued to type their responses and project them on screen.

To answer the third prompt, students were guided through a final portion of the focus group where they learned about Expectancy-Value Theory specifically. Researchers used this portion to get more information about what contributes to students' expectancy, value, and cost perceptions. The first researcher gave a brief lesson on EVT, where they explained the major components: expectancy, value, and cost. Expectancy

was defined as a students' beliefs regarding whether they could be successful in a class and value was defined as the worth students' place on a class. Cost was defined as anything students had to sacrifice or give up for success in a class and that prevented them from being motivated. Students listed specific things that increased and decreased their expectancy and value, they also listed anything they thought of as a cost. Below I will present the coding results and discussion for the MM and LM prompts together, followed by the coding results and discussion for just the cost specific prompts.

MM and LM Analysis. Two independent raters coded the responses from the most and least motivated portions for the theorized components of cost using the program NVIVO. Again, the definitions used to code the components are included in Table 17. Coding took a top-down approach as the coding scheme was decided from the literature review in the first iteration of this project. Though a strict scheme was used, it was possible that coders would find responses that were related to cost, but were not cleanly captured by the coding scheme. Appreciating that other codes could emerge from these data (Creswell, 2008), the coders also kept track of any emerging themes.

Coders progressed through two levels of coding where they first considered if the response was a cost response, then which theoretical component it described. For example, the response, "The course was too intense, too much time, too rigorous" was first coded as *Cost*, then, during the second level of coding coded as *Effort-Related*. Whereas, this response, "I hate math, I like things that are concrete" was coded as *Not Cost*. Each coder followed a detailed set of instructions during coding (included in The Appendix). If a student response was coded *Cost*, but fell outside of the theorized

components the coders coded it as *Other*. I then explored the *Other* category for emerging themes related to the construct of cost.

Percentage agreement was calculated for the two coders and frequencies of each component. Frequencies represent the number of responses for that code across all of the responses and across all focus groups. Responses were not tied to a specific individual or focus group in this analysis. Instead, frequencies and percentages were calculated using all comments that were generated across all focus groups.

MM and LM Results. Percentage agreement between the two coders was the first step in the analysis. After the first round of coding, agreement for the first level of coding (*Cost* or *Not Cost*) was 83%. Specific disagreements regarded one coder coding descriptions of feeling pressure to do well for a class required by their major, and descriptions of the class being too easy or not having enough required work as *Cost*, whereas the other did not. To clarify these discrepancies the two coders met and discussed each point of disagreement. After this discussion, they decided that responses describing the pressure or work related to a requirement for their major were *Cost* responses. Therefore, those responses were recoded as *Cost* by both raters. Also, the descriptions of the class being “too easy” or “not enough work” were considered unique and informative, so the coders created a new code, *Not Enough Cost*, to categorize those responses. After these recodes, agreement for the first level of coding was 100%. At the second level of coding the coders were in 98% agreement. Any discrepancies for the second level of coding were resolved through discussion.

A total of 735 responses were coded across both the MM and LM portions of the qualitative study. The frequencies and percentages of *Not Cost*, *Not Enough Cost*, *Cost*, and the specific components of cost, are included for the MM and LM portions in Figures 1 and 2. I list frequencies first with percentages in parentheses.

Figure 1. Pie Chart of Coding for MM Portion

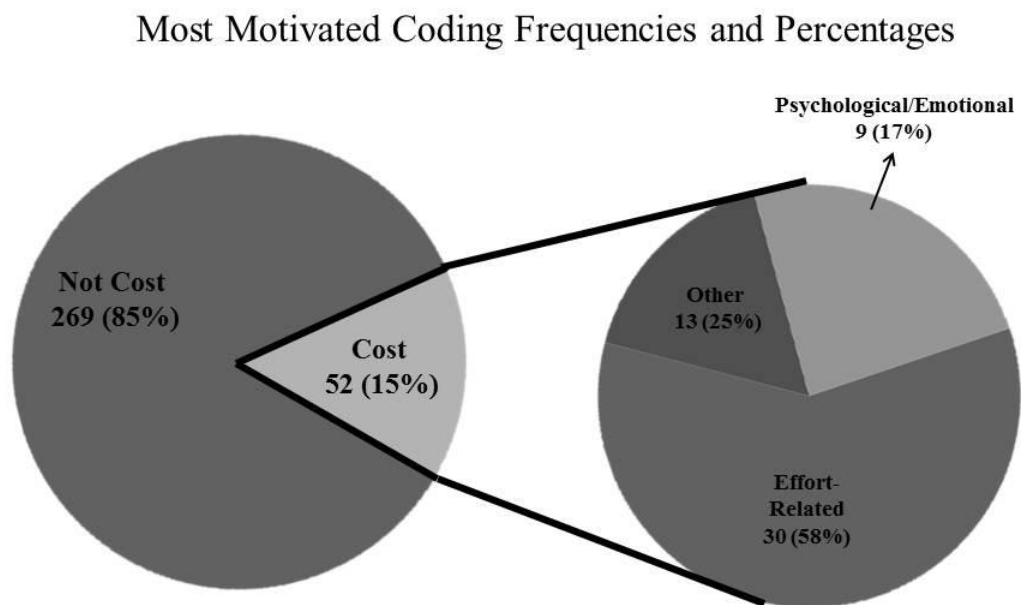
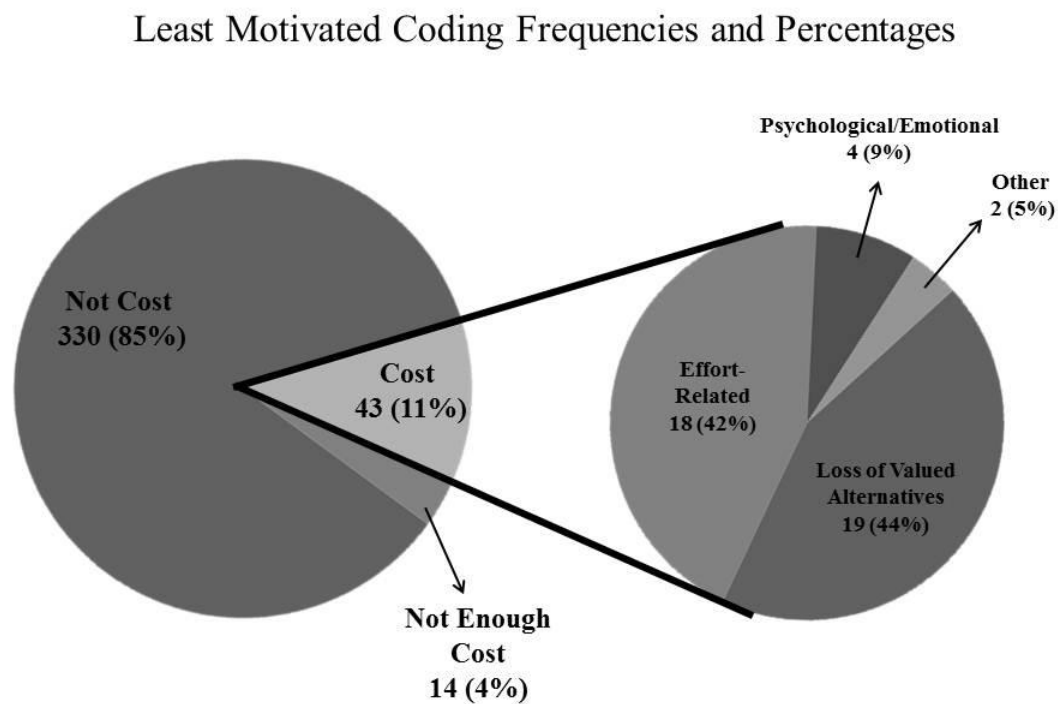


Figure 2. Pie Chart of Coding for LM Portion



Cost was present across both the MM and LM portions of the study. Overall, 15% of responses were coded as *Cost* in the MM portion, whereas 11% of responses were coded as *Cost* in the LM portion. An unexpected theme, *Not Enough Cost*, emerged from the LM condition and accounted for an additional 4% of the responses. In these responses, students' indicated that they were not motivated in the class because it did not require them to put in a substantial amount of effort, time, or was "too easy." Though these responses were a small percentage of the data, they provided a unique insight into effort and should inform future scale development.

Then, more specifically any response initially coded as *Cost* was further coded for the theoretical components of *Effort-Related*, *Effort-Unrelated*, *Loss of Valued Alternatives*, *Psychological or Emotional*, or *Other*. Figures 1 and 2 also depict the percentage of responses coded for each cost component in the MM and LM portions. Cost components that were not present in the data are not displayed in the figure. For example, *Loss of Valued Alternatives* was not present in the MM portion of the study, so it is not represented in Figure 1.

Effort-Related was the most common component across both the MM and LM portions (representing 58% and 42% of the responses, respectively). However, the content of these codes was vastly different. In the MM portion students described effort as "keeping up" or "quizzes forced me to study a lot", but in the LM portion, effort was described as "too much." Thus, while the MM responses were positive in nature and cited as reasons why the students were motivated in that class, the LM responses were always negative.

After effort, the most frequent component in the MM portion was *Other* (25%). The *Other* responses consisted of descriptions of the amount of credit hours the course was and needing to work hard because the course was a requirement for the major. The final component found in the MM data was *Psychological/Emotional* (17%). These responses consisted of descriptions of challenge and social pressure to do well (e.g., from family, friends, or the professor).

After effort, the most frequent component in the LM portion was *Loss of Valued Alternatives* (44% of *Cost* responses). These responses described giving up time, particularly time to sleep when classes were early in the morning. The remaining components found in the LM portion were *Psychological/Emotional* (9%) and *Other* (5%). The *Psychological/Emotional* responses described stress or negative feelings related to the class. The *Other* responses described financial cost. I will discuss these results in more detail below.

MM and LM Discussion. The MM and LM responses from the qualitative study were extremely informative, as they provided an understanding of what students experience in their classes without prompting about specific theories of motivation. I found that descriptions of cost were not restricted to low motivation only, but were present across both MM and LM portions in sizable numbers (ranging from 11 to 15%). Cost responses included specific descriptions of *Effort-Related*, *Psychological/Emotional*, *Loss of Valued Alternatives*, and *Other*. Though some of the same components were present across both MM and LM portions, the content of their

responses varied greatly. These differences in content are especially important for understanding how to measure cost and are discussed below.

In the MM portion students mentioned effort, work, or time as often as they did in the LM portion, but in the MM portion the increased effort or work required was positive (they cited it as a reason they were motivated). In contrast in the LM portion, student responses regarding effort were negatively appraised and took two forms: too much or not enough. These differences in the content of the responses coincide with findings from Van den Broeck et al. (2010). They found that increased effort in the work place could be positive and associated with vigor, specifically when employees felt that they had the resources to complete the work. However, increased effort and hard work were also found to be negative and associated with quitting, specifically when employees felt the work was out of their control or unmanageable.

Even though coding of the MM portion revealed a greater percentage of cost responses than in the LM portion, the observation that effort was appraised differently in the MM and LM portions changed my conceptualization of cost. Rather than conceptualizing cost as good or bad, I want to reserve the label of “cost” for negative appraisals of what is invested, exerted, or given up to be successful at a task. Cost is not just effort, but it is the students’ subjective perception of their effort, as Eccles et al. (1983) theorized. Effort, work, and time spent on a task can be motivating for a student by providing challenge and reward, but when it becomes too much or adverse in some way (e.g., requiring sacrifices or causing stress) cost is activated. One can then think of cost as either on or off. When the effort, work, or time that a task takes reaches a

particular threshold, cost turns on. As a result, my proposed scale will measure the negative, subjective appraisal that is a detriment to motivation, not just effort. Objective evaluations of effort do not help us distinguish the motivated students from the non-motivated students.

The other component present across the MM and LM portions was *Psychological/Emotional*. As with the effort, the content of these responses was different depending on the motivation level of the student. In the MM portion, students described challenge and pressure to do well, whereas in the LM portion students described stress, and worry. The increased amount of effort in most motivating classes had a positive influence on affect (the student described the challenge as motivating), but the increased amount of effort in the least motivated classes caused feelings of stress. Again these responses suggest a threshold point for cost activation. Effort that is “too much” is associated with negative affect (feelings of stress and worry). For this reason, I propose measuring affect on the cost scale. It is important to consider the appraisal of what is sacrificed and the affective indicators that accompany that appraisal, not just the objective measure of the sacrifice. Again, it is not the amount of time and effort that is impeding motivation, it is the negative appraisal if it. Once a student appraises that exertion negatively and experiences a negative emotion or feeling, cost is activated.

In contrast to what was shared across the MM and LM portions, the LM portion included *Loss of Valued Alternatives*, whereas the MM portion did not. Furthermore, *Loss of Valued Alternatives* was a substantial percentage of cost responses in the LM condition (44%). In the LM portion, students often described giving up other desired

activities because of the heavy work load, and their descriptions of *Effort-Related* were mentioned in tandem with *Loss of Valued Alternatives*. These sacrifices of other valued alternatives, like the negative psychological states, are another indicator that students have appraised the effort negatively and that cost was activated in LM.

Another difference that was not shared between MM and LM portions was the frequency of the *Other* code, which occurred at a higher frequency in the MM portion. The MM *Other* responses consisted of two themes that were not initially considered after my literature review. Some of the responses described the cost of the class in terms of credit hours or money. The rest of the responses described the course as a requirement for the major. This cost, due to credit hours and program requirements did not quite fit under the structure of cost from iteration 1, but still consisted of a description of what is exerted to engage in a task. I decided not to include a component to capture these responses because they are very specific to college students and the goal for this initial scale is that it can be used across different ages and types of students. Future research should investigate how financial cost relates to other costs and motivation for college students. For some students the financial cost helped to motivate them, but some students in the LM portion cited financial cost as a reason they weren't motivated.

An emerging theme also came from the LM condition, *Not Enough Cost*. Though these responses consisted of a smaller percentage of the total responses in comparison to *Cost* and *Not Cost*, they captured a relevant concept. These responses described not enough effort needed or not enough work required for the class. This indicates the importance of balance for student motivation and displays that the amount of work is not

as important as the students' evaluation of the work. This idea of balance is not a new one. Csikszentmihalyi (1975) hypothesized Flow Theory. This theory of motivation proposes that optimal motivation is a function of skill and challenge. If challenge is low, but skill is high, one experiences boredom. Conversely, when challenge is too high for the skill level, one experiences anxiety. This seems to be related to what the students from this study are describing in the *Not Enough Cost* code, as they described the class as “too easy” or “not enough challenge.” It is when students experience a balance between challenge and skill that they are in a state of flow.

The *Not Enough Cost* responses indicate that lack of stimulation or challenge is a detriment to motivation. Though this concept incites questions about balance of task related effort, it represented a small percentage of responses and was outside of the theoretical scope of the first iteration of this project. In addition, when *Not Enough Cost* is experienced, it would seem that students would directly experience loss of valued alternatives, which is incorporated as a theoretical component of cost. For these reasons, I decided not to include a component to capture these responses after the second iteration of the cost scale.

Cost Specific Analysis

The author coded the cost specific responses from the third prompt of the study for themes. This coding was different from the MM and LM portions, as it employed an exploratory approach as described by Creswell (2008). This approach allows for themes to emerge from the data, without any *a priori* coding scheme, thus a coding structure was not imposed for this set of data. Students listed what they perceived as costs using the

definition of “what has to be sacrificed or given up to be successful in a class” and the coder coded the data into themes to understand the essence of the responses. Creswell, Hanson, Clark-Plano, and Morales (2007) describe coding for the essence of the data as phenomenology. This coding approach to qualitative data is not meant to create a theory from responses, but to understand what participants have in common after having experienced a common phenomenon. The students in this study were all prompted to think of cost; therefore they were already primed with the theory. Through coding of their responses, we could understand the phenomenon of cost and what its essence is across the student responses.

The coder read every response twice. In the first reading, she created a one to three word label for the main idea of the response. This provided an opportunity to understand the responses before trying to code for themes (Creswell, 2008). In the second reading, she organized those main ideas into themes. Frequencies of each theme and the main ideas composing it were calculated. Themes from these data informed scale structure. Also, language from the responses was used during the item writing process.

Cost Specific Results

Students provided 184 responses from the cost specific, EVT portion of the qualitative study. The first round of coding resulted in 39 different main ideas. In the second round of coding the cost specific responses, the coder consolidated the main ideas from the first round into themes. This reduces the data and allows researchers to understand the essence of the responses (Creswell et al., 2007). The larger themes and main ideas comprising them are included in Table 18. The larger themes coincided with

Eccles' et al. (1983) conceptualization of cost. A majority of responses (48%) described the sacrifice of a desired activity, which corresponds to loss of valued alternatives proposed by Eccles et al. (1984). The second most common theme consisted of responses describing effort, work or time (26%). Students also described emotional/mental costs (5%) and the task not being valued (2%). Finally, students described a variety of other costs that did not comprise a larger theme (18%). For example, 7% of responses described the financial cost associated with a class.

Table 18
25. *Cost Specific Main Ideas by Theme*

	Frequency	Percentage
Effort	45	24%
Loss of time	28	19%
Too much work	10	7%
Loss of energy	2	1%
Outside of class work	2	1%
Class meets for many hours	1	1%
Far away from dorm	1	1%
Weather	1	1%
Sacrifice of Desired Activities	96	52%
Less time with friends	21	14%
Loss of sleep, a lot of work	14	9%
Loss of time for other classes	14	9%
Loss of weekend	8	5%
Sacrifice leisure time lost	7	5%
Loss of job/work time	5	3%
Sacrifice being in an organization on campus	4	3%
Sacrifice exercise	4	3%
Loss of valued alternatives	3	2%
Loss of meal time	2	1%
Loss of time with family	2	1%
Sacrifice watching TV	2	1%
A lot of uncovered reading	2	1%

Class not valued	2	1%
Value to work load trade off	2	1%
Loss of volunteer time	1	1%
Sacrifice playing sports	1	1%
Sacrifice time using electronics	1	1%
Work that isn't needed	1	1%
Emotional or Mental	10	5%
Stressful	6	4%
Boredom	2	1%
Mental	2	1%
Miscellaneous	33	18%
Financial Cost	10	7%
Unknown or not clear	6	4%
Unhelpful professor	3	2%
Grades	3	2%
Loss of morals or beliefs to appease professor	3	2%
Class is at a bad time	3	2%
Other people in class are distracting	2	1%
Unreasonable grading	1	1%
Cookie cutter assignments	1	1%
Other	1	1%
Total	184	100%

Cost Specific Discussion

The cost specific portion of the qualitative study allowed me to get more insight into what comprises cost for students. Students most frequently cited giving up other activities such as, social time, time to sleep, and time for other classes, which corresponds to loss of valued alternatives proposed by Eccles et al. (1983). The second most frequent theme regarded effort required by the task, which corresponds to how I defined the *Effort-Related* code from the LM and MM data.

The responses from the cost specific portion of this project further supported the model of cost activation that I discussed earlier. Students described that they felt cost when the class required too much effort, then additionally when they had to give up other activities they would like to do. They, like I propose, only used cost to describe the negative appraisals. The major themes present in these data support the components of cost theorized by Eccles et al. (1983) of task related effort, loss of valued alternatives and psychological/emotional.

However, Eccles et al. (1983) conceptualizes the effort component of cost as effort that is not worth the benefit. It is not clear if the students in this study viewed their costly effort as not worth it. Only 2% of the responses described the task as not being valued. This is an important distinction and is in contrast with Eccles et al. (1983) conceptualization of cost. I am proposing that effort can be negatively appraised, independent of value. Once students make negative appraisals about the task (cost is activated), students may begin to feel their sacrifices and stress for the class. How this is related to value is unknown. These data suggest that cost may be separate from the expectancy and value components of EVT, not just an anti-value. These responses capture an important impediment to motivation that has been neglected in EVT research.

Synthesizing Iterations 1 and 2

This project used numerous iterations to prepare a scale for the structural phase of Benson's (1998) model of construct validation. The first iteration outlined in the introduction provided a theoretical structure of the construct of cost. In the second iteration, I challenged that structure using qualitative data. Researchers coded qualitative

data for general descriptions of cost, then Eccles' components of *Effort*, *Loss of Valued Alternatives*, and *Psychological/Emotional*. In addition, researchers also coded for *Effort-Unrelated*. After analysis of the qualitative data, it was apparent that general descriptions of cost captured both motivated and unmotivated students, so I have decided that the term cost should only refer to negative, subjective appraisals. I wrote 11 items to capture negatively appraised effort (e.g., This class is too much work). I also wrote 14 items to capture Eccles et al.'s (1983) component of loss of valued alternatives. Finally, I wrote 13 items to measure the negatively appraised psychological/emotional effects of a task, as they were also present in the qualitative study.

In contrast, across all prompts of the qualitative study, students did not mention the time and effort that they exerted for tasks unrelated to the class. Though the behavioral economics literature implicates that this is an important factor in motivated behavior, students did not describe this type of cost. This may be because we prompted them to think of a specific class only. Given these specific instructions to consider one class, they may not have thought it appropriate to respond about outside tasks. Even though the qualitative study did not support this component, I am interested in how items measuring it interact with items from the other components. Thus, I wrote 8 items to capture the *Effort-Unrelated* component.

The second iteration of this project resulted in more specific construct definitions of what cost is and isn't, and the creation of the first draft of a new scale to measure cost (see Table 19). I am now using the term cost to describe negative appraisals of what is invested, exerted, or given up to engage in a task. I am proposing to measure cost in the

way that students described it, thus I used their language to generate items. For example, one student stated, “It was really stressful with all the work and labs we had to do.” This response was coded as *Psychological/Emotional* and I wrote the following item, “There is so much work in this class that it causes me to feel stressed out” to capture that student’s response. I drafted many items to measure each component, more than I would prefer on a single subscale. However, as the scale progresses through the rest of this project and the other phases of Benson’s Model (1998), I expect items to be discarded and to make additional revisions. Once a full scale was drafted, the third iteration of this project began.

Table 19

26. First Draft Cost Scale by Component

Effort-Related

This class is too much work

This class is so much work that I can’t keep up with my other classes

This class takes up too much of my time

It takes too much effort for me to get to this class

I have to spend too much of my time studying for this class

I have to spend too much time outside of class to do well in this class

There is so much work in this class that I can’t keep up

The amount of work I have to do for this class is ridiculous

I have to put too much energy into this class

This class requires too much of my time

I can’t handle the amount of work that we are asked to do in this class

Effort-Unrelated

Because of other things that I do, I don’t have time to put into this class

I have too much going on in my life to put time into this class

I am unable to invest the time that is needed for this class because of my other commitments

I don’t have enough time in my schedule to put in the effort that is needed for this class

I can’t put the time that I need to into this class because of all of my other demands

I have so many other responsibilities that I can’t focus on this class

This semester, I don’t have the necessary time to do well in this class

My workload in other classes is making it hard for me to dedicate time to this class

Loss of Valued Alternatives

I can't commit to doing the other things that I want to do because of this class

This class is at a horrible time of day

This class makes me miss out on other things I care about

This class is difficult to fit into my schedule

Because of this class, I can't do the outside of class activities that I would like to do

I am unable to take on more out of class responsibilities because this class takes up all of my time

This class requires me to give up time on the weekends

Because of this class, I can't spend as much time with my friends as I would like

I can't put as much time into my other classes as I would like because of this class

I can't be successful in my other classes because this class is so demanding

I have to sacrifice my sleep to do well in this class

I can't be as social as I would like because of all the time I spend doing work for this class

I have to give up my weekends to do well in this class

The work for this class takes up too much of my personal time

Psychological/Emotional

This class makes me feel bad about myself

This class takes a lot out of me emotionally

This class is very stressful

This class makes me feel mentally exhausted

There is so much work in this class that it causes me to feel stressed out

This class is emotionally draining

This class makes me feel bad

I feel anxious about this class

The requirements for this class stress me out

I worry a lot about this class

This class forces me to sacrifice my sanity

I spend all my mental energy on this class

Trying to keep up with this class is wearing on me emotionally

Iteration 3-Backwards Translation

Method. After an initial pool of items was created to assess cost, six content experts participated in a backward translation (Anderson & Thelk, 2005; Dawis, 1987; Smith & Kendall, 1963). This method was described by Smith and Kendall (1963) and calls for the use of a group of trained judges or experts who were not involved in the item writing process to map items to the theorized scale structure. This method provides assurance that items clearly map to the proposed dimensions of the scale. In addition, a backward translation provides evidence that items cover their intended breadth of the construct, which can be used as support for the content validity of the scale (Messick, 1995).

Experts included two faculty members, two doctoral students, and two master's students. All of which have expertise in measurement and motivation theory. Experts were explicitly instructed to map items if they corresponded to one, more than one, or none of the cost components. A high degree of agreement among the item reviewers would provide evidence for content validity. Previous content validation studies (e.g., Miller, Setzer, Sundre, & Zeng, 2007) have used 67 percent agreement among content experts as a minimally acceptable level for an item. The purpose of this study was to narrow the item pool, so only items where the majority of experts agreed were retained. Instances where reviewers' agreement was lower than a majority (or less than 4 experts agreed) indicate that the items are potentially problematic and may need to be reviewed or removed from the cost scale. Experts were also asked to provide feedback about the items in a comment box. These comments were also considered when evaluating the

items. If an expert commented that an item was confusing, it was not retained for the final scale.

Results. I display results from the backward translation in Table 20. I analyzed the reviewers' results in relation to what component the item was written to measure. The items that map to each component are shown in boldface in Table 20. For example, the first item was written to measure *Effort-Related* to the task, the percent of agreement for *Effort-Related* is bolded. All of the content experts mapped the item to the *Effort-Related* component.

Table 20

27. Backwards Translation Proportion Agreement by Item

Item	Effort- related	Effort- Unrelated	Loss of Valued Alternatives	Psychological/ Emotional	None
This class is too much work	1	0.17	0	0	0
This class is so much work that I can't keep up with my other classes	1	0.33	0.33	0	0
This class takes up too much of my time	1	0	0.17	0	0
It takes too much effort for me to get to this class	0.83	0.17	0	0	0.17
I have to spend too much of my time studying for this class	1	0.33	0.33	0	0
I have to spend too much time outside of class to do well in this class	0.33	0.33	0	0.17	0.33
There is so much work in this class that I can't keep up.	1	0	0	0	0

The amount of work I have to do for this class is ridiculous	1	0	0	0.17	0.17
I have to put too much energy into this class	1	0	0	0	0
This class requires too much of my time	1	0	0	0	0
I can't handle the amount of work that we are asked to do in this class	1	0.17	0.17	0.5	0
<hr/>					
Because of other things that I do, I don't have time to put into this class.	0.17	0.83	0.33	0	0
I have too much going on in my life to put time into this class	0.33	0.83	0.33	0	0
I am unable to invest the time that is needed for this class because of my other commitments	0.33	1	0.33	0	0
I don't have enough time in my schedule to put in the effort that is needed for this class	0.67	0.83	0.17	0	0
I can't put the time that I need to into this class because of all of my other demands	0.33	1	0	0	0
I have so many other responsibilities that I can't focus on this class	0.17	1	0.33	0	0
This semester, I don't have the necessary time to do well in this class	0.33	0.83	0	0	0.17
My workload in other classes is making it hard for me to dedicate time to this class	0.17	1	0	0	0
I can't commit to doing the other things that I want to do because of this class	0.17	0	0.83	0	0

This class is at a horrible time of day	0.33	0.17	0.17	0	0.5
This class makes me miss out on other things I care about	0.17	0	1	0	0
This class is difficult to fit into my schedule	0.33	0.33	0.33	0	0.5
Because of this class, I can't do the outside of class activities that I would like to do	0.33	0	1	0	0
I am unable to take on more out of class responsibilities because this class takes up all of my time	0.67	0.17	0.83	0	0
This class requires me to give up time on the weekends	0.67	0	0.83	0	0
Because of this class, I can't spend as much time with my friends as I would like	0.17	0	1	0	0
I can't put as much time into my other classes as I would like because of this class	0.67	0	0.67	0	0
I can't be successful in my other classes because this class is so demanding	0.83	0	0.67	0	0
I have to sacrifice my sleep to do well in this class	0.17	0	0.67	0	0.17
I can't be as social as I would like because of all the time I spend doing work for this class	0.5	0	1	0	0
I have to give up my weekends to do well in this class	0.17	0	1	0	0.17
The work for this class takes up too much of my personal time	0.5	0.17	0.67	0	0

This class makes me feel bad about myself	0	0	0	1	0
This class takes a lot out of me emotionally	0.17	0	0	0.83	0
This class is very stressful	0.17	0	0	1	0
This class makes me feel mentally exhausted	0.17	0	0	1	0
There is so much work in this class that it causes me to feel stressed out	0.5	0	0	1	0
This class is emotionally draining	0.17	0	0	1	0
This class makes me feel bad	0	0	0	1	0
I feel anxious about this class	0	0	0	1	0
The requirements for this class stress me out	0.17	0	0	1	0
I worry a lot about this class	0	0	0	1	0
This class forces me to sacrifice my sanity	0.17	0	0.17	1	0
I spend all my mental energy on this class	0.33	0	0.17	0.83	0.17
Trying to keep up with this class is wearing on me emotionally	0.33	0	0	1	0

Note. Proportions in bold indicate the component the item was written to measure

Table 21 shows the percentage of items by their level of agreement for each component. The *Effort-related* and *Psychological/Emotional* component had the highest percentage of complete agreement. *Effort-Unrelated* and *Loss of Valued Alternatives* had less than 50% complete agreement. Most of the items (93%) had favorable agreement among the raters, and alignment with the appropriate component. However, many of the items were mapped to numerous components, though they were written to map to only a single component.

Table 21

28. *Count and Percent of Items for each Component by Agreement*

	Effort-related	Effort-unrelated	Loss of Valued Alternatives	Psychological / Emotional
Complete Agreement	9 (82%)	4 (50%)	5 (36%)	11 (85%)
Majority Agreement	1 (9%)	4 (50%)	7 (50%)	2 (15%)
Less than Majority Agreement	1 (9%)	0 (0%)	2 (14%)	0 (0%)

Discussion. The backwards translation helped narrow the item pool and better understand the proposed components. Many of the items that I wrote to measure *Loss of Valued Alternatives* and *Psychological/Emotional* cost were also mapped to the *Effort-Related* component by the judges. Excess amounts of effort or time needed for the task seems to be inherent in loss of valued alternatives and psychological/emotional cost. Recall the *Psychological/Emotional* item I mentioned earlier, “There is so much work in this class that it causes me to feel stressed out.” Experts mapped this item to the *Psychological/Emotional* component, but half of them also mapped it to the *Effort-Related* component. If cost is negatively appraised effort, then loss of valued alternatives and psychological/emotional costs may be indicators or outcomes of that effort. These experiences seem to all implicate cost and may not be easily separated in the mind of the student. The final item pool includes items that cleanly measure the proposed components, per the backward translation analysis, but also items that touch on numerous components at once, like the example from above.

Individual item feedback provided by the experts was also an important part of the final scale construction. Experts stated that many of the *Loss of Valued Alternatives* items were too specific and not applicable to all students. For example, the item “I have to give up my weekends to do well in this class” implies that the time on the weekend is a valued alternative. However, it is possible that a student does not view the weekend as a valued alternative to work. Thus, only general items were retained. For example, the item “This class causes me to miss out on other things I care about” does not specify any certain valued alternative and could apply to anyone. In addition, some items, though

agreement was high, were regarded as confusing or too colloquial. The final item pool excludes items where those comments were made.

Experts' comments also led to further thought regarding the *Psychological/Emotional* component and what type of items would help fully represent the breadth of this component. Specifically, experts made additional comments about other aspects of psychological or emotional cost that were excluded from the initial pool of items such as, not enough challenge and that could lead to other types of negative affect (most notably boredom). These comments inspired me to revisit the literature and the *Not Enough Cost* responses from the qualitative study.

Four percent of responses from the LM portion of the qualitative study described that the class did not demand enough. For example, one response, "Seemed easy, no tests, limited work" described a general lack of effort needed. Students also described that the class was not challenging enough. In addition, in the cost specific qualitative study a small percentage (1%) of students mentioned boredom. Given the comments from raters and further consideration of the qualitative study, it seems imperative that some scale of motivation capture these themes. Though, it is unclear if a cost scale should encompass this theme. As discussed before, another theory, Flow Theory (Csikszentmihalyi, 1975) captures this lack of challenge and boredom. To explore these issues, I generated an additional pool of new items to capture these parts of Flow Theory that were present in the qualitative data. However, further research and theoretical explanation will be required to truly understand how this theme relates to cost from EVT.

That type of research would be conducted during the external phase of Benson's Model (1998).

Experts also commented about the lack of breadth regarding affect on the *Psychological/Emotional* component. Therefore I am proposing that content from a pre-existing scale complement the items that I originally wrote. Linnenbrink-Garcia, Rogat, and Koskey (2011) created a scale to measure affect that covers indicators of negative and positive affect. They divide their negative affect scale into two subscales: one for negative-activated affect and the other for negative-deactivated affect. Linnenbrink-Garcia et al. characterized activated affect as arousing (e.g., feeling tense or anxious) and the deactivated subscale as low arousing (e.g., feeling tired or worn out). The content of the items in the negative-deactivated subscale were used to revise the *Psychological/Emotional* items I wrote, so that both types of negative affect are equally represented.

In sum, the results from the backward translation helped to refine the item pool, but also influenced the proposed structure of the scale. At the end of the second iteration, I wrote a pool of items to measure *Effort-Related*, *Effort-Unrelated*, *Loss of Valued Alternatives*, and *Psychological/Emotional*. However, experts mapped many of my items to numerous components and they commented that the *Psychological/Emotional* component was incomplete. To address these issues a new proposed structure is warranted. Table 22 lists the revised components and the items written to measure them. This structure includes 36 items to measure *Effort-Related*, *Effort-Unrelated*, *Loss of Valued Alternatives*, *Psychological/Emotional* (with activated and deactivated items), and

Not Enough Cost. In addition, some of the item are now regarded, per results of the backward translation, as a blend of numerous components and are labeled Mixed.

Table 22

29. Final Draft Cost Scale by Component

Effort-Related
I have to spend too much of my time studying for this class
I have to put too much energy into this class
This class requires too much of my effort
This class takes up too much of my time
It takes too much effort for me to get to this class
The amount of work I have to do for this class is ridiculous
There is so much work in this class that I can't keep up
Effort-Unrelated
Because of the other things that I do, I don't have time to put into this class
I have so many other responsibilities that I can't focus on this class
My work load in other classes is making it hard for me to dedicate time in this class
I can't put the effort that I need to into this class because of all of my other demands
I am unable to invest the time that is needed for this class because of my other commitments
Loss of Valued Alternatives
I can't commit to doing other things that I want to do because of this class
Because of this class, I can't spend as much time with my friends as I would like
This class causes me to miss out on other things I care about
Because of this class, I can't do the other activities that I would like to do
This class requires me to give up too much of my leisure/free time
Psychological/Emotional
This class is very stressful
This class makes me feel mentally exhausted
This class is emotionally draining
The requirements for this class stress me out
Trying to keep up in this class is tiring
I feel anxious about this class

I worry a lot about this class
This class makes me mentally tired/fatigued
This class takes a lot out of me, emotionally

Mixed items

This class is so much work that I can't keep up with my other classes
I can't handle the amount of work we are asked to do in this class
There is so much work in this class that it causes me to feel stressed out
I can't put as much time into my other classes because of this class
I can't be as social as I would like because of all of the time I spend doing work for this class
I can't be successful in my other classes because this class is so demanding
I spend all of my mental energy on this class
I feel anxious about all of the work in this class

Not Enough Cost

This class was too easy
This class didn't challenge me enough
I didn't even have to try in this class
This class was boring

General Discussion

The purpose of this project was to embark on a journey that would lead to the understanding of the unmotivated students I quoted in the opening. I began with these questions:

What is it that these students were describing?

Can we capture it systematically?

How is it related to students' expectations for success or interest in their course?

How is it related to their performance and willingness to take more courses in the subject?

And, what could teachers do to optimize student motivation if they knew students were experiencing it?

These were, of course, too many questions to answer in a single study, or this project. However, these questions parallel the phases of Benson's model (1998) for construct validation and provide a guide for the journey. The first question captures what is at the heart of the current project, the substantive phase of Benson's model. Completely answering, "What is it that these students are describing?" was the primary goal of the studies presented here. Once I can answer that question, a scale could be created to measure the construct. This first and crucial step in the process paves the way for research to answer the rest of the questions I had about comments from those unmotivated students in the introduction.

Table 22 includes the proposed scale to measure cost. This scale went through numerous iterations. As a result of the first iteration, I discovered that a scale does not exist to measure the breadth of the theory proposed by Eccles and colleagues. I also

reviewed the educational psychology literature and literature from other areas of psychology to get a broad understanding of the theoretical space in which cost lives. At the end of the first iteration of this project, the literature suggested that cost is comprised of Eccles et al.'s (1983) components, but also an additional component, *Effort-Unrelated*. Specifically, the Behavioral Economics literature proposed that motivated behavior for one task is function of how much energy or time is left after other tasks are completed. Therefore, to get the complete story of what drives student behavior for a given task, the scale will measure the effort they exert for other tasks as well.

In addition to proposing components, I also set out to define cost. It was unclear if cost should be conceptualized as only negative. Van den Broeck et al. (2010) found that increased amounts of work or effort were related to vigor under certain circumstances. For this reason, the second iteration of the project coded for general descriptions of what is invested, exerted, or given up to engage in a task. The context of those descriptions was considered to understand if they were negative or positive.

The second iteration of this project allowed students to speak about what influences their motivation. From this study, I learned that the general definition of cost from iteration 1 was present across motivated and unmotivated situations. The data from this study supported that students were motivated and unmotivated when the work load was heavy and required effort. What varied across the MM and LM portions of the qualitative study were the appraisals of that effort and how it made the students feel. Effort in the MM portion was described as a reason for their motivation. Students' cited "working hard to keep up" as a positive thing, whereas in the LM portion students

described their work as “too much”, “overwhelming”, or “stressful.” In contrast, students described challenge and pressure to do well when they were the most motivated. These differences in responses stress the importance of the subjective appraisal of the effort invested. It seems that, from these data, that when the effort is appraised negatively cost is activated. Effort and hard work cannot be used to distinguish the motivated student from the unmotivated student. The subjective appraisal of the work must be measured.

The second iteration of the project also allowed students to speak about what sorts of things felt like cost. In this part of the study, I learned that the loss of valued alternatives is especially salient to students. Students most frequently described giving up time with friends or time to spend working for other classes. This further supported the negative nature of cost. Though students described putting a lot of effort into a class in the MM portion, they did not describe giving up other valued activities. This sacrifice is associated with the activation of cost. For these reasons, the first draft of the cost scale included items to measure negatively appraised effort, effort from other tasks, loss of valued alternatives, and psychological/emotional components.

The third iteration of the project, the backwards translation, helped to narrow the item pool, but also to understand the overlapping nature of my proposed components of cost. Many items were mapped to numerous components by expert judges. The *Effort-Related* component was mapped to items written to measure the other components. This suggests that it was difficult for the expert raters to pull task related effort apart from unrelated effort, loss of valued alternatives, and psychological/emotional items. This presents a challenge in writing items that focus on one component. For this reason, items

of a “mixed” nature were included on the final scale. For example, the item, “This class is so much work that I can’t keep up with my other classes”, describes work, but also not being able to keep up with other classes (a loss of a valued alternative). Though I propose cost has different components, it is possible that these components all capture a single latent construct and tend to blend together in the minds of a student. It is currently unknown if that is how students experience it, or if the different components of cost are independent from one another. A factor analytic study is needed to understand the empirical structure of the proposed scale. The scale could be unidimensional, and including different types of items will help span the theoretical breadth of cost for content validity purposes. Alternatively, cost could be multidimensional, in which case the mixed items might need to be discarded if they do not map to a single component.

I also added new items after the backwards translation to address comments from experts and a theme from the qualitative data. Items now capture a balance of activated and deactivated negative affect (Linnenbrink-Garcia et. al., 2011) as well as what was described by students in the *Not Enough Cost* theme. Though I provided pilot items to capture the *Not Enough Cost* theme, I am not convinced, from the results of this project that they should be under the umbrella of cost. These items capture a component from a different theory, Flow Theory (Csikszentmihalyi, 1975). While they may be crucial to understanding the unmotivated student, further research is necessary to see how they overlap or interact with components of EVT to form a broader explanation of student motivation.

The final proposed scale includes 39 items (listed in Table 22). Many items were written for each component with the expectation that items will be discarded as the scale progresses through the latter stages of Benson's Model (1998). The items are meant to capture the negatively appraised sacrifices that students make to be successful in a class. I hope this proposed scale can detect if cost is activated for students, and if so, how much cost they are experiencing. In addition, we could see how cost interacts with the expectancy, value, and other theories of motivation to explain student behavior and outcomes..

Strengths and Limitations

A majority of validity studies published over the past 50 years have focused on quantitative analyses that investigate scale structure (Zumbo & Shear, 2012). Though this is a very important part of the process of validation, no single part of the process should be the focus of validity work (Messick, 1989). This project does not fall in that majority and focuses on the substantive structure of cost, not quantitative, scale structure. The strength of this study lies within its in-depth approach to the substantive phase (Benson, 1998) of construct validation and its use of the voices of actual college students. Though this is the primary strength of this study, it also introduces limitations.

This project provided immense insight into student motivation and a detriment to it, cost. From this analysis I have a better understanding of the history of cost from EVT, how it has been measured, how students speak about their motivation, what they see as cost, and what expert judges think of the items I wrote to measure cost. However, there

are important questions that go unanswered with these data. I will briefly discuss the limitation in the literature review, qualitative studies, and general scope of the project.

The first phase of this study used literature to determine the coding structure for the subsequent phases. However, the focus of that literature review was on Expectancy-Value Theory. I reviewed some other areas of psychology, but it is possible that other literatures that I did not review could contribute to the understanding of cost. A more in-depth literature review could provide new insights into how to understand and measure cost. Gehlbach and Brinkworth (2011) discuss an in-depth process of review where the construct of interest is connected to all other relevant theories and ideas. This sort of in-depth review would aide in the appropriate placement of cost in the sea of constructs and theory that science has to offer. I cannot say that the literature review conducted in this study served that purpose, but focused on the history of cost from EVT and its measurement.

Another limitation of this project had to do with the qualitative study. The qualitative data used for this project were part of a larger study, and not specifically designed for this project. The first two prompts of this study to look at factors contributing to MM and LM experiences provided a great opportunity to code for descriptions of cost when students weren't prompted in a specific manner. The last prompt, however, meant to capture student perceptions of cost specifically, and did not use the exact definition that I began with after the first phase of this project. Cost was defined as anything students had to sacrifice or give up for success in a class and that prevented them from being motivated. That definition did not provide students with the

opportunity to talk about the positive side of time invested, but limited cost to a negative appraisal. An ideal study would have allowed students to speak to their effort and sacrifices objectively, and then get their appraisal of those investments, and is worthy of a future follow up study. Though this limits the interpretations that can be made from those data, the rest of the qualitative data provides an insight into student appraisals of effort and work.

Finally, although the proposed scale was informed by the literature, numerous studies, and a great deal of thought, it is unknown how it will function with actual students. The greatest limitation in this series of studies is that they do not render a scale with known properties. This work does not tell us how reliable the scale is, what its factor structure is, or what it is related to. Those questions are very important to consider and fundamental in scale development. Researchers are ill advised to put this scale to use before future research has been conducted on it. The scale must continue on its journey through Benson's (1998) model of construct validation before it can be used.

Future Research

The following questions remain unanswered:

Can we capture it systematically?

How is it related to students' expectations for success or interest in their course?

How is it related to their performance and willingness to take more courses in the subject?

And, what could teachers do to optimize student motivation if they knew students were experiencing it?

In order to answer each of these questions, the results of the current project's substantive phase need to progress through the remaining phases of Benson's model (1998).

To move into the structural phase, the next study should determine how the items function and the scale's structure. This research is necessary before item scores can be summed and used to represent a student's level of cost. A score on the scale is useless if it is not reliable and unidimensional. This study would aim to answer those questions and focus on the second phase of Benson's (1998) model, the structural phase. In this future study, I would administer the scale to a large sample of students in a college class and determine the patterns in their responses. Item analyses that investigate the distribution of responses for each item and the reliability for the scale will need to be thoroughly investigated. Item distributions could alert me to items that are skewed, or stand out from the rest. Then reliability of items would need to be investigated by using statistics such as Cronbach's Alpha to determine the overall reliability of the scale, and to identify items that decrease the reliability. A general item analysis allows for exploration of individual items, but a factor structure analysis is also necessary.

The next set of analyses in a structural study would first utilize an exploratory factor analytic approach. All items were written to measure cost. Though the scale includes items that measure different components, the items could all measure one underlying factor. However, that is an empirical question. An exploratory factor analysis would help me to better understand the structure of students' responses. Later samples could utilize a confirmatory approach to continue to test the hypothesis that the scale is

unidimensional, but in addition, competing hypotheses that the scale consists of separate factors, perhaps one for each major component of cost. Confirmatory factor analyses could also test the factor structure of the scale at different time points or across different populations to ensure the structure is stable. Additionally, these studies could inform if *Not Enough Cost* is related to the other components I proposed.

If the scale is to be used in different settings, with different students, assessing the factor structure with those populations is necessary to assess invariance. These studies help to answer the question, “*Can we capture it systematically?*” that I posed earlier and are an imperative part of Benson’s (1998) model. Structural work on the scale paves the way to answering substantive questions about student motivation. A scale with a reliable structure can be used to predict student outcomes. Studies that aim to answer substantive questions about cost would coincide with Benson’s (1998) third phase, the external phase.

In the external phase, “How is cost related to students’ expectations for success or interest in their course?” and “How is cost related to their performance and willingness to take more courses in the subject?” are of primary interest in this phase of Benson’s (1998) model and are of particular interest to me. Future research with this scale would determine the relationship cost has with the other components of Expectancy-Value Theory, but also with outcomes, such as performance and persistence. It was such questions that inspired me to undertake this measurement project in the first place. Many students struggle to succeed in their classes, major, or even college as a whole. I hope that the ability to capture cost will help me to understand why these students struggle and

how to design interventions to help them. Studies that seek to answer these sorts of questions could be many, and varied, but of immediate interest would be investigations of interactions with other components of EVT and performance in a college class.

I intend to investigate the relationship between expectancy, value, and cost in different college classrooms and the predictive power of the scales used to measure those constructs. I would like to collect data in different types of classes for known groups validity evidence, including those that are known to have high level of drop, withdrawal and fail rates (DWF rate). If functioning properly, the scale should be able to detect the differences in cost across the different types of classes.

If cost, in conjunction with other EVT components, can predict which students will give up or fail a class, we can then begin to think of ways to reduce it. Also, we can, for the first time, see the substantive contribution cost makes in the classroom environment. Does cost help researchers and teachers to understand student performance or persistence beyond the information that measures of expectancy and value provide? This is just unknown for now. The scale proposed here must continue on its journey of validation.

This scale paves the way for an exciting opportunity, to incorporate the forgotten component of EVT into motivation research. Eccles and colleagues discovered important relationships between student outcomes and components of EVT. Specifically they found that students' levels of expectancy were strong predictors of grades in math, even when taking previous grades and values into account (Eccles et al., 1983; Eccles et al., 1989; Meece, Wigfield, & Eccles, 1990; see Wigfield & Eccles, 2000 for a review). In

contrast, they found value to be consistently related to students' interest and future course taking. A scale that would allow for cost to be incorporated into these models provides the opportunity to finally understand its contribution. It may be a missing piece that provides insight into what was previously unknown about student motivation.

Appendix
FOCUS GROUP COVER SHEET

Session # _____

Date _____ Location _____ Time: Start _____
End _____

Facilitator(s) _____ Participants: Expected # _____
Actual # _____

COMMENTS

Preparing for the Focus Group

Materials (All materials and the key will be stored in G-087, our basement motivation lab).

- conference room key
- consent forms (+ extra copies)
- timer/watch
- facilitator script
- participant packets
- manila folders/envelopes
- focus group cover sheet
- pens/pencils
- dry erase markers

Room setup

1. Start up the main computer and projector
2. open up a blank Microsoft Word document (or place dry erase markers at the board if using a whiteboard).
 - a. Immediately save the file to the desktop using the following format that summarizes 3 things:
 - i. Type of session (e.g., Qual_session),
 - ii. Date session was run (e.g., 1-26-11), and
 - iii. Time session started (e.g., 5pm)

e.g., Qual_session_1-26-11_5pm
 - b. Also get the MS word file ready by zooming in and selecting TEXT WIDTH so font is easy to read by participants
3. Also, open up the powerpoint presentation to teach E-V-C components and download it to the desktop (or be prepared to write it on the whiteboards). The file is posted at our MRI blackboard website and was emailed to our group.
4. Have the FOCUS GROUP COVER SHEET placed by the keyboard, so the experimenter who is typing in responses can also write down any comments while the session is taking place.
5. Arrange desks or tables if necessary.

*in particular, position yourselves so the facilitator can be near the screen in the front of the room and is able to point or access the screen.

6. Have materials (packets and pencils) ready to pass out to participants.
7. Locate restrooms in case students ask where they are.
8. **And for your FYI: the title of our study that students are signing up for is COLLEGE STUDENT MOTIVATION (STUDY A).**

Directions for Running the Focus Group

Participants will come directly to the room where we are running the focus groups. Simply introduce yourself and let them know that you will be running their session, and tell them to have a seat and wait until the others arrive. Ask them to turn off their cell phones and other electronic devices, and to put away their belongings.

Words **in bold** are said to participants. Words not in bold are instructions for interviewer/facilitator.

Welcome to our session, and thank you for participating in today's focus group. I will be serving as the facilitator of your discussion, and to help standardize how each session is run, I will be referring to a "script" throughout the session.

If a second researcher is assisting, introduce him/her at this time.

If you haven't already done so, please turn off your cell phone and any other electronic devices you've brought with you.

Also, you'll need something to write with, does everyone have a pen or pencil?

To begin the session, I am going to pass out a consent form. It outlines the purpose of today's session and your rights as a research participant. I'd like everyone to take a few moments to read through the consent form and then to sign it if you agree to participate in the focus group. I'm going to collect these from you, but I have extra copies available if you'd like to take one with you when you leave.

****Pass out consent forms.**** Allow participants a few minutes to read, and look for visual signs that everyone is done and has signed the bottom of the sheet. *If you're*

unsure whether someone has finished a task during the session, you can always ask: "Does anyone need more time?" After everyone has signed, continue with the script.

****Collect signed consent forms.****

Before we begin our discussion, it would be helpful for us to get acquainted. Let's go around the table and say your name, what year you are in school, and what you're majoring in or thinking of majoring in.

Identify one member and say, **Why don't we start with you?**

Wait for everyone to introduce themselves and then continue on with the script.

As you read in the consent form, you're here to share your thoughts on important factors that affect the motivation of college students and to engage in a group discussion of those factors.

Now, for our discussion to be as productive as possible, I want you to know that it is VERY important that you are open and honest in your responses. I also want you to know that anything you share will remain completely confidential between us, so I really do want you to feel comfortable and safe in sharing your opinions.

Also, if you have any questions or need clarification about instructions during the session, please don't hesitate to ask. Note really emphasize this line and try to make eye contact with each participant as you deliver it.

Now, before we start sharing ideas as a group, we want to give you a chance to generate ideas on your own. To help you keep track of your ideas, I'm going to pass out a packet to everyone.

****Pass out packets****

On the first page, you are being asked to think about the college class in which you were the most motivated.

First, can you choose a specific class and write down what that class was on the top of the page. Pause to give participants time to write a class down. Does everyone now have a class clearly in mind?

Second, can you take the next few minutes to list ideas on WHY you were motivated? Be sure to write down anything that comes to mind that you think is important.

Give them 3 minutes at most, then stop everyone at this time. If they all stop writing before the 3 minutes is up, go ahead and continue. If people are still writing as 3 minutes approaches, give them a “30 seconds remaining” warning to finish up their last idea, and then continue on with the script. If anyone starts to turn to the next page before they are instructed to do so, just politely tell her/him to wait for additional instructions.

Now, turn to the second page in your packet. Rather than thinking about the class in which you were the most motivated, I want to flip the coin and have you think about the class in which you were the least motivated.

Again, can you first choose a specific class and write down what that class was? Pause to give participants time to write a class down. Does everyone now have a class clearly in mind?

Then, can you take the next few minutes to list ideas on why you were unmotivated? Be sure to write down ANYTHING that comes to mind that you think is important.

Give them 3 minutes at most, then stop everyone at this time. If they all stop writing before the 3 minutes is up, go ahead and continue. If people are still writing as 3 minutes approaches, give them a “30 seconds remaining” warning to finish up their last idea, and then continue on with the script. If anyone starts to turn to the next page before they are instructed to do so, just politely tell her/him to wait for additional instructions.

Now, I would like us to share and discuss everyone’s ideas. Can you turn back to the 1st page of your packet?

To get us started, let’s begin by going around the table and having you each share one idea from your lists on why you were motivated. Then, we’ll keep going around the table until we list all the unique ideas that you came up with. We're going to type in and keep track of your responses on screen. Point to the screen at the front of the

room, and go stand near it if you're not. See end of the script for how to format the MS word file that we're using to record responses on screen.

See if one person volunteers an idea, or ask one person to go first. Try to have students take turns so everyone can quickly get involved and feel like a part of the conversation. Also be sure to type in each student's idea in his/her own words.

***If a response is unclear and would be difficult to link to a particular theory or construct (e.g., they say the "teacher"), try to have the participant elaborate (e.g., What do you mean by "teacher"? What specific things does the teacher do to motivate you? Can you elaborate a bit more on your idea so I know why it's motivating/unmotivating?)*

After they slow down or stop generating ideas continue with the script:

Can everyone check their lists... Do we have all of the ideas that you wrote listed on screen, or is there something on your list that hasn't been said?

Add any missed ideas.

Now I'm going to read each of the items listed on the screen. But now I would like to tally how many of you had the same ideas written on your list. As I read each item, please raise your hand if you had it on your list. For example, how many of you had the first item? After identifying the number for the first item as ____, simply state back to the group this would mean that ____ of you had that response, and ask if that makes sense to our participants. Then continue with the entire list line-by-line, adding in parentheses (____) beside each idea how many people had it.

Now that we've been exchanging ideas about your most motivating classes, can you think of anything NEW to add to the list on what made your class motivating?

Add any new ideas to the list, but now start new ideas with asterisks (rather than dashes). Once all ideas are said, continue with the script.

Now, please turn to the 2nd page of your packet and let's discuss your ideas about the class in which you were the least motivated. Again, let's take turns sharing ideas.

See if one person volunteers an idea, or ask one person to go first. Again, try to have students take turns so everyone can quickly get involved and feel like a part of the conversation. Maintain a "Least Motivated" list on the screen.

After they slow down or stop generating ideas, continue with the script:

Can everyone check their lists... Do we have all the ideas, or is there something on your list that hasn't been said?

Add any missed ideas.

Again, I'm going to read through our list, and if I say something that you had written down on your list, please raise your hand so I can record how many people came up with each idea. Read aloud the entire list line-by-line, adding in parentheses (___) beside each idea how many people had it.

And now that we've been exchanging ideas about your least motivating, can you think of anything NEW to add to the list on what made your class unmotivating?

Add any new ideas to the list, indicating somehow (maybe by a line or asterisks) that these are new. Once all ideas are said, continue with the script.

That completes the first part of our session.

For the NEXT part, I'd like to share with you a theory of motivation.

**Refer to overhead slides to provide a visual to participants (or write out notes on a white board).

One theory suggests our overall level of motivation can be determined by 3 components:

- ❖ **The first component is EXPECTANCY.**
- ❖ **The second component is VALUE.**
- ❖ **The third component is COST.**

When applied to being motivated in a college class:

- ❖ **EXPECTANCY refers to your belief on whether you can be successful in a class.**
- ❖ **VALUE refers to the worth that you place on a class.**
- ❖ **COST refers to anything you have to sacrifice or give up to be successful in a class.**

Now, can you turn to the 3rd page of the packet? Hold up a copy of the packet and turn to the 3rd page, then point as you deliver the next line to help focus participants' attention:

On the top of the page, we'd like you to think of your most motivating class that you identified earlier. Then, we like you to rate your overall levels of expectancy, value, and cost in your most motivating class.

Wait for participants to make their 3 ratings then point to the bottom of the page as you deliver the next line"

Then on the bottom of the page, think about your least motivating class. Again, rate your overall levels of expectancy, value, and cost were in your least motivating class.

Optional: If we have time, it would be helpful to ask participants how easy or hard it was to do these overall ratings ("Was it easy or hard to indicate your expectancy, value, and cost for these classes?")

Now, can you turn to the 4th page of the packet? We'd like to spend our final part of our session talking more about each of these components to motivation.

Our first component suggests that students are motivated when they have high expectancy .

Again, expectancy refers to your belief on whether you can be successful in a class.

Take a few moments to list specific things that increase and decrease your expectancy that you will be successful in your college classes.

Give them 4 minutes at most, then stop everyone at this time. If they all stop writing before the 4 minutes is up, go ahead and continue. If people are still writing as 4 minutes approaches, give them a “30 seconds remaining” warning to finish up their last idea, and then continue with the script.

Now can you turn to the 5th page of the packet. Our second component suggests that students are motivated when they have high value.

Again, value refers to the worth that you place on a class.

Take a few moments to list specific things that increase and decrease the value of your college classes.

Give them 4 minutes at most, then stop everyone at this time. If they all stop writing before the 4 minutes is up, go ahead and continue. If people are still writing as 4 minutes approaches, give them a “30 seconds remaining” warning to finish up their last idea, and then continue with the script.

Now turn to the 6th page of the packet. Our last component suggests that the cost of engaging in a behavior may prevent us from being motivated.

Cost refers to anything that you have to sacrifice or give up to be successful in a class.

So, for one final time, list specific things that you see as a cost that prevent you from being motivated in your college classes.

Give them 2 minutes at most, then stop everyone at this time. If they all stop writing before the 2 minutes is up, go ahead and continue. If people are still writing as 2 minutes approaches, give them a “30 seconds remaining” warning to finish up their last idea, and then continue with the script.

Optional:* If there is time remaining in the session, you could continue, **Now, I would like us to discuss your ideas for questions 4 and 5.*

- **What were the ideas that you listed to increase your expectancy?**
- **What were the ideas that you listed to decrease your expectancy?**
- **What were the ideas that you listed to increase your value?**
- **What were the ideas that you listed to decrease your value?**

Again, try to facilitate getting students to take turns. For each question, maintain a list on the computer. After each question, ask: **Can everyone check their lists... Do we have all the ideas, or is there something on your list that hasn't been said?** Add any missed ideas.

And now that we've been talking about it, can you think of anything NEW to add to the list? Add any new ideas. (use a line/asterisk)

Once all ideas have been shared for a question, continue on to the next question in the list above, or move on with the script.

Finally, I ask that you please turn to the last page of your packet and complete some demographic questions.

Wait several minutes until it seems like everyone is just about done.

Collect packets

DEBRIEFING STATEMENT

Thank you for participating in our study today. If you have any questions or concerns, please feel free to take a copy of the consent form and e-mail any of the addresses on your consent form. Thank you again for your time and have a good evening.

Shutting Down the Focus Group

1. Be sure to **SAVE** the MS word file, and to save this file in multiple locations (flash drive, MRI's Blackboard page, and e-mail it to yourself and to kenn: barronke@jmu.edu). Also, please **CHECK** that it has been saved and can be opened **BEFORE** you leave the session
– OR –
If we have to use the whiteboards, be sure that any lists from the whiteboards have been accurately transferred onto paper. **DOUBLE-CHECK** that the paper lists match the ones on the whiteboard **BEFORE** erasing.
2. Complete the FOCUS GROUP COVER SHEET and write down any comments that you or your co-facilitator have.
3. Write the date and start time of your session at the top of the 1st page of each participant's packet (just in case these happen to get shuffled).
4. Put consent forms, participant packets, focus group cover sheet, and note paper (if applicable) in the folder/envelope.

If another session does not immediately follow...

5. Shut down computer/projector.
6. Return desks/tables to their original places.
7. Make sure the room is locked.
8. Pack up all materials **AND THE KEY TO THE ROOM**, and return them to the motivation lab
9. Post participation credit on SONAS system for those who completed the study (and if we had no-shows, indicate no show status on SONAS).

****And again remember to return the key****

Tips on how to enter data in the MS WORD file.

Q1: Most motivating ← *start off by typing in a header*

- the teacher is funny (3) ← *initially use a dash to bullet each new idea*
- the teacher is brilliant (1)
- the teacher, cares about students (4)
- the material, because it was interesting (1) ← if a participant is asked to elaborate (E.g., if they just said the material), use a "comma" to separate what elaboration was given
- *I learned a lot ← use an asterisk to indicate new items generated after everyone's initial ideas
- * I liked the other students in the class

INSERT PAGE BREAK (press and hold down control and enter keys, or select page break under the INSERT menu).

Q2: Least motivating

- boring topic (5)
- boring professor (4)
- required for gen-ed (1)
- too much work (3)
- * time of day
- * too hard

Parentheses at the END of each line represent our format on how to tally how common each idea was in the group **Q1) Throughout your time in college, think about the class in which you were the most motivated.**

FIRST, write down your class (providing as much information as you can remember about the department, course number, and title of the class, e.g., Bio 155: Introduction to Molecular Biology)

SECOND, take the next few minutes to list ideas below on why you were motivated. Write down **anything** that comes to mind that you think is important.

Q 2) Throughout your time in college, think about the class in which you were the least motivated.

First, indicate the class (providing as much information as you can remember about the department, course number, and title of the class, e.g., Bio 155: Introduction to Molecular Biology)

Second, take the next few minutes to list ideas below on why you were unmotivated. Write down **anything** that comes to mind that you think is important.

Q3) Now that you are more familiar with expectancy, value, and cost theories of motivation.

Think again about the college class in which you were the most motivated.

Using the 1 to 7 scale below, please indicate how low or high your expectancy, value, and cost were in this class:

	Extremely						Extremely
	Low		Moderate				High

Expectancy refers to your belief on whether you can be successful in a class.

a) My expectancy for the class was...	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

Value refers to the worth that you place on a class.

b) My value for the class was...	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

Cost refers to anything that you have to sacrifice or give up to be successful in a class.

c) My cost for the class was...	1	2	3	4	5	6	7
--	---	---	---	---	---	---	---

Now think about the college class in which you were the **least motivated**.

Using the 1 to 7 scale below, please indicate how low or high your expectancy, value, and cost were in this class:

	Extremely						Extremely
	Low		Moderate				High
<hr/>							
Expectancy refers to your belief on whether you can be successful in a class.							
a) My expectancy for the class was...	1	2	3	4	5	6	7
Value refers to the worth that you place on a class.							
b) My value for the class was...	1	2	3	4	5	6	7
Cost refers to anything that you have to sacrifice or give up to be successful in a class.							
c) My cost for the class was...	1	2	3	4	5	6	7

Q 4) Expectancy refers to your belief on whether you can be successful in a class.

List specific things that increase your expectancy that you will be successful in your college classes.

Now list specific things that decrease your expectancy that you will be successful in your college class

Q 5) Value refers to the worth that you place on a class.

List specific things that increase the value of your college classes:

Now list specific things that decrease the value of your college classes:

Q 6) Finally, **cost** refers to anything that you have to sacrifice or give up to be successful in a class.

List specific things that you see as a cost that prevent you from being motivated in your college classes.

Demographic Questions

Q7) What is your gender? (CIRCLE ONE)

- a) Female
- b) Male

Q8) What is your class year? (CIRCLE ONE)

- a) Freshman
- b) Sophomore
- c) Junior
- d) Senior
- e) Other _____

Q9) What is your age? _____

What is your ethnicity? _____

Q11) What is your major (or your intended major)?

Q12) What is your current college GPA? _____ *(If you don't have a current GPA yet because you're a 1st semester freshman or a new transfer student, leave blank.)*

Consent to Participate in Research

Identification of Investigators and Purpose of Study. The purpose of this session is to interview students about their academic motivation in college courses. You are being asked to participate in a research study being conducted by Drs. Kenn Barron and Chris Hulleman from the Department of Psychology at James Madison University. This study will contribute to the investigators' program of research in motivation.

Potential Risks and Benefits. The investigators do not perceive any more than minimal risks from your involvement in the study. You are volunteering your opinion and are under no obligation whatsoever to share information that you do not wish to share. Your responses will have a number of benefits, most notably to help develop a new measure on academic motivation, which will help universities measure and potentially increase academic motivation in college coursework.

Research Procedures. Should you decide to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction. You also will be asked a series of questions to help generate an extensive list of characteristics of a course that help motivate college students.

Time Required. Participation in this study will require about one hour of your time.

Confidentiality. The results of this study may be reported at research conferences and in academic journals. We will not use your name or identify you when discussing the results of the study. The results of this project will be coded in such a way that the respondent's identity will not be attached to the final form of this study. The researchers retain the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented representing averages or generalizations about the responses as a whole. All data will be stored in a secure location only accessible by the researchers. After completing the study, all the information about the participants and data will be destroyed. You can also contact the researchers at barronke@jmu.edu or hullemcs@jmu.edu to discuss the results of the study.

Participation and Withdrawal. Your participation is entirely voluntary, and you are free not to participate. If you choose to participate, you can withdraw from the study at any time without consequences of any kind.

Questions about the Study. If you have questions or concerns about your participation in the study, or you would like to receive a copy of the final aggregate results of this study, please contact:

Dr. Kenn Barron, Department of Psychology, James Madison University, barronke@jmu.edu, (540) 568-4065

Questions about Your Rights as a Research Subject

Dr. David Cockley

Chair, Institutional Review Board

James Madison University

(540) 568-2834

cocklede@jmu.edu

Giving of Consent. I have read this consent form and I understand what is being asked of me as a participant. I freely consent to participate, and my questions have been answered to my satisfaction. The investigator provided me with a copy of this form. I am at least 18 years old.

Name of Participant (Printed)

Name of Researchers (Printed)

Name of Participant (Signed)

Name of Researchers (Signed)

Date

Date

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