

IOWA STATE UNIVERSITY
Digital Repository

Retrospective Theses and Dissertations

Iowa State University Capstones, Theses and
Dissertations

1-1-2003

**Developing outcome expectancy measurement: moderating
expectancy with value**

Reed Jeremy Robinson
Iowa State University

Follow this and additional works at: <https://lib.dr.iastate.edu/rtd>

Recommended Citation

Robinson, Reed Jeremy, "Developing outcome expectancy measurement: moderating expectancy with value" (2003). *Retrospective Theses and Dissertations*. 20015.
<https://lib.dr.iastate.edu/rtd/20015>

This Thesis is brought to you for free and open access by the Iowa State University Capstones, Theses and Dissertations at Iowa State University Digital Repository. It has been accepted for inclusion in Retrospective Theses and Dissertations by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.

Developing outcome expectancy measurement:

Moderating expectancy with value

by

Reed Jeremy Robinson

A thesis proposal submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Psychology

Program of Study Committee:
Norman A. Scott, Major Professor
Lisa M. Larson
Douglas G. Bonett
John M. Littrell

Iowa State University

Ames, Iowa

2003

Graduate College
Iowa State University

This is to certify that the master's thesis of
Reed Jeremy Robinson
has met the thesis requirements of Iowa State University

Signatures have been redacted for privacy

TABLE OF CONTENTS

ABSTRACT	iv
CHAPTER 1. LITERATURE REVIEW	
Introduction	1
Social Cognitive Theory	1
Social Cognitive Career Theory	2
Outcome Expectations	3
OE Measurement and Considerations	5
Importance of Value	7
Unique Features of OE	8
CHAPTER 2. PURPOSE	9
CHAPTER 3. METHOD	
Participants	17
Procedure	17
Constructs Measured	18
Instruments	19
Hypotheses	23
Design and Analyses	24
CHAPTER 4. RESULTS AND DISCUSSION	
Results	26
Discussion	35
Future Directions	40
CHAPTER 5. REFERENCES	44
APPENDIX A. IRB APPROVAL FORM	47
APPENDIX B. EXAMPLES (COV & COE)	48

ABSTRACT

Social Cognitive Career Theory is an emergent theory in the realm of Vocational Psychology. A component of this theory is the construct of outcome expectations. This study proposes to explore and expand the Career Outcome Expectancy scale created by Larson (Springer, Larson, Tilley, & Gasser, 2001). The goal of this study is to assess whether an expansion of the scale to incorporate outcome valuation with the already-measured expectancy will enhance the measurement of the construct of outcome expectation. Further, a more adequate measure of the construct could provide additional and empirical support for *social cognitive career theory* (Lent, Brown, & Hackett, 1994) to which the construct is tied.

CHAPTER 1. LITERATURE REVIEW

Introduction

Through his development of *social cognitive theory* (SCT; 1977, 1982, 1989), Albert Bandura has made some of the most significant contributions to date in psychology's efforts to understand human behavior. He sought to explain, understand, and even make efforts to predict human behavior. By introducing acceptance of and attention to cognition, Bandura has taken the study of behavior beyond the realm of rewards and punishments, and into the realm of thought, interest, and anticipation.

Social Cognitive Theory

Bandura focused upon three variables as central to the problem of understanding and predicting behavior: the person, his/her behavior, and the environment in which they exist and function (Bandura, 1989). *Social cognitive theory* (SCT) introduces the idea of *triadic reciprocity* as a model of the interaction between these three variables. Bandura's theory was unique in that it viewed behavior as a codeterminant of the interaction between the person and environment rather than as a by-product (Lent, Brown, & Hackett, 1994). As a result, human behavior is seen as being partially affected by the result of past behaviors.

In exploring the personal determinants of behavior within SCT, Bandura (1977, 1982, & 1989) placed considerable emphasis on self-efficacy. However, he also acknowledged the importance of outcome expectation and goal representations as determinants of behavior. Perhaps in response to this emphasis, a great deal of research has been conducted investigating the relationship between self-efficacy and career variables within the context of vocational psychology (Hackett & Lent, 1992; Multon, Brown, & Lent, 1991; Sandri & Robertson, 1993).

Social Cognitive Career Theory

Building on the generality of SCT, Lent, Brown, and Hackett (1994) introduced a model for career behavior and interest development called *social cognitive career theory* (SCCT). Within this broad and comprehensive model, they develop sub-theories that attempt to explain and predict interest development and choice behavior at varying levels. Figure 1 is a representation of the “choice model” as Lent and colleagues present it. As in SCT, they focused on self-efficacy and outcome expectations as the principle determinants of interest development.

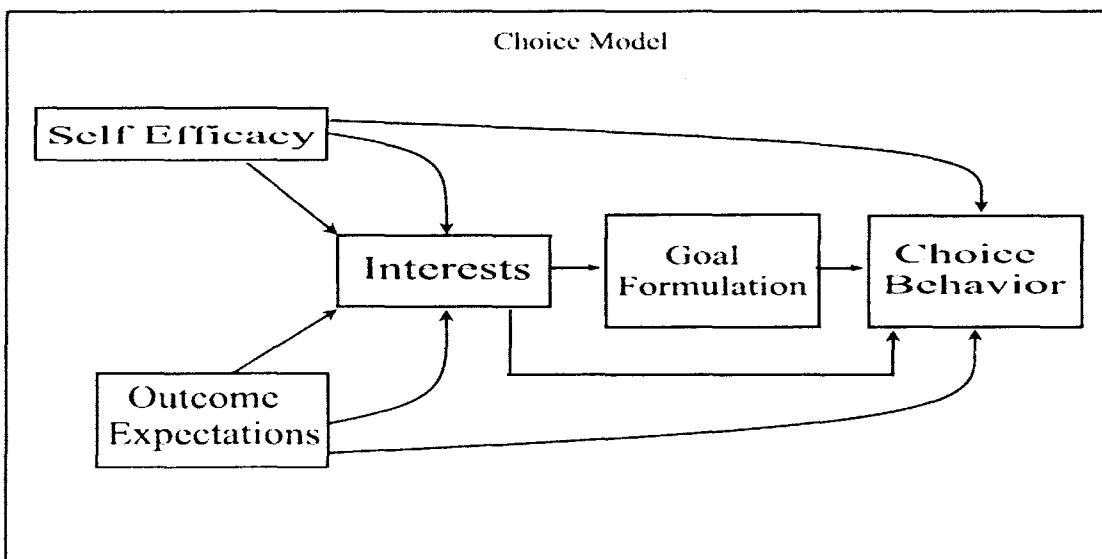


Figure 1. Lent, Brown, and Hackett's *Social Cognitive Career Theory* (1994)

As illustrated in figure 1, to determine goal formation, Lent and colleagues theorize a combinational effect of these three determinants, self-efficacy (SE), outcome expectations (OE), and interest (1994) on choice behavior. This choice behavior (whether the individual follows through with an action) is therefore the product of the interaction of these three variables and goal formulation. Yet Lent and colleagues (1996) identified goal formulation as a choice behavior. Thus the model can be simplified to include goal formulation within the rubric of choice behavior.

Thus, research suggests that three variables converge to predict choice behavior. All of these determinants have been thoroughly researched except OE (Betz, Borgen, & Harmon, 1996; Harmon, Hansen, Borgen, & Hammer, 1994). We argue that attention to this variable is both warranted and needed in order to begin to empirically validate SCCT. Without a means to measure OE, the model can only be partially supported.

As indicated above, two of the variables are well known, measured, and accepted in the field. The first, self-efficacy, has been given a significant amount of attention in the literature (Hackett & Lent, 1992; Multon, Brown, & Lent, 1991; Sandri & Robertson, 1993), and in the realm of measurement vis-à-vis inventory development as seen in the Skills Confidence Inventory (SCI; Betz et al., 1996). Interest, perhaps the most prominent of career variables in the literature, has been studied for years, beginning in the area of vocational psychology with the work of Strong (1927). Even today one of the premiere interest scales in the field bears his name in the Strong Interest Inventory (SII). The SII (Harmon et al., 1994) is constructed around the ideas of John Holland (1997), who proposed the hexagon of career interests, categorizing them across the “Holland Themes”. Thus the General Occupational Theme (GOT) scores that the SII produces can be thought of as quantifications of Holland’s theory (Harmon et al., 1994).

Outcome Expectations

Having established that self-efficacy (SE) and interest are both relatively well studied and measured, we turn our attention now to the third component of Lent and colleagues’ model, outcome expectations. Lent et al. (1994) define Outcome Expectations (OE) as “personal beliefs about probable response outcomes” (1994, p. 83). In formulating the original social cognitive theory of behavior, Bandura (1986) delineated outcome expectations into classes. These classes included physical outcomes, social outcomes, and self-evaluative outcomes. Physical outcomes are arguably the most salient in career behavior and choice determination, in that they include monetary expectations. Social and self-evaluative outcomes, often

conceptualized as approval and satisfaction respectively, are less easily conceptualized but perhaps no less important.

Individual researchers have highlighted the importance of OE in different ways. Vroom (1964) emphasized outcome probability as largely determinant of choice behavior. Yet, Bandura (1989) himself does not seem so sure as he merely indicates that OE may contribute independently to motivation and behavior. But Lent and colleagues (1994, p. 84) believe more strongly, stating that, "costly life decisions would seem to mandate consideration of response outcomes as well as personal capabilities".

What is evident is that the focus of the research to date has been on interests and SE. Studies examining the two variables independently would be almost too numerous to mention. In a meta-analysis of relevant research, Rottinghaus, Larson, and Borgen (in press) found 48 samples which addressed the relationship between interest and SE. Additionally, over half of the studies included in their analysis were based in SCCT. Outcome Expectations, on the other hand, has not received such thorough attention. Recent studies including operational definitions of OE in some respect include studies of them in specific contexts. Examples include client attrition (Longo, Lent, & Brown, 1992), career planning for secondary education students (Shell, Colvin, & Bruning, 1995), math and science careers in vocational psychology (Fouad & Smith, 1996; Lopez, Lent, Brown, & Gore, 1997), counselor training (Larson, 1998), research careers in vocational counseling psychology, and management careers (Van Vianen, 1999). While these studies do include attention to OE as a construct, even fewer actually attempt to measure it. Of these, most are tied to a specific domain like engineering (e.g., Hackett, Betz, Casas, & Rocha-Singh, 1992), or subject-specific outcomes like those for math and science (Fouad & Smith, 1996; Lopez, Lent, Brown, & Gore, 1997). However, none of the OE measures found while conducting the review for this study are entirely domain flexible except the Career Outcome Expectancy Measure (COE; Springer, Larson, Tilley, & Gasser, 2001).

OE Measurement and Considerations

As a construct, outcome expectations have traditionally been defined as a range of confidence that a given outcome or series of outcomes will be realized if a choice is engaged. One of the issues with the measurement of OE is that outcomes are tied to a particular choice possibility and the expectations it inspires. An individual's choice of career is often seen as the central concern of vocational psychology in this area. Career choices are central to Holland's theory, and all choices can be categorized within it. Outcome expectations, on the other hand do not readily fall in to Holland-based categories. Therefore, one cannot easily measure an individual's OE across the domains of Holland's hexagon because only the choice behavior (and not the OE that it may inspire) can be thought of in this context. This dilemma occurs because to answer questions about OE, one must first be given (or choose for themselves) a choice (occupation) to consider and evaluate. For example, respondents might be asked what outcomes they would expect if they pursued a career as a doctor. As such, OE measurement becomes domain/choice specific. For any one choice there are several outcomes to consider, such as monetary considerations, prestige, opportunity for advancement, and so on. Instruments designed to measure interest and SE have hundreds of items, each of which would qualify as a potential choice. Therefore, to adequately capture all of the OE across Holland's domains, one might be forced to multiply the length of the SII by a factor of twenty or more. This could be accomplished by taking every interest question on the inventory and asking to what extent the respondent felt that favorable outcomes would be obtained by developing or pursuing this interest.

It may be that the relative lack of development in OE measurement is due in part to this lack of OE measures, as OE researchers do not yet benefit from standardized inventories like the SII and SCI (Harmon et al., 1994; Betz et al., 1996). To address the need for a flexible OE measure that is not grounded in a particular domain or choice behavior, Larson created the Career Outcome Expectancy measure (Springer, Larson, Tilley, & Gasser, 2001, see appendix for examples). The COE was based on the 20 items contained in Rounds, Henly, Dawis, Lofquist, &

Weiss' (1981) listing of values in the Minnesota Importance Questionnaire (MIQ). In taking the inventory, an individual responds to the items (which are general) with respect to a specific choice possibility that they may choose themselves or may be chosen for them. For example, having chosen a specific career about which to respond, an individual is then asked about the extent to which he/she feels confident that their salary will compare well with that of others. The items of the COE are measured on a 6-point Likert scale, with a higher rating corresponding with high expectations for the given outcome.

The COE was designed in such a way as to be universally applicable and flexible in that it is not choice/job specific. Thus, it can be used to assess an individual's OE with respect to any occupational choice. However, it is domain specific in that the OE measurement is meaningful only with regard to the choice/job an individual pre-identifies before completing the measure. That is, the individual taking the inventory is asked to think of a particular, specific occupation and then asked to rate the extent to which he/she would expect to receive each of the 23 different outcome possibilities (e.g., "My salary will compare well with that of others" and "I will have good working conditions"). The ratings are then summed to create a single score that measures that individual's outcome expectations for that particular occupational choice. In an early three-part study entailing a factor analysis, a cross validation, and an assessment of test-retest reliability, Larson was able to provide good support for the potential utility (validity and reliability) of the measure (Springer et al., 2001). Refer to the "instruments" section within the method section of this paper for more detailed information on the psychometric properties of this inventory.

While the COE presents a new, generalized direction in OE measurement, the power of an outcome expectation to influence behavior may be related to the value one places on the outcomes in question. And so we turn our attention to valuation.

Importance of Value

The Minnesota Importance Questionnaire (MIQ) was developed as one of many components of the Work Adjustment Project at the University of Minnesota under the guidance of Lloyd H. Lofquist and René Dawis (Scott, Dawis, England, & Lofquist, 1960; Dawis, 1996). This project was organized to empirically formulate a theory of work adjustment through the collection of large amounts of data across several variables Dawis and his colleagues thought to be important. The result was the *theory of work adjustment* (TWA; Dawis, 1996). TWA emphasized the bi-directional nature of the worker-environment relationship, and concluded that the primary determinants of tenure (length of time in a given position) were satisfaction (worker's satisfaction with the job) and satisfactoriness (the extent to which the worker is satisfactory in the eyes of his/her employer). In describing the elements that determine worker satisfaction, the researchers "drew on the concept of reinforcement," defining "needs" as "preferences for classes of reinforcers" (Dawis, 1996, p. 76). As the theory develops, "needs" translate to "values," which may or may not be met by the circumstances of employment at any given time. This, then, becomes the essence of satisfaction within TWA: are the specific needs of the worker being met by the environment? Of even more interest is the fact that in TWA, the extent to which need fulfillment determines satisfaction is moderated by the importance of the needs being met (or failing to be met), which is a function of values (Dawis, 1996). That is, if a need is not being met, it matters more to the worker's level of satisfaction if the need is an important one, rather than a relatively insignificant need. This moderating relationship may seem simple upon initial examination, but its application later in this study will be central to the purpose of the study itself.

Having considered the importance of value in refining the definition of work-related needs, it then becomes possible to transpose this idea to outcome expectations. OE can essentially be thought of as beliefs about whether certain "needs" will be met by a given choice. For example, many people value monetary gain a great deal. Others value prestige or social status or any number of possible

outcomes. A potential limitation of the COE is that it does not take this into account, as it only measures the extent to which a person expects to receive the outcome. For instance, an individual may be considering a job as a teacher. For purposes of brevity one might consider three outcome possibilities: money, social service (doing things for others), and security. Most people would likely rate money as low on the OE, while rating the other two fairly high (depending on their perceptions of teachers), potentially yielding a score of 13 (1+6+6). But if the individual does not care at all about making a lot of money, the absence of this expectation would not matter as much as it might if it were highly valued. In either case, the item sum score would continue to be 13, and these differences in values would not be recognized.

Unique Features of OE

Outcome expectancy has, by name, two elements. The latter is very clearly measured by the COE. However, the ability of the “outcome” to affect behavior is a product of motivation (Bandura, 1986). With the *theory of work adjustment* (TWA), Dawis and colleagues posit that motivation is inherently captured by value (1996). *social cognitive career theory* (SCCT) argues that OE is a product of considerations of positive and negative possible outcomes, positives enhancing behavior likelihood, and negative making the behavior less likely. The strength of the positivity or negativity of the outcome is determined by value. For example, we have mentioned the potential importance of salary in determining career decisions. One person may value money above all else, while another may care little about being wealthy. However, both could be guaranteed to make the same large amount of money for choosing a particular occupation, yet the individual who values money highly would be expected to be more likely to pursue the choice than the other. SCCT and traditional conceptions of OE consider the belief that an outcome will be obtained. Within TWA, the key factor in determining satisfaction is the delivery of what is valued. Thus, given the convergence of these two theories of vocational phenomena, we hypothesize that incorporating an “outcome valuation” measure into

an assessment of outcome expectancy may yield more useful results than an OE measure alone. Such a measure would therefore be a development of the COE, and given SCCT, should better empirically predict choice behavior than the COE alone if the construct validity were higher. Given this convergence, let us review some of the key points as we explain the rationale for this study.

CHAPTER 2. PURPOSE

As stated above, the COE measures expectancy. What it does not measure, however, is the extent to which each outcome is valued, sometimes referred to as outcome importance. This study is designed to add a value-measurement component to the current COE measure in order to (potentially) further develop its utility as a vocational instrument. Figure 2 displays the portion of the choice model investigated by the current study. Figure 3 displays what this portion of the choice model looks like after adding the value-measurement component. In this model, the resulting COE-V can become an operational representation of value-fulfillment expectancy, which can be seen as a potentially more predictive version of outcome expectancy.

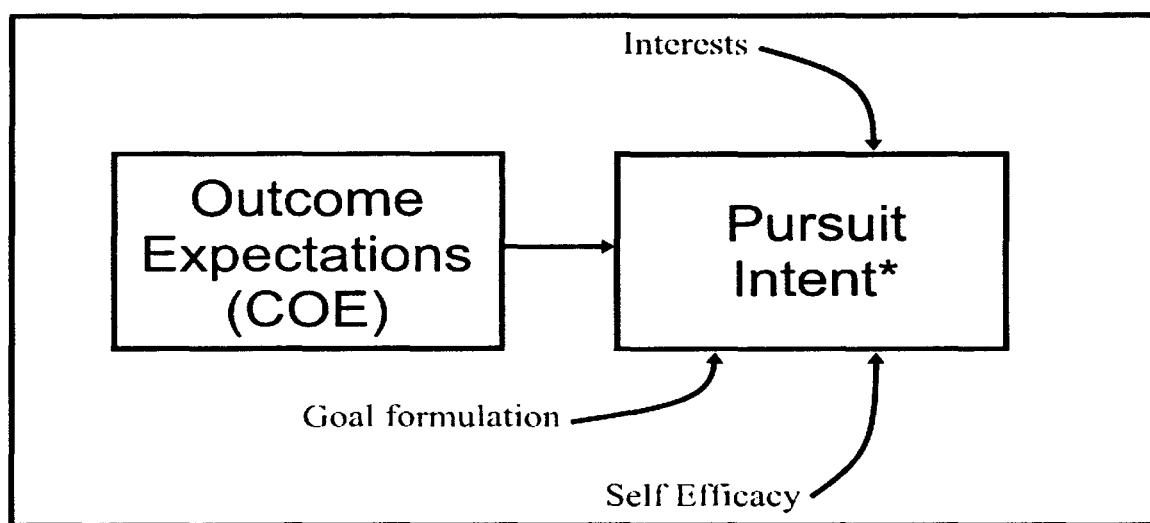


Figure 2. Current Model (no attention to value)

COE: Career Outcome Expectancy Scale (Springer et al., 2001)

*Pursuit Intent is an operational definition for Choice Behavior

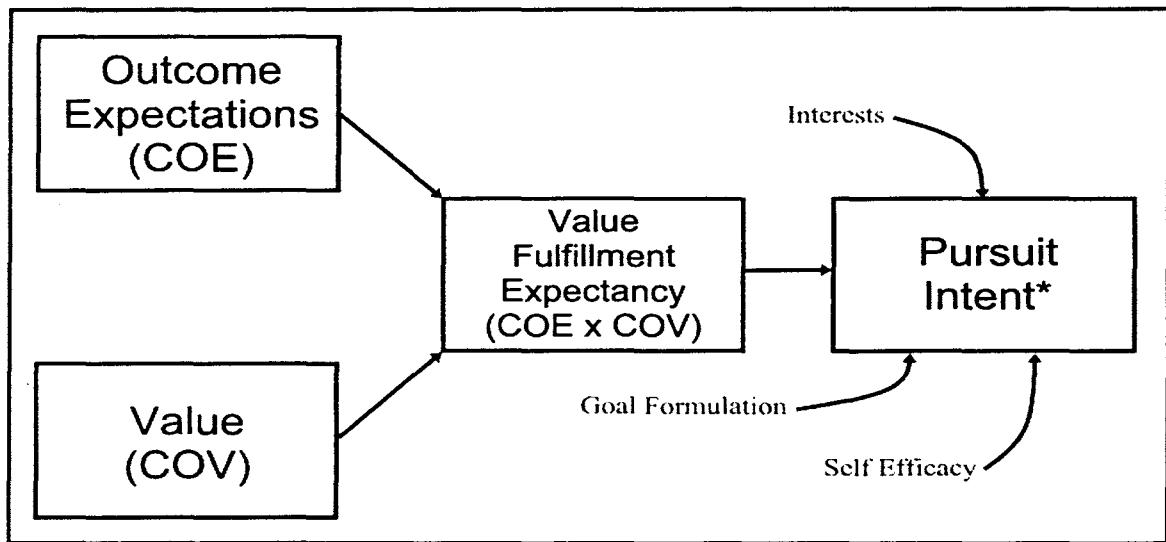


Figure 3. Proposed model of Value-weight Outcome Expectancy

COE: Career Outcome Expectancy Scale (Springer et al., 2001)

*Pursuit Intent is an operational definition for Choice Behavior

The incorporation of value measurement to this area of vocational research entails the introduction of the construct of "outcome valuation". "Outcome valuation" is the idea that a given outcome will be assigned a different level importance contingent upon the values that an individual holds. For example, a person who greatly values being well paid in his/her career would place great importance in the measure of monetary outcomes. Conversely this same individual may not be concerned about having good working conditions, and so the expectancy of this outcome is not likely to have an effect on his/her choice.

While expectancy is a variable construct, changing over time as new information is obtained and varying from one choice possibility to the next, values are a far more stable construct. For this study, valuation of these outcomes will be measured by expanding the COE to include a new section which, like the COE, will be based on item content from the Minnesota Importance Questionnaire (MIQ; Rounds et al., 1981). The same item stems are presented, but the instructions direct the respondent to rate the extent to which each outcome is valued/importance of the items rather than the confidence that they would be obtained. This new

section would be presented before the COE and will be generically referred to as the Career Outcome Valuation (COV), while the resulting final measure (the combination of the COV and the COE) will be referred to as the COE-V.

As stated above, the proposed COV portion of the COE-V is based on the MIQ (Rounds et al., 1981). This shorter, Likert-formatted analog of the MIQ is preferred to the actual MIQ due to the extensive length of the MIQ, which utilizes a paired-comparisons format. This permutation is not unprecedented, however. During the development of the MIQ, it was considered that attitude measurement could also be accomplished through a Likert-type format. The resulting study (Fischer et. al., 1968) found that the two formats compared well in areas of reliability. However, the paired-comparison format, regardless of length, was final choice of the developers for their work in the development of the *theory of work adjustment* (TWA; Rounds et al., 1981).

Clinical use and theoretical differences distinguish the Career Outcome Valuation Scale (COV) from the Career Outcome Expectancy Scale (COE). In practice, the COV needs only to be given a single time or at lengthy intervals, because it measures the trait-like construct of values. Alternatively, the COE might be given several times over a short period of time, once for each career choice being considered. The COV and the COE are almost identical in presentation. All the item stems appear in the exact same manner and in the same order. The measures differ only in their instructions and anchors. In the COV, the participant is instructed to rate the importance of the outcomes. Alternatively, for the COE, the participant is asked to rate his or her confidence that the outcomes will be obtained if a particular career choice is followed. Despite their similarities in structure and presentation, several issues separate the interpretability of the data obtained by a COE and a COV. The first is that a COE score is meaningful for only one career choice, the choice about which the responses were being made. Alternatively, the COV score is more a measure of the individual than a choice possibility, and thus it applies to and is meaningful for any career choice. The COE has a meaningful total score (summed), because the greater the number of positive expectancies, the more

attractive a choice is likely to be. The COV does not have an interpretable total score however, as a sum of values is not as meaningful as how the valuation is distributed. Thus, we are essentially interested in identifying which outcomes are important and valued and which are not.

The rationale for combining these two measures is based in the expectation that an outcome that is highly valued and expected will operate differently in motivating choice than an outcome that is not valued but is expected. Without a measure of value, it would be difficult if not impossible for the COE to differentiate between these two instances. Perhaps more importantly, the COE would be functionally unable to differentiate between the real life implications and effects of low expectancy. Would the belief that a highly valued outcome will not be received (low expectancy) operate differently from low expectancy of an unimportant outcome? It would seem to be so. As such, valuation may be operating as a moderator of the relationship between OE and choice behavior. As in any moderator relationship, it may be that as valuation changes at a single level of expectancy, there will be differential effects on the resulting choice behavior.

If valuation does have a differential effect on the motivational consequence of OE, then there may be a moderator effect of valuation on choice behavior across levels of expectancy. Thus, the value scores, such as those provided by the COV, can serve as a means of “weighting” the expectancy score to make it more meaningful and potentially enhance its construct validity. As such, the operationalization of the theory suggests an item-by-item moderator effect.

In order to accomplish this objective, two possible scoring protocols can be implemented where the COV and COE score for the same item (each of the 23) would be multiplied to provide a value-weighted measure of outcome expectancy. These methods are detailed below. Both protocols are being used because one of the goals of this study is to determine which of the two methods is the more valid in the treatment of these scores.

In the first protocol, corresponding raw item scores would simply be multiplied. These 23 products could then be summed to create a final COE-V score that reflects the interaction between what is important to a person and what he/she expects from a given occupational choice. The second scoring protocol uses this multiply-then-sum approach, however, the item scores on the COE are recoded before the products are calculated. The recode changes the range of item responses from one through six (1-6) to negative three to positive three (-3-3). The rationale behind the use of negative numbers in the scoring protocol is indicated below.

The first method captures the conceptual differences between expecting a highly valued outcome and a less valued outcome. However, it does not do so well in representing the effect of expecting *not* to receive an outcome. The best way to portray the implications of this might be with another example. Consider the student whose sole drive in the world is monetary gain. Assume he would rate this item as a six on the COV, and all other items as a one or two. Now imagine he's given an interest inventory that suggests he would enjoy being a teacher. What would his COE profile look like? There would probably be a great deal of variation, but it is likely he would rate the monetary item as a 1. The first scoring protocol would still yield a six for this item. Compare that to an item which yields a pair of ones. Essentially, the second item is not valued at all, nor is it expected to be obtained. This second item's contribution should be minimal to any prediction of choice behavior, because it lacks motivational strength.

Alternatively, let us return our attention to the monetary item, with its product contribution of six. Essentially, this product is loading in such a way as to predict the choice is more likely. However, the opposite would seem to be the case. Instead, one might expect the denial of a value to have a deleterious effect on the pursuit of a choice possibility. Additionally, in the spirit of the ideas of this study, one might also expect the strength of that deleterious effect to be moderated by the amount of valuation. This brings us to the second possible scoring protocol. By recoding the expectancies into negative and positive numerals, we allow for the effect of value

denial, while retaining the other conceptual advantages afforded us by using an item-by-item product to express the relationship between valuation and expectancy.

When considering the potential of integrating a measure of value within OE measurement, the utility may be theoretically enhanced through an increased ability to predict choice behavior. Choice behavior is the fourth variable in Lent, Brown, & Hackett's SCCT model (1994). Because it cannot be known until the individual actually makes a choice, it must be redefined for methodological purposes. Therefore, choice behavior shall be investigated through Pursuit Intent (PI), where PI is defined as a person's level of intent to pursue a particular career choice. PI could be measured any number of ways, but for the purposes of this study, it shall be defined as the sub score taken from a multi-faceted vocational scale developed by Fouad and Smith (1996). This scale, the subscore used, and the operational definitions being used will be explained below.

The primary purpose of the study, beyond the basic purpose of developing and improving the COE, is to determine if the COE-V improves the prediction of choice behavior/pursuit intent over using the COE alone. In order to investigate this potential difference, two statistical procedures will be implemented. The first, a hierarchical multiple regression, will be used to ascertain whether the COE-V addition explains a significantly greater amount of the variance in Pursuit Intent than does the COE by itself. It will do so while holding the variance associated with COE constant in order to detect the effect of COE-V. However, there is a problem with this procedure given these variables. This problem is that COE and COE-V are mathematically related, making it extremely difficult to hold one constant while addressing the effect of the other. Therefore, a different procedure will also be used. The test of correlated correlations is a hypothesis test which calculates whether the variance accounted for by each of the predictors is equal. By rejecting the null hypothesis, we are able to state that one is better than the other, and thus explains more of the variance in PI. If the COE-V does explain a greater amount of significance in PI, this can then be taken as evidence that the COE-V is a better measure of the OE construct that Lent, Brown, and Hackett included in their theory.

The final benefit of this development is the flexibility and utility of the addition. The COV only needs to be administered to an individual a single time, but its results, while useful in their own right, can be used in combination with several administrations of the COE (presumably for different career choice possibilities). As such, the COV score on a given item becomes a static coefficient that can be used over and over again in practice, basically until the values actually change.

CHAPTER 3. METHOD

Participants

All of the data in the present study have been obtained in collaboration with the research team of Larson, Borgen, and Fouad. This research project was reviewed and supported by the Iowa State University Human Subjects in Research Committee (IRB; see Appendix A).

Participants (n=386) were obtained from two large undergraduate psychology courses at a large Midwestern university in the fall of 2003. However, 24 of these participants failed to indicate a "career of choice," thereby making their COE score uninterpretable. Removal of these individuals reduced the total number of participants to 362, and all following percentages are based on this total. Descriptive data indicate more women than men (about 1.8 times as many), with a mean age of about 19.5 (SD=1.60). Ages ranged from 18 to 40. Most were freshman and sophomores, totaling 203 (56.5%) and 114 (31.8%) respectively, while 32 (8.9 %) were juniors, and 10 (2.8%) were seniors. The sample's ethnic breakdown is as follows: 326 Caucasians (90.1%), ten African-Americans (2.8%), five Hispanics (1.4%), nine Asian Americans (2.5%), eight International Students (2.2%), and four Other/Bi-racial students (1.1%). Additionally, almost the entire sample was single; only one married individual and one divorced or separated individual responded. Information pertaining to decidedness of major and career choice was also collected. Sixty one point three percent (n=222) of the sample was "decided" about their major, with 27.1% "tentatively decided" (n=98), and 11.6% (n=42) undecided. Decidedness of career choice was more evenly distributed, with 25.1% (n=92) "decided," 42.3% (n=153) "tentatively decided," and 32.3% (n=117) "undecided" about their career choice.

Procedure

Participants in the sample volunteered to attend a group testing session in return for extra credit in their respective psychology courses. In this session, the participant received several materials including an informed consent sheet and one

of three color-coded test packets. These test packets included a demographic questionnaire and the following materials: 1) the proposed COV addition to the COE; 2) The Strong Interest Inventory (SII; not relevant to this study); 3) The Fouad-Smith Scales For Subject Matter Specific Social-Cognitive Constructs; 4) the COE measure, for which they will respond with respect to the career choice they indicated at the initial data collection from which these participants were chosen; 5) the Skills Confidence Inventory (SCI; not relevant); and 6) the Multidimensional Personality Questionnaire (MPQ; not relevant). Upon completing the test packet, the participants received a debriefing form detailing the purpose of the data collection, and an extra credit card which allows them to receive compensation for their time and effort. All packets began with the demographic information and then proceeded to the COV. These were followed by the interest, efficacy, and personality measures (all unrelated instruments used in other areas of the project) in random order. Having completed this much of the packet, participants are instructed to indicate (by writing it in) their “career of choice” and then proceed to the COE, responding in accordance with the job choice they have indicated. All packets are concluded with sections B (outcome expectancy; not included in this study) and C (goals/pursuit intent) of the Fouad-Smith measure.

Constructs Measured

Outcome Expectancy (OE). Outcome Expectancies can be defined as personal beliefs one holds about the consequences or outcomes of engaging in particular behaviors. In the present study, they are operationally defined as the composite score produced by the Career Outcome Expectancy Scale (COE; Springer et al., 2001).

Outcome Valuation (OV). Outcome Valuation is the extent to which the receipt of an outcome is important to an individual. OV shall be operationally defined as the item scores produced by the Career Outcome Valuation Scale (COV), an addition to the COE proposed by this study and based on the Minnesota Importance Questionnaire (MIQ; Rounds et al., 1981).

Pursuit Intent (PI). Pursuit Intent is a predictive construct used to represent choice behavior. Pursuit Intent can be defined as a person's level of intent to pursue a particular career choice. In the present study it is operationally defined as a subscore derived from the Fouad-Smith Scales For Subject Matter Specific Social-Cognitive Constructs (Fouad & Smith, 1996). Section C of this measure asks randomly questions about the respondent's degree of intent to follow through with each of five educational domains. They include social studies, art, English/language arts, science, and math. Each respondent's occupational choice (the choice used to answer the COE) will be classified into one of these domains and the corresponding domain subscore will be used for that individual, regression equation. More information about the Smith-Fouad Scale and the other measures mentioned above can be found in the instruments section below.

Instruments

Demographic Information. The demographic sheet contained items designed to elicit major, gender, year in school, age, ethnicity, marital status, major decidedness, major status (declared/undeclared), major college, and career choice decidedness.

The Career Outcome Expectancy Scale. The Career Outcome Expectancy Scale (COE: Springer et al., 2001) is a 23-item measure consisting of six-point Likert-type items (see appendix for examples of item content and presentation). The measure assesses the degree of expectancy of various occupational outcomes given a particular occupational choice. Item content in the 23 items of the COE was based on the 20 items found in the Minnesota Importance Questionnaire (Rounds et al., 1981). The additional three items were added in the COE to reflect diversity

issues not addressed in the MIQ (Springer et al., 2001). High Scores indicate higher expectations that a given outcome will be obtained. The COE has been found to be somewhat reliable in its initial validation (Springer et al., 2001), with a test-retest reliability of $r=.52$ over a period of one month. The authors attributed this level of reliability to the population, in that college student's outcome expectations can be expected to be in flux (Springer et al., 2001). The COE was also found to be internally consistent in this study, with reliability $\alpha=.83$ for females and $\alpha=.88$ for males. In further attempting to validate this measure, the authors conducted two pairs (males and females separately) of principle axis factor extractions with varimax and oblique rotations. In the first set of analyses it was determined that a one-factor solution was the most appropriate, accounting for 24% of the total variance in the female sample and 34% of the variance in the male sample. Only 3 of the items did not meet the criteria for retention in the solution; however, they were maintained and reworded due to their theoretical importance. A cross validation study was conducted using these re-worded items. The single solution factor analyses on this sample provided higher loadings, with 34% of the variance explained by the solution in women and 43% in men. Thus it appears that items of the COE are appropriately homogenous and seem to measuring aspects of a single construct in outcome expectancy.

The Career Outcome Valuation Scale. The proposed study requires a means to measure the extent to which a respondent values each of the outcomes used as items in the COE. The most straight-forward way to do this is to duplicate the item stems presented in the COE and change the instructions and response anchors to reflect the new construct. As such, the Career Outcome Valuation Scale (COV) is a 23-item measure consisting which assesses the attitude of valuation using anchored Likert scales. The COV was presented as a component/companion measure to the COE and should always be in presented advance of a COE presentation. To reduce error variance and maximize the ability to detect an effect of the distinction between the expectancy and valuation constructs, the item stems of the COV and the COE were also presented in the same order and using identical wording.

It is important to note that while the COV is a new presentation of items designed for the assessment of values, it is not unprecedented. In fact, the primary instrument for the measurement of values is the measure upon which the item content for the COE (and thus, the COV) was based. This measure, the Minnesota Importance Questionnaire (MIQ; Rounds et al., 1981), was developed as a component of the Work Adjustment Project at the University of Minnesota (Dawis, 1996). The MIQ was the measure used by Lofquist and Dawis to assess valuation in the workers in their sample. However, the presentation of the MIQ makes it impractical for use in the present study. This impracticality is based in the format and consequent length of the MIQ. Because it is a paired-comparison forced-choice measure, the MIQ requires 20 times 19 items to gauge the relative importance of each of the outcomes. This is because each outcome is compared, one-by-one, to each of the other outcomes.

Such a format does well to control for the vulnerability of a Likert-type measure to yield a flat elevated profile, thereby improving the metrics of the instrument. However, attempts to measure valuation using a Likert-type format are not entirely new to the COV. In fact, working with Dawis on the development of the MIQ, Fisher and Weiss (1968) conducted a study to compare the paired comparisons format with a parallel Likert-type presentation of the MIQ. Fisher and colleagues found the Likert version to produce comparatively adequate reliabilities with regard to the paired-comparisons version. Overall, they found that the paired comparisons format afforded only modest advantages over the Likert-type format and that the Likert scales “were able to achieve almost the same degree of technical precision as the pair comparisons scales with only a forth as many items,” (Fisher et al., 1968, p. 92). In this study they found that the Likert-type format yielded good internal consistency ($\alpha=.84$ in the employee sample; $\alpha=.85$ in the student sample).

As this was a single comparative study, no temporal stability information is available; and because the Likert format was ultimately rejected by its authors, no further published reliability data exists.

Fouad-Smith Scales for Subject Matter Specific Social Cognitive Constructs.

The Fouad-Smith Scales for Subject Matter Specific Social Cognitive Constructs (Smith & Fouad, 1999) is an instrument consisting of 153 Likert-scales items with a response range of 1-6 (see appendix for examples of item content and presentation). All items are posed such that consistent anchors can be used. A response of 1 corresponds to (*very strongly disagree*) with the statement, while a response of 6 corresponds to (*very strongly agree*) with the statement. The instrument measures two dimensions: career variables and career domains. "These Likert-scaled items were designed by the authors to produce scaled scores for four constructs: self-efficacy, outcome expectations, interests, and goals (only goals were measured in this study) with respect to four subject matter areas: math/science, social studies, English, and the arts. The intersection of these two facets created 16 scales." (Smith & Fouad, 1999, p. 463) Items are organized into four sections, one of each of the career variables. Thus, domain content from each of the domain is mixed throughout each section. As a result, certain items in each section will contribute to the scale scores derived from that section. Scale scores are obtained by computing the mean of the responses for each of the scales. For example, hypothetical items n, m, l, k, z, y, and z may be the items designed to measure English self-efficacy. Thus, the scale score for English self-efficacy would be the average of those items. A scoring criterion is provided with the measure to cue the administrator to which items contribute to each scale. Therefore, scale scores range from 1-6, where a high score indicates a high level of the career variable (interest, SE, OE, and PI) in the given domain. As this study was conducted in coordination with Fouad, the latest version of the measure was used. This measure is the same as the one described here, but it divides the math/science domain into two, separate domains. This change results in a measure with 20 scales rather than the original 16.

Reliabilities (Cronbach's alpha) for each of the 16 original scales are acceptable, ranging from $\alpha=.76$ (social studies interest) to $\alpha=.94$ (math/science interest), with most reliabilities falling between .81 and .87. Smith and Fouad (1997)

point out that lower reliabilities generally correspond to scales which are composed of fewer items, as would be expected.

A Confirmatory Factor Analysis (Smith & Fouad, 1999) was conducted to test the fit (viability) with the data collected by Smith and Fouad. Because the scales are systematically varied along the two dimensions of career variables/constructs and career domains/subject-matters, a multi-method multi-trait approach was used in which the constructs took the place of the methods, and the domains took the place of the traits. The analyses entailed in this investigation are too complex to fully describe here, so the interested reader is encouraged to refer to Smith and Fouad's article (1999). Essentially what they found was that an 8-factor structure provided the best fit. In this model, both facets (domains & constructs) were represented, and these results supported the validity of the scales.

Hypotheses

The COE-V (COV * COE) score will explain a significantly larger amount of the variance in Pursuit Intent than will the COE alone. This hypothesis was tested using two statistical analyses, a hierarchical multiple regression, and a test of correlated correlations. For the purposes of this analysis, Pursuit Intent was operationally defined as a subscore from section C of the Fouad-Smith Scales for Subject Matter Specific Social Cognitive Constructs (Smith & Fouad, 1999).

This study also tested the hypothesis that the "recode" scoring protocol will perform better than the "standard" scoring protocol. Recall the recode method converts the item scores on the COE from 1 to 6 to -3 to +3 before calculating the item products and summing the results. The standard method uses the raw scores for the calculation of the product before creating the sum. Thus, the second hypothesis was that the "recode" scoring protocol will allow the COE-V score to explain a larger amount of the variance in PI than will the "standard" scoring protocol.

Design and Analyses

To test our hypothesis, we divided the sample into five subsamples in accordance with the Smith & Fouad-defined domain that includes their respective job choice. Recall that the Fouad-Smith scale provides subscores based on five educational domains. We then undertook the task of classifying each participant's career choice into one of those five categories (social sciences, science, math, English/language arts, and art; Smith & Fouad, 1997). Classifications were based on the area of coursework that would primarily need to be studied in order to obtain the career choice indicated by the participant. Thus, a participant who indicated a desire to be a mechanical engineer would be placed in the math subsample. Alternatively, if a respondent indicates that he/she plans on becoming a sociologist, he/she would be assigned to the "social science" sub-sample.

After completing this classification, the applicable Fouad-Smith pursuit intent subscore was isolated to correspond with the individual's job choice. In order to maximize the representativeness of the pursuit intent variable for each individual, a primary and secondary educational domain was coded for each job, and the resulting sum was used as the final PI variable. Thus, in the instance of a participant indicating a desire to be an architect it would be important to represent both the intent to pursue math as well as art classes, as both would be necessary for the ultimate pursuit of this career. In cases in which there was little or no overlap between educational domains (as in someone who wants to be a mathematician) the single domain score was simply doubled to maintain the scaling of the summed variable.

Before proceeding to analysis, both scoring protocols were used to determine the COE-V score. In the standard protocol, the products of corresponding raw item scores were calculated and then summed. In the recode protocol, all COE scores were converted from the 1 - 6 format to a -3 - +3 format before the products and sums were calculated. Due to these differing procedures, we will heretofore refer to the COE-V_{stan} for the standard protocol and the COE-V_{recode} for the recode protocol.

For the duration of the paper, all analyses will be conducted separately for each protocol and presented separately.

Multiple-Regression. We regressed both the COE score and the COE-V scores ($\text{COV} * \text{COE}$) on the measure of choice behavior taken from the Fouad scale operationalized as “intent to pursue” a career in the area in which the individual’s job choice is found. These analyses were conducted separately for each of the five career domains as represented by the five groups into which the sample was divided. If the hypothesis is supported, the addition of the COE-V to the regression should account for more variance in the DV (Fouad subscore) than does the COE alone.

Test of Correlated Correlations. The Pearson correlation coefficient obtained between COE and the DV should be significantly smaller than the coefficient obtained between COE-V and the DV. In order to test this, we conducted a test of correlated correlations for each of the five subgroups. This test assesses whether the correlation between the COE score and the DV (Fouad Score) is smaller than the correlation between the COE-V score and the DV, after removing the variance attributed to the intercorrelation between the COE and COE-V. As such, these tests determine whether the amount of the variance explained by the COE-V is significantly greater than the variance explained by the COE.

Differences by Scoring Procedure ($\text{COE-V}_{\text{stan}}$ vs. $\text{COE-V}_{\text{recode}}$). The hypothesis that the two scoring procedures would produce meaningfully different results was not tested due to the overall lack of significant results (see Results section).

CHAPTER 4. RESULTS AND DISCUSSION

Results

Classification of the subjects into subsamples according to their indicated career of choice produced a distribution into which most participants fell into the math or science group (see table 1). As might be expected from a science and technology-based university, 55.1% of the participants were placed in the "science" group according to their career of choice, and 29.3% of the participants were placed in the "math" group in like fashion. Means and standard deviations are displayed in table 2.

Table 1.

Group Classification Distribution within the Sample

Group	n	% of sample	Sex		Mean Age	Age S.D.
			Males	Females		
Social Sciences	48	15.5	17	31	19.8	3.1
Science	109	55.1	29	80	19.2	1.1
Math	91	29.3	54	37	19.7	1.5
English/Lang. Arts	33	10.4	8	25	19.5	1.2
Art	29	9.1	4	25	19.6	1.2

Table 2.

Means and Standard Deviations

Group	Variables	<i>n</i>	μ	S.D.
Social Science		48		
	COE		113.3	13.83
	COE-V _{stan}		555.6	110.56
	COE-V _{recode}		221.0	94.36
	PI (w/ primary only)		4.0	.89
	PI (composite)		8.0	1.68
Science		109		
	COE		115.6	13.13
	COE-V _{stan}		576.2	101.44
	COE-V _{recode}		221.3	94.86
	PI (w/ primary only)		4.2	1.32
	PI (composite)		8.1	2.12
Math		91		
	COE		109.1	16.80
	COE-V _{stan}		528.3	123.76
	COE-V _{recode}		189.0	109.56
	PI (w/ primary only)		4.1	1.10
	PI (composite)		8.1	1.91
English/Language Arts		33		
	COE		109.2	14.58
	COE-V _{stan}		534.4	90.52
	COE-V _{recode}		191.1	94.48
	PI (w/ primary only)		4.8	.92
	PI (composite)		9.3	1.65
Art		29		
	COE		110.7	10.77
	COE-V _{stan}		533.3	88.90
	COE-V _{recode}		199.1	68.62
	PI (w/ primary only)		4.8	1.08
	PI (composite)		9.3	1.94

The multiple regression analyses (see tables 3 and 4, and figures 1 and 2) were the first of the two analyses to be run. These analyses were conducted in accordance with the data analytic directives and suggestions made by Wampold & Freund (1987) and were calculated using SPSS statistical software. Because the purpose of the regression is primarily predictive (i.e. Do the independent variables, COE and COE-V, predict the criterion variable, PI?) a hierarchical regression was used in which the COE was entered first into the regression equation, followed by the COE-V. Standardized and unstandardized beta weights are listed in table 3 but were not relevant to this study.

Table 3.

Hierarchical Regressions – Summary of Standardized and Unstandardized Betas

Group	Standard Scoring Protocol ^a			Recode Protocol ^b		
	B	SEB	β	B	SEB	β
Social Science (n=48)						
COE	.098	.048	.818	.166	.083	1.384
COE-V	-.009	.006	-.630	-.021	.012	-1.180
Science (n=109)						
COE	.089	.040	.550	.102	.067	.635
COE-V	-.009	.005	-.440	-.013	.011	-.519
Math (n=91)						
COE	-.007	.030	-.062	-.038	.058	-.329
COE-V	.003	.004	.180	.008	.009	.441
English/Lang. Arts (n=33)						
COE	.040	.049	.350	-.082	.133	-.718
COE-V	-.001	.008	-.052	.018	.021	1.032
Art (n=29)						
COE	-.004	.089	-.023	-.046	.142	-.255
COE-V	.003	.011	.118	.010	.022	.351

Note^a. For model with predictors COE and COE-V_{stan} and criterion PI.

Note^b. For model with predictors COE and COE-V_{recode} and criterion PI.

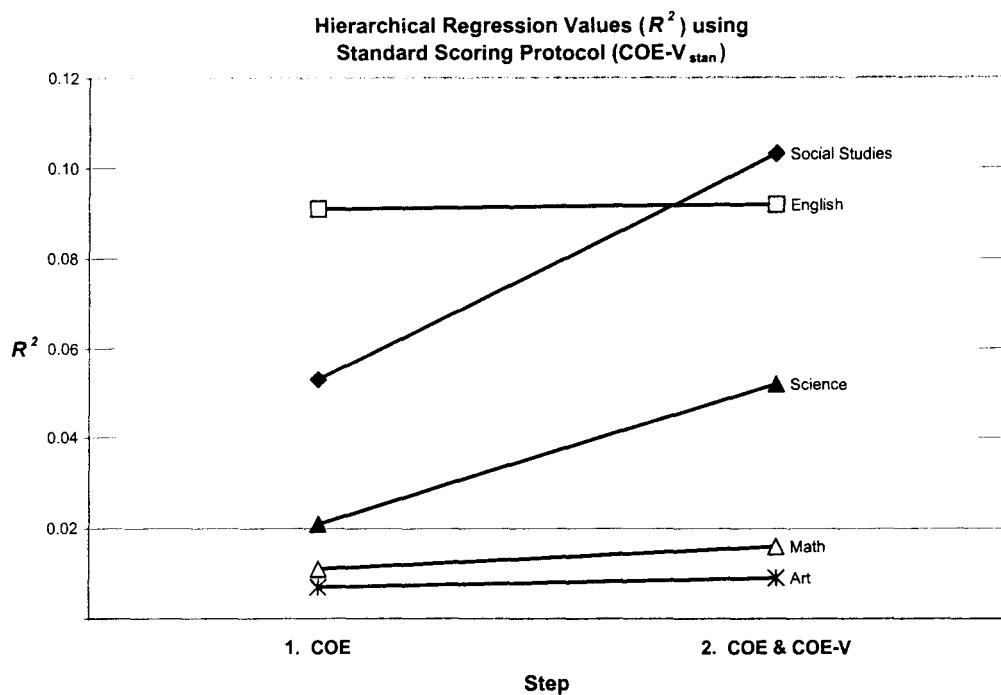


Figure 1. Changes in R^2 when COE-V_{stan} is added to the regression equation. Note that none of these R^2 changes were significant.

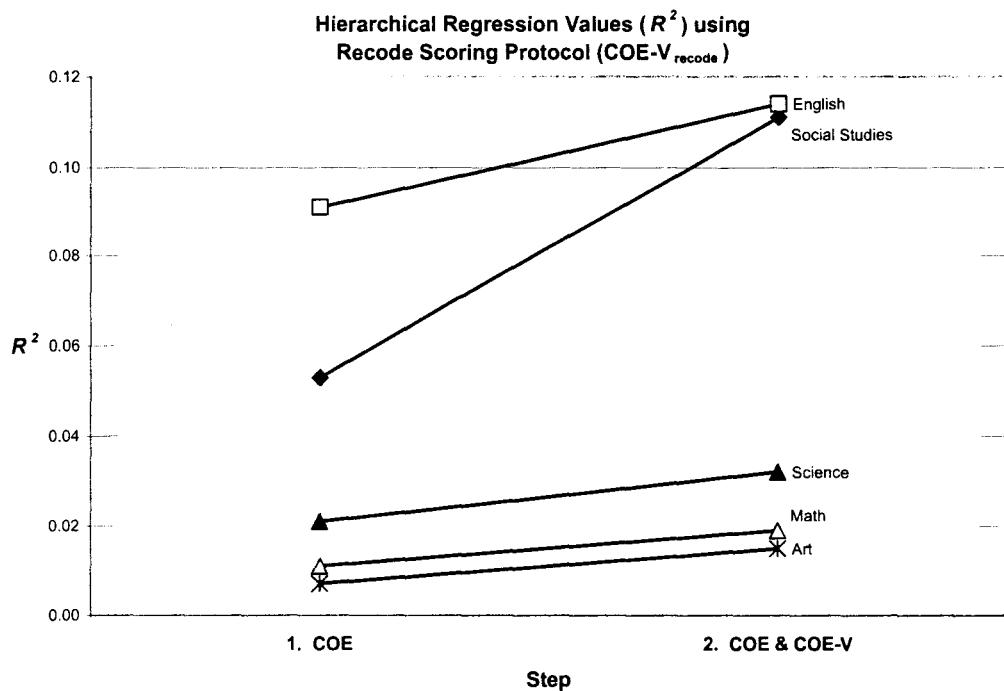


Figure 2. Changes in R^2 when COE-V_{recode} is added to the regression equation. Note that none of these R^2 changes were significant.

Table 4.

Summary of Hierarchical Regression Analysis for COE and COE-V's prediction of Pursuit Intent*

Group	Variable(s)	Total R^2	Increase in R^2	F for increase in R^2	dfs	p
Social Science (<i>n</i> = 48)						
	1. COE	.053	.053	2.496	1,45	.121
	2a. COE & COE-V _{stan}	.103	.050	2.469	1,44	.123
	2b. COE & COE-V _{recode}	.111	.059	2.902	1,44	.095
Science (<i>n</i> = 109)						
	1. COE	.021	.021	2.210	1,102	.140
	2a. COE & COE-V _{stan}	.052	.031	3.250	1,101	.074
	2b. COE & COE-V _{recode}	.032	.011	1.545	1,101	.217
Math (<i>n</i> = 91)						
	1. COE	.011	.011	.946	1,89	.333
	2a. COE & COE-V _{stan}	.016	.005	.467	1,88	.496
	2b. COE & COE-V _{recode}	.019	.008	.758	1,88	.386
English/Language Arts (<i>n</i> = 33)						
	1. COE	.091	.091	3.120	1,31	.087
	2a. COE & COE-V _{stan}	.092	.000	.015	1,30	.904
	2b. COE & COE-V _{recode}	.114	.023	.769	1,30	.388
Art (<i>n</i> = 29)						
	1. COE	.007	.007	.199	1,27	.659
	2a. COE & COE-V _{stan}	.009	.002	.057	1,26	.813
	2b. COE & COE-V _{recode}	.015	.008	.199	1,26	.659

Note*. Separate regressions were performed for both the standard and recode scoring protocols, however, because the individual COE score and PI criterion scores are unchanged, the COE statistics also remain unchanged in both analyses and are therefore only displayed once for each group.

The R^2 value resulting from these analyses (see table 4) can be interpreted as the amount of variance explained by the independent variables in the model. Thus, the R^2 for the initial model is the amount of the variance in PI explained by variance in COE. After adding the second independent variable, COE-V, to the model, the overall R^2 is interpreted as the proportion of variance in PI explained by both COE and COE-V. If our hypothesis is correct, there will be a significant change in the overall R^2 indicating that the addition of the COE-V variable increases the predictive power of the model.

Inspection of R^2 value increases and corresponding F tests (see table 4) indicates that Outcome expectancy as measured by the COE does not significantly predict Pursuit Intent in any of the five areas. Adding the value component to the COE does not allow for the significant prediction of PI in any of the five areas. This holds for both scoring protocols used to create the COE-V score.

The multiple regression analyses failed to yield any significant results; however, there was concern about the appropriateness of this procedure given the multicollinearity of the predictor variables. The extent of this multicollinearity can be seen in Table 5, which includes the summary of the statistics obtained from the Test of Correlated Correlations. Examination of the first column of simple correlations ($r_{COE, COE-V}$) reveals strong positive relationships among the COE and COE-V as we would expect given their mathematical relationship. While the test itself cannot be performed on SPSS, the simple correlations that contribute to its computation were calculated using this program. These simple correlations can be seen in Figure 1. The t-statistic in Table 5 is used to test the null hypothesis that the correlation between COE and PI is the same as the correlation between COE-V and PI after controlling for the extent to which COE and COE-V are correlated with each other. Thus, a significant t (that is positive) indicates that the COE is the better predictor of PI, while a negative t indicates that the COE-V is the better predictor of PI. Only the COE-V created using the recode protocol in the science group yielded a significant result. Specifically, in the science group, the COE-V_{recode} explained a greater amount of the variance in PI than does the COE alone ($t(102) = -2.12, p < .05$). This

finding lends partial support to the both the first and second hypotheses of the study, as the value-added measure does outperform the original and it was the recode scoring method that outperformed the standard method.

The simple correlations between COE and the two versions of COE-V with PI are displayed graphically in Figure 3. It should be noted that this figure is for display purposes only. The simple correlations depicted in this figure can be used for visual comparisons, but no significant conclusions can be drawn from such a comparison. It should also be noted that none of these correlations are statistically significant given these limited sample sizes. Because of this sample size issue, the confidence intervals for the simple correlations are quite large. Therefore, figure 4 (using the Social Science group) was included as an exemplar of what the figure would look like if confidence intervals were added. Notice that all of the intervals include a zero correlation, meaning that none of these relationships were significant.

Table 5.

Summary of Results for Test of Correlated Correlations

Group	Scoring Protocol	Simple Correlations				
		$r_{COE, COE-V^*}$	$r_{COE, PI}$	$r_{COE-V, PI}$	df	t
Social Science (n=48)						
	Standard	.934	.229	.134	44	1.83
	Recode	.979	.229	.217	44	0.40
Science (n=109)						
	Standard	.918	.131	.064	102	1.70
	Recode	.972	.131	.179	102	-2.12**
Math (n=91)						
	Standard	.916	.103	.123	88	-0.46
	Recode	.978	.103	.120	88	-0.77
English/ Language Arts (n=33)						
	Standard	.915	.302	.268	30	0.47
	Recode	.989	.302	.321	30	-0.75
Art (n=29)						
	Standard	.919	.085	.097	26	1.12
	Recode	.969	.085	.104	26	-0.39

Note*. The two scoring protocols used for the calculation of COE-V are indicated in separate rows in the table below.

Note**. Indicates a significant difference at 95% confidence level

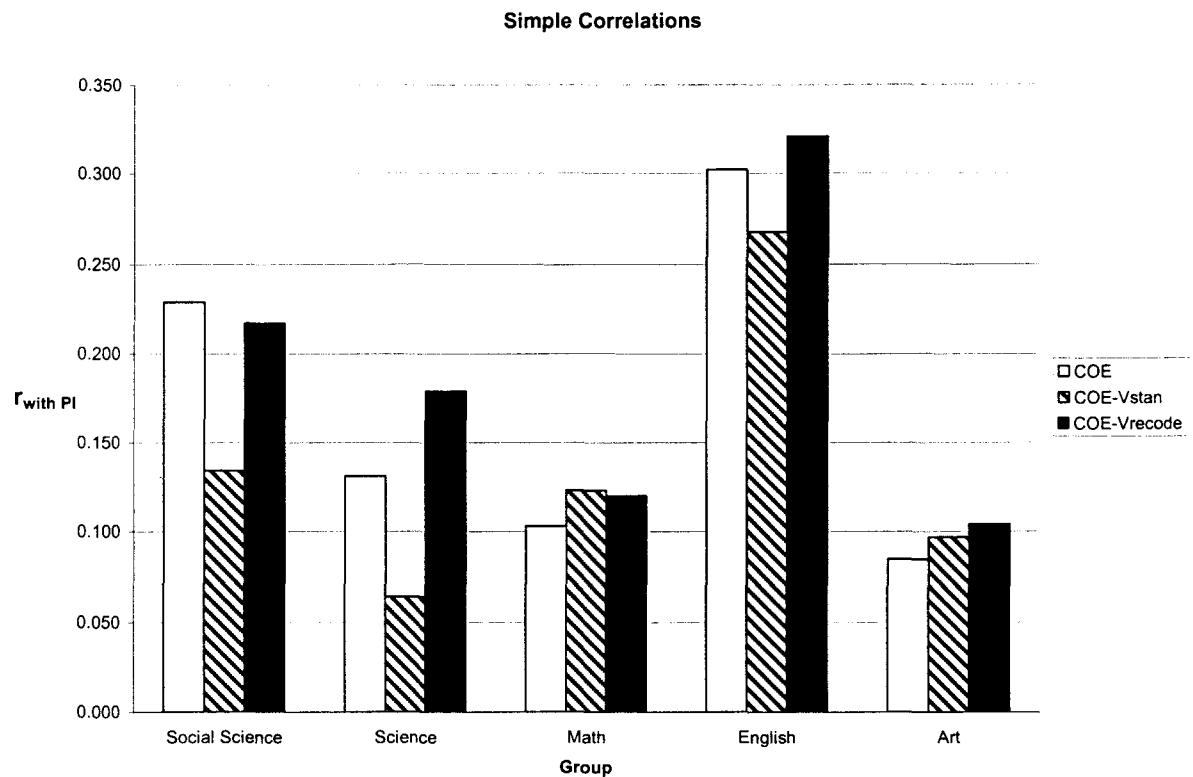


Figure 3. Simple Correlations between the three versions of the outcome expectancy measure and the PI variable by group.

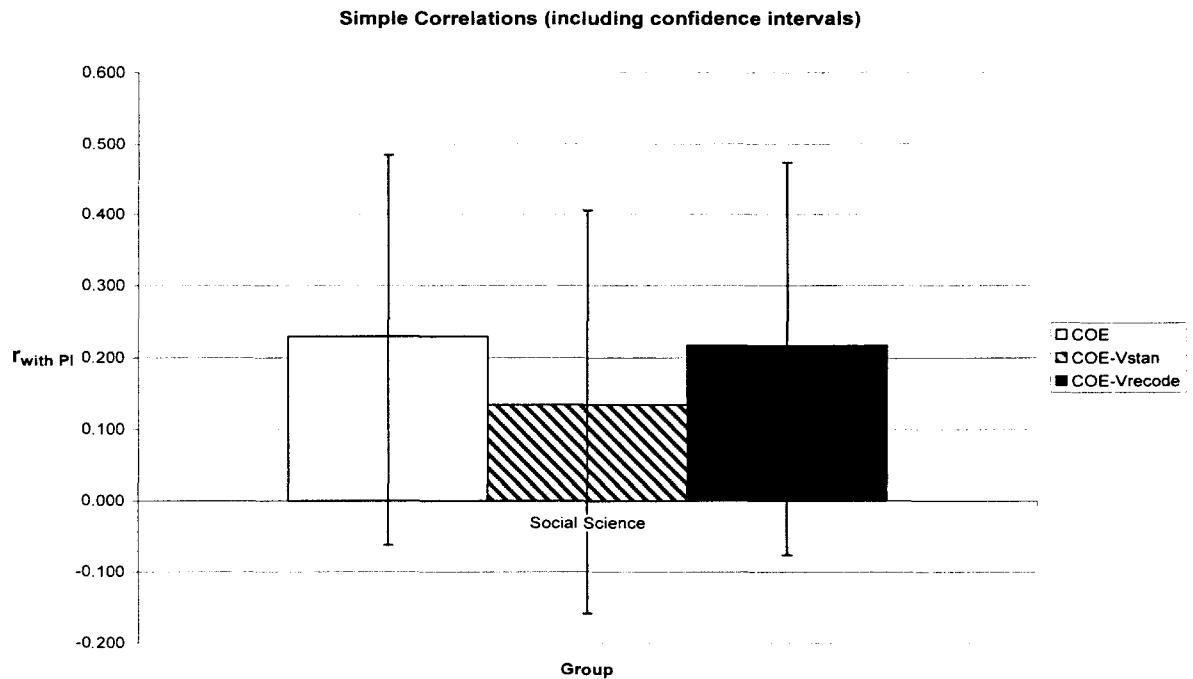


Figure 4. Simple correlations in the Social Science group with error.

Discussion

The obtained results, while disappointing, are not entirely surprising. While the rationale for the study was reasonable, some aspects of the design may have reduced the power of the investigation. As discussed, the primary rationale for the study was to develop the COE in the hope that its construct validity might be enhanced. With a construct founded in a theory, one seeks empirically demonstrate that the construct relates to other variables and constructs in a manner predicted by the theory. In the case of the COE, the underlying theory is Lent et al.'s *social cognitive career theory* (SCCT; 1994). This theory proposes that outcome expectations and self-efficacy should combine to predict interests, and the three of these variables, in turn, predict choice behavior. Thus, the best measure of career outcome expectations would be the measure that explains the greatest amount of variance in choice behavior. In this specific study, we were exploring whether adding a value component to the COE, we would be able to improve its ability to predict choice behavior.

However, in the present study there are some design limitations. The first is that in order to concurrently measure the three salient variables, we must partially relinquish the predictive component of explaining choice behavior, as this implies that a choice has been made. To do so, we operationalized choice behavior as pursuit intent. Thus, within the context of the theory, an individual who has high expressed intentions of pursuing a given career choice could be seen as synonymous with a person who has already made the choice. This situation is not ideal, but it may be reasonable, especially when one considers that career counselors would be using this measure in a pre-choice context.

The second problem encountered (regarding the use of the pursuit intent variable) is embedded within the design of the study. Specifically, we are interested in the participant's valuation and expectations for the career choice that is most salient to them. Recall that when an individual is prompted to fill out the COE, they are instructed to do so such that they are rating their expectations of the outcomes for their "career of choice." Thus, we are asking them to respond for the career

choice that they are actually considering or pursuing. This makes sense in that a participant might understandably be confused when asked to rate his/her outcome expectations for a career in which he/she is not at all interested. Yet by following the basic method by which the COE is administered, we have also put serious restraints on this criterion variable (pursuit intent). By asking an individual to indicate their career of choice, we are essentially asking them to indicate the career for which they have the highest pursuit intent. In doing so, we are artifactually reducing the variance in the PI variable.

In an ideal design, we would be able to investigate the relationship between a normal distribution of outcome expectations and a normal distribution of pursuit intent. Additionally, for both variables, we would benefit from a large range of variation, as this allows for most powerful investigation of the relationship. With this full range we would be able to see the relationship between OE and PI when PI is low, middle-ranged, and high. However, under the conditions of the present study, we are only able to see how OE varies within high levels of PI variation. This drastically inhibits our ability to detect the full extent of this relationship.

A third potential limitation of this design is the use of an indirect index of pursuit intent. By indirect we mean that we are trying to measure the extent to which an individual intends to pursue a particular career choice (e.g., doctor, lawyer, teacher, etc.). However, because a measure for this exact construct does not exist, a suitable substitution needed to be identified. In this study we chose to use the Fouad Smith subscale for goals (Fouad & Smith, 1996). This subscale measures subject-specific goal formulation. Thus, it assesses an individual's pursuit intent profile within an academic context. While academic studies are often a precursor to a particular career, they rarely equate directly to a specific career. Thus, in this study we are forced to infer that domain-specific academic pursuit intent will equate to career-specific pursuit intent. For example we are making the inference that an individual with high PI for becoming a doctor will also have appropriately high PI for diligent study in Math and Science classes (as these will be the dominant subject domains for this career). Reliance upon the use of this inference was less than

ideal. However, the alternative would be to assess pursuit intent directly. Direct measurement of pursuit intent would require either a single-item rating (which carries its own limitations in terms of reliability) or a new measure (which would have been beyond the scope of this study).

Use of the Fouad subscales as measures of pursuit intent causes a fourth limitation. Recall that this instrument assesses (via five subscales) the respondent's pursuit intent in each of five subject areas. However, only one or two of these subject areas may be directly pertinent to the career choice indicated by the respondent for the COE. This requires that the investigator match or pair academic pursuit intents with the inferred appropriate career choice. For example, inclusion of the pursuit intent for "art" would not be valid for an individual who wants to be a physicist. While it is fairly straightforward to assign math and science pursuit intent to an individual who indicated a desire to be a doctor, it may not be so clear how to handle career choices like "business manager". However, in all cases an effort was made to assign individuals to the domains from which they could be expected to have to take at least some coursework in their work toward their chosen career.

The domain-specific nature of the pursuit intent instrument also required that the sample be categorized by the most salient domain area. Specifically, the sample was categorized into five smaller subsamples, each one corresponding to one of the five domains of the Fouad Scale. This categorization is done so that when the analyses were carried out, all the variables used would be homogenous. This is an important outcome because the statistical basis for a hierarchical regression depends on the homogeneity of each variable. In the case of this study, PI is the variable for which we must be concerned. Each subscale yields a PI for a particular domain (i.e. Social Sciences, Science, Math, English/Language arts, and Art). While all of these are type of pursuit intent, they cannot be treated as a single variable in a multiple regression (or any other statistical analysis) because they do not originate from the same items in an instrument.

Because this categorization was necessary, the total sample size of 362 needed to be parsed out to five smaller subsamples (i.e. Social Sciences, Science,

Math, English/Language arts, and Art). This subdivision had serious implications for the power of the analyses required to test the hypotheses. The first problem was that the use of five smaller subsamples instead of one larger sample had a detrimental effect on the power of the analysis. If one includes both protocols for the scoring of the COE-V, a total of 20 separate analyses were conducted (10 regressions, and 10 tests of correlated correlations). Of these 20 separate analyses, only one was significant, and it was obtained from the group with the largest sample size (science).

If the method (and results) had been more robust, appropriate statistical procedures would have also included a Bonferroni adjustment. However, we did not apply this adjustment to these results because only one result was statistically significant. There is no question that the single significant result that was obtained would not have emerged as statistically significant if a Bonferroni adjustment had been applied.

The complications of smaller sample size due to the use of the Fouad subscales and divisions of the total sample into five subsamples seemed to have an effect on the power of the analyses (as would be expected). Even the simple Pearson correlations between, for example, the COE and the PI variable were non-significant under the conditions of reduced sample size. The social science group, for example, had a Pearson correlation point-estimate of .229 (meaning that the COE alone accounts for about five percent of the variance in the pursuit intent variable). While this relationship is hardly impressive, it would seem to imply at least some relationship exists between these variables. However, when the confidence interval determined by the alpha level and sample size is inspected, we see that this relationship cannot be said to be significantly different from zero. Thus, if we can not rule out a correlation of zero, we cannot be confident that there is any relationship at all.

Having addressed the design limitations that accompany the pursuit intent variable, we turn now to a direct discussion of the results. As has been reported above, none of multiple regressions yielded a significant result. The COE alone did

not predict pursuit intent at a statistically significant level, and the addition of the value component did not significantly enhance its predictive power. These results can be interpreted in several ways. One possibility would be that the addition of the value component is not helpful in enhancing the construct validity of the measure. While this explanation is possible, it does not seem attractive when one considers the other alternatives.

Of the more probable explanations, we turn first to the pursuit intent variable. While empirical study has supported the construct validity of the Fouad scale (Smith & Fouad, 1999), it is not likely that this instrument was intended to be used in the way it was employed in this study. It was designed to be used a direct measure of subject specific goal formulation (and thus, pursuit intent). While it may have seemed reasonable to use this pursuit intent as an indirect representation of career-specific pursuit intent, it is highly probable that this was a misapplication of the pursuit intent captured by the Fouad scale. Thus, it is not that the Fouad scale lacks validity as a measure pursuit intent, but rather that subject-specific pursuit intent is likely not a valid representation of career-specific pursuit intent.

In any correlational or experimental design, it is of the utmost importance that the measures being used are suitable representations of the constructs being tested. We can not be confident whether we have suitable representations of the constructs being tested until we conduct further studies of the COE and COE-V. Additional studies are necessary in order to ascertain whether these non-significant results were the product of design flaws leading to small subsample sizes by group, range-constriction in the PI criterion variable, or a misuse of the Fouad instrument as a measure of career-specific pursuit intention. A final possibility is that the construct of outcome expectations simply lacks validity as a meaningful and useful predictor of choice behavior.

Even in the absence of significant results, we are aware of the limitations of the sampling procedure used in this study. The sample was drawn from psychology classes in an ethnically homogenous university. Therefore, the findings would only be generalizable to similar populations. However, while this aspect of the study

would certainly be a potential limitation for generalizing to more diverse populations, the findings may be more generalizable to similar age groups. This is because much career counseling is done with late high school and early college-age individuals, which are very well represented in this sample. However, it would still be important to validate both the COE and *social cognitive career theory* in individuals of all ages, as career counseling can and is sought by individuals of all ages at varying points in the career lifetime.

Future Directions

While the results of this study did not support the hypothesis that adding a value component to the COE would enhance its predictive power and construct validity as an instrument, however, the findings provide a useful starting point for the investigation of this theory. Several directions for future research can be inferred from this study. Foremost among these would be the importance of investigating the predictive ability of outcome expectancy across a full range of pursuit intent. By asking participants to indicate their "career of choice," and then asking them to fill out the COE with respect to this choice, we have restricted the range of the pursuit intent variable, rendering the analyses less powerful. Thus, future research might manipulate the career choice so that pursuit intention is more variable. For example, this could be done any number of ways. One approach would simply require all participants to indicate the extent of their outcome expectancy for a single career (e.g., teacher). All research participants in the sample would respond to the COE relative to this one choice. A procedure such as this would ideally produce a more normal distribution of PI scores, however the range of the scores would likely depend heavily on the career choice to which the participants were forced to respond.

A second concern resulting from the proposed procedure would be the variance this procedure would yield in the COE scores. If we assume that most individuals have similar expectancies (through education or general public knowledge) about certain careers, we might expect this manipulation to produce a fairly restricted range. This could be both ideal and problematic. For instance, if one

were attempting to validate only the COE using such a design, he/she would likely encounter the same range restriction problems we see in the current study. However, it is for this exact reason that we have proposed the addition of a value component to the COE. In doing so, we would be able to investigate the effect of the addition in a much more isolated manner. A recoded (and thus, "centered") COE-V variable, might have a much wider range and large variance than the original COE. By "centered" we mean that the standard scoring protocol produces a value-weighted outcome expectancy that ranges in magnitude from zero to high. However, by recoding the COE before calculating COE-V, we maintain the magnitudinal effect of value, but center the final variable by allowing the absence of an expectancy to be negative. Thus our final variable would be centered at zero (meaning no effect on pursuit intention) and allowed to vary in magnitude to either side of that central point. This hypothetical centered variable has statistical advantages as well as the potential benefit of being more conceptually valid.

Another methodological approach to allowing the PI variable to range freely would be to ask half of the sample to indicate (and respond to) their "career of choice," while asking the other half to choose (and respond to) the career they would least like to pursue. These conditions could be made more interesting (but likely more confusing to the participant) if the respondents were asked to choose a career that were "confident that they could do and interested in to some degree, but. . ." The ensuing instructions beyond the conditional statements would introduce the manipulation listed above. Use of this method would allow the experimenter to parse out the variance in PI explained by interest and self-efficacy. If the participants were able to follow these directions *and* generate such a choice the power to find the remaining effect should be enhanced. All that would remain would be two groups who differ primarily in their pursuit intent. This would allow for a comparison of means in the COE scores. If the mean COE score in the low-PI group were significantly smaller than the mean COE score in the high-PI group, that would provide some preliminary evidence for the construct validity of the COE.

However, in order to demonstrate that the addition of the value measure to the COE enhances this construct validity, we would still want to investigate the relationship between the COE and PI and to compare that finding with the relationship between the COE-V and PI, through the use of a single career choice stimulus.

Of course, all of these suggestions would be of dubious utility unless a more direct and context-valid measure of pursuit intent could be found. Ideally, such a measure would have multiple items and would be validated in longitudinal research to demonstrate that the career-specific pursuit intent it measures is highly predictive of actual choice behavior in the future. Thus, future research would either find or develop such a measure. Once such a measure has been identified, research investigating the relationship between any career constructs and pursuit intent (or choice behavior) would be much more useful and valid.

The operationalization of choice behavior as pursuit intent raises another possibility for study. Rather than attempting to validate SCCT using predictive variables, one could conceivably validate it over time by actually measuring whether an individual actually enters their “career path of choice.” Such an investigation might entail the use of a discriminant analysis that sought to predict whether an individual would follow through on their choice, given their outcome expectancies and values. Indeed, the analysis could be expanded to assess the predictive power of all the component of SCCT, rather than limiting the investigation to pursuit intention.

Finally, we consider the wording and instructions of the COE in its current form. Recall that the MIQ (upon which the COE is based) used a pair-comparisons format. This allowed the researcher to avoid a “flat profile” in which the participant answers all of the items in a similar manner. While this is not as crucial for the COE, it can be very problematic for the value component we have dubbed the COV. This problem is due to the tendency some individuals will have to indicate high levels of value to all potential outcomes (even though some may in reality be valued much more highly than others; thus the dreaded “flat, elevated profile”). In some cases,

this may be an artifact of social desirability or reactance in which the respondent rates all value possibilities highly because they believe that should. One way potential way of avoiding this would be to change the “anchors” of the COV in such a way that lower rating would be more attractive and very high ratings should only be applied to the absolute most essential outcomes (e.g., change “do not value at all” to “do not value enough to affect my behavior”). In this way, the variance in the value component might be extended, further improving the power of any statistical analysis. Another way of minimizing “yea saying” in responding would be to consider reverse keying and wording for some or all of the COV items compared to the COE.

In conclusion, this study has attempted to demonstrate the potential utility of a parallel value measure to Larson’s Career Outcome Expectancy Scale (Springer et al., 2001). The results were inconclusive regarding whether such an addition is indicated, however, numerous methodological limitations can be identified to potentially explain the lack of significance in these results. Foremost among these limitations was the sample size restrictions imposed by the design and the scale chosen to represent pursuit intent. However, it is possible that a more direct and appropriate pursuit intent measure might be used to more adequately test the construct validity of a revised COE. A revised design in which outcome expectations (as measured by the COE) and pursuit intent are allowed to vary in an unconstrained manner may provide the empirical basis for the utility of adding value-weighting to the existing COE instrument.

CHAPTER 5. REFERENCES

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122-147.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall
- Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology*, 25, 729-735.
- Betz, N. E., Borgen, F. H., & Harmon, L. W. (1996). *Skills Confidence Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Bishop, R. M., & Bieschke, K. J. (1998). Applying social cognitive theory to interest in research among counseling psychology doctoral students: a path analysis. *Journal of Counseling Psychology*, 45, 182-188.
- Dawis, R. V. (1996). The theory of work adjustment and person-environment-correspondence counseling. In D. Brown, L. Brooks, & Associates (Eds.), *Career Choice and Development* (pp. 75 – 120). San Francisco: Josey-Bass Publishers.
- Fisher, S. T., Weiss, D. J., & Dawis, R. V. (1968). A comparison of Likert and pair comparisons techniques in multivariate attitude scaling. *Educational and Psychological Measurement*, 28, 81-94.
- Fouad, N. A. & Smith, P. L. (1996). A test of a social cognitive model for middle school students: Math and science. *Journal of Counseling Psychology*, 43, 338-346.
- Fouad, N. A., Smith, P. L., & Enochs, L. (1997). Reliability and validity evidence for the middle school self-efficacy scale. *Measurement and Evaluation in Counseling and Development*, 30, 17-31.
- Hackett, G., Betz, N. E., Casas, J. M., & Rocha-Singh, I. A. (1992). Gender, ethnicity, and social cognitive factors predicting the academic achievement of students in engineering. *Journal of Counseling Psychology*, 39, 527-538.

- Harmon, L. W., Hansen, J. C., Borgen, F. H., & Hammer, A. L. (1994). *Strong Interest Inventory: Applications and technical guide*. Stanford, CA: Stanford University Press.
- Holland, J. L. (1997). *Making vocational choices* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Larson, L. M. (1998). The social cognitive model of counselor training. *Counseling Psychologist*, 26, 219-273.
- Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45, 79-122.
- Lent, R. W., Brown, S. D., & Hackett, G. (1996). Career development from a social cognitive perspective. In D. Brown, L. Brooks, & Associates (Eds.), *Career choice and development* (pp. 373 – 421). San Francisco: Josey-Bass Publishers.
- Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1991). Mathematics self-efficacy: Sources and relations to science based career choice. *Journal of Counseling Psychology*, 38, 424-430.
- Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1993). Predicting mathematics-related choice and success behaviors: Test of an expended social cognitive model. *Journal of Vocational Behavior*, 42, 223-236.
- Longo, D. A., Lent, R. W., & Brown, S. D. (1992). Social cognitive variables in the prediction of client motivation and attrition. *Journal of Counseling Psychology*, 39, 447-452.
- Lopez, F. G., Lent, R. W., Brown, S. D., & Gore, P. A. (1997). Role of social-cognitive expectations in high school students' mathematics-related interest and performance. *Journal of Counseling Psychology*, 44, 44-52.
- Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology*, 38, 30-38.

- Rottinghaus, P. J., Larson, L. M., & Borgen, F. H. (in press). Theoretical and empirical linkages of self-efficacy and interests. *Journal of Vocational Behavior*.
- Rounds, J. B., Henly, G. A., Dawis, R. V., Lofquist, L. H., & Weiss, D. J. (1981). *Manual for the Minnesota Importance Questionnaire: A measure of vocational needs and values*. Minneapolis, MN: University of Minnesota Department of Psychology.
- Sandri, G., & Robertson, I. T. (1993). Self-efficacy and work-related behavior: A review and meta-analysis. *Applied Psychology: An International Review*, 42, 139-152.
- Scott, T.B., Dawis, R. V., England, G. W., Lofquist, L. H. (1960). A definition of work adjustment. *Minnesota Studies in Vocational Rehabilitation*, No. X, 1-68.
- Shell, D. F., Colvin, C., & Bruning, R. H. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology*, 87, 414-423.
- Smith, P. L. & Fouad, N. A. (1999). Subject-matter specificity of self-efficacy, outcome expectations, interests, and goals: Implications for the social cognitive model. *Journal of Counseling Psychology*, 46, 461-471.
- Springer, S., Larson, L. M., Tilley, B. P., Gasser, & C. E. (2001, August). *The development of two outcome expectancy measures*. Poster session presented at the annual meeting of the American Psychological Association, San Francisco, CA.
- Strong, E. K., Jr. (1927). Vocational interest test. *Educational Record*, 8, 107-121.
- Van Vianen, A. E. M. (1999). Managerial self-efficacy, outcome expectancies, and work-role salience as determinants of ambition for managerial position. *Journal of Applied Social Psychology*, 29, 639-665.
- Vroom, V. H. (1962). *Work and Motivation*. New York: Wiley.

Wampold, B. E. & Freund, R. D. (1987). Use of multiple regression in counseling psychology research: A flexible data-analytic strategy. *Journal of Counseling Psychology, 34*, 372-382.

APPENDIX A: IRB Approval Form**IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

Human Subjects Research Office
2810 Beardshear Hall
Ames, IA 50011-2036
515/294-4566
FAX: 515/294-7288

DATE: October 3, 2002

TO: Lisa Larson

FROM: Janell Meldrem, IRB Administrator

RE: IRB ID # 03-120

The project, "Personality, Self-Efficacy, and Interest" has been declared exempt from Federal regulations as described in 45 CFR 46.101(b)(2).

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

To be in compliance with ISU's Federal Wide Assurance through the Office of Human Research Protections (OHRP) all projects involving human subjects, must be reviewed by the Institutional Review Board (IRB). Only the IRB may determine if the project must follow the requirements of 45 CFR 46 or is exempt from the requirements specified in this law. **Therefore, all human subject projects must be submitted and reviewed by the IRB.**

Because this project is exempt it does not require further IRB review and is exempt from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects.

We do, however, urge you to protect the rights of your participants in the same ways that you would if IRB approval were required. This includes providing relevant information about the research to the participants.

Any modification of this research should be submitted to the IRB on a Continuation and/or Modification form to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

APPENDIX B: EXAMPLES (COV and COE)
Career Outcome Valuation Scale

Instructions

Listed below are 23 statements that reflect work values. These vary from person to person and are quite personal. For some people, making a lot of money is highly valued, while for other people working independently is very important. Read each statement and rate them on a scale of 1 to 6 (1 = do not value at all; it is not important to me, to 6 = extremely value; it is extremely important to me).

Anchors

- 1 = do not value at all; not important to me at all
- 2 = mostly do not value; not very important to me
- 3 = only slightly value; only slightly important to me
- 4 = moderately value; fairly important to me
- 5 = very much value; very important to me
- 6 = extremely value; extremely important to me

Example Items

- I will have an opportunity for advancement
- I will try out my own ideas
- My salary will compare well with that of others
- I will have good working conditions
- People of my ethnic origin will be accepted and have good job possibilities

Career Outcome Expectancy Scale

Instructions

To what extent do you expect the following outcomes when you are employed in your outcome of choice (as listed on the Career Choice Form)?

Anchors

- 1 = not at all expect
- 2 = mostly do not expect
- 3 = slightly expect
- 4 = somewhat expect
- 5 = moderately expect
- 6 = very much expect

Example Items

Same as for COV (see above)