

## ABSTRACT

TOADDY, STEVEN ROBERT. Conscientiousness and Training Outcomes: The Added Utility of Facet-Level Analysis. (Under the direction of Samuel B. Pond, III.)

The purpose of this study is to replicate and expand upon previous models of the relationship between conscientiousness and learning outcomes using a facet-level analysis. Self-report personality and training performance data were collected from undergraduate students (N = 400). Correlation and structural equation modeling results indicate that self-efficacy and motivation to learn predict learning, while self-deception does not. Additionally, tentative support is offered for the use of facet structures in the analysis of the relationship between conscientiousness and gain in verbal knowledge as a result of training. Additional research is needed to confirm these findings.

Conscientiousness and Training Outcomes:  
The Added Utility of Facet-level Analysis

by  
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## Conscientiousness and Training Outcomes: The Added Utility of Facet-level Analysis

Meta-analytic work supports the notion that training programs result in reaction, learning, behavioral, and performance outcomes ([Arthur, Bennett, Edens, & Bell, 2003](#)), and validates the face-valid assumption that training can be a worthwhile investment of funds. Moreover, organizations have invested funds, and they continue to invest these funds heavily in training activities. According to an industry report, in 2007 U.S. businesses paid \$58.5 billion for formal training; up 4.8% from the prior year ([“2007 Industry Report,” 2007](#)). Training, then, is an area of substantial interest to organizations, and requires research to ensure that it is done well. A rich and broad literature has emerged to fill this need, spanning decades (e.g., [Levinson, 1962](#); [Pilati & Borges-Andrade, 2008](#)) and foci, including leadership ([Scaduto, Lindsay, & Chiaburu, 2008](#)), personality ([Tziner, Fisher, Senior, & Weisberg, 2007](#)), organizational justice ([Liao & Tai, 2006](#)), and many others. In the current work, I review, integrate and expand upon several such research threads, and focus on a model of the relationship between individual differences and training outcomes.

The theoretical model that I investigate in this work (see [Figure 1](#)) is an extension of Martocchio and Judge’s ([1997](#)) and Lee and Klein’s ([2002](#)) model of the relationship between conscientiousness and training outcomes. The present model seeks to add motivation to learn to the list of mediators initially proposed by Martocchio and Judge ([1997](#)), which included self-efficacy and self-deception. I expect this addition to increase

the overall validity of the model. In Martocchio and Judge's (1997) and Lee and Klein's (2002) studies, high conscientiousness predicted both self-efficacy and self-deception. These constructs, in turn, positively and negatively predicted training outcomes, respectively. As a result of these relationships, the overall relationship between conscientiousness and training outcomes was conflicted and weakened. A second substantial change to Martocchio and Judge's (1997) model in the present study is the measurement of conscientiousness at the facet level. I believe that this effort avoids the issue of overlapping prediction of beneficial and deleterious mediators, revealing a more powerful model of the relationship between individual differences and training outcomes.

### **Predictors of Training Effectiveness**

Over the course of organizational research, investigators have examined a variety of predictors of training effectiveness. Four of these predictors are of particular interest in the present work: self-deception and self-efficacy ([Martocchio & Judge, 1997](#); [Lee & Klein, 2002](#)), motivation to learn ([Colquitt & Simmering, 1998](#); [Liao & Tai, 2006](#)), and conscientiousness ([Barrick & Mount, 1991](#)). What follows is a discussion of each of these predictors.

### **Self-Deception**

Hirschfeld, Thomas, & McNatt (2008, p. 155) define self-deception as “a disposition to maintain unwittingly an overly positive self-image, which engenders biased cognitions about and assessments of oneself.” Research indicates that this form of self-

deception is negatively associated with training outcomes ([Martocchio & Judge, 1997](#); [Lee & Klein, 2002](#); [Hirschfeld et al., 2008](#)).

I highlight here the deliberately negative language that is included in the above definition. Unlike self-efficacy (discussed below), self-deception at its core is an undesirable disposition; it is this quality that separates it from similar but positive traits.

### **Self-efficacy**

Perceived self-efficacy (hereafter “self-efficacy”), as described by Bandura ([1986](#), p. 391), is “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances.” This definition highlights the subjectivity of the construct in that it emphasizes the individual’s judgment of ability and not the individual’s actual ability to execute these actions. Bandura ([1986](#)) further pointed out that a combination of skills and self-efficacy is necessary for competent functioning. Evidence exists that corroborates this claim; self-efficacy independently predicts performance, even when controlling for past performance ([Locke, Frederick, Lee, & Bobko, 1984](#); [Chen, Gully, Whiteman, & Kilcullen, 2000](#)). This construct holds much in common with self-deception, but in the case of self-efficacy, the judgments are not by definition deleterious, whereas in the case of self-deception, they are.

Apart from being a direct predictor of employee performance (i.e., [Locke et al., 1984](#), [Chen et al., 2000](#); [Norris, 2002](#)), research has shown that self-efficacy also significantly predicts a wide array of outcomes pertinent to organizational and training

settings, such as post-training verbal knowledge ([Martocchio & Judge, 1997](#), [Lee & Klein, 2002](#)) and other training outcomes ([Alvarez, Salas, & Garofano, 2004](#)).

### **Motivation to learn**

Noe and Schmitt ([1986](#)) describe motivation to learn as “a specific desire on the part of the trainee to learn the content of the training program.” Motivation to learn is a state construct that varies by the topic addressed in the training program. Like self-efficacy, this construct also predicts training effectiveness ([Colquitt & Simmering, 1998](#); [Liao & Tai, 2006](#); [Tziner et al., 2007](#)). Research has also shown that organizational social support, along with whether an employee can opt into or out of training, predicts motivation to learn, and that motivation to learn then predicts motivation to transfer learning to on-the-job situations ([Green, 2002](#)). Additional research indicates that those who are intrinsically interested in training report higher motivation to learn ([Nease, 2000](#)). As designed, the current study partially replicates and extends Colquitt and Simmering’s ([1998](#)) work by demonstrating that motivation to learn mediates the relation between conscientiousness and learning outcomes.

### **Conscientiousness**

Conscientiousness is one of the most pervasively studied personality factors in the realm of industrial/organizational psychology research. Research has shown that this construct conceivably reflects a variety of traits, including conformity, dependability, will to achieve, and perseverance ([Barrick & Mount, 1991](#)).

In organizational research, conscientiousness has functioned as the *de facto* leader of the Big Five personality characteristics because high conscientiousness predicts such a wide array of constructs both in and out of the organizational setting (See the meta-analysis by [Ones, Dilchert, Viswesvaran, & Judge, 2007](#)). The present study aims to examine conscientiousness's association with self-deception, self-efficacy, and motivation to learn.

Research supports links between conscientiousness and these variables ([Martocchio & Judge, 1997](#), [Lee & Klein, 2002](#); [Colquitt & Simmering, 1998](#)). Herein lies one of the main problems with prior models, however; namely, that conscientiousness is positively related to a deleterious (self-deception) and two beneficial (self-efficacy and motivation to learn) predictors of learning.

Thus, when conceptualizing each of these three predictors as mediators of the relationship between conscientiousness and training outcomes, self-deception operates in opposition to motivation to learn and self-efficacy and weakens the overall predictive power of conscientiousness. That is, conscientiousness as a composite construct serves as an ambivalent predictor of training outcomes. In order to develop a more fruitful model of the relationship between individual differences and training outcomes, it is necessary to resolve this issue. Below, I discuss using facets of conscientiousness as one possible means of addressing the problem.

### **Facets of Conscientiousness**

Sackett and Wanek ([1996](#)) called for a more molecular look at the Big Five personality dimensions. Such an effort, they contended, could reveal a greater contrast in relationships between facets of the larger dimensions (e.g. conscientiousness) and workplace outcomes. Suggesting that certain facets of a given personality factor could predict beneficial outcomes while other facets of the same dimension could predict deleterious outcomes, Sackett and Wanek ([1996](#)) encouraged researchers to devise facet structures of these dimensions for use in model development. Meta-analytic work reveals that there are benefits and pitfalls to using facets as opposed to dimensions depending upon the situations in which researchers are interested. For instance, a general measure of the conscientiousness dimension provides greater predictive power than any of its individual facets can provide ([Holland, 2001](#)). In this study, however, because specificity of prediction is crucial to the model, and because dimension use in similar models in the past has proven inadequate ([Martocchio & Judge, 1997](#); [Lee & Klein, 2002](#)), I used facets.

Researchers have delineated the facets of conscientiousness in a variety of ways through factor analysis (See for example [Hogan & Ones, 1997](#); [Vinchur, Schippmann, Switzer, & Roth, 1998](#); [Ones, Dilchert, Viswesvaran, & Judge, 2007](#)). Most models contain a facet related to orderliness, achievement, and dependability, whereas elements such as self-control, persistence, cautiousness, and intention-action gap (among others) appear more sporadically across studies.

Maulden (2008) conducted factor analyses on newly gathered data to examine the validity of these and other factor structures and showed that, to various levels, the different structures demonstrated convergent validity – that is, when taken together, factor structures correlate with each other. In other words, although each factor structure to some extent is measuring conscientiousness at the composite level, the hypothesized facets of these structures differ substantially both in name and in the characteristics the facets measure. Such differences between facet structures demonstrate the degree of subjectivity inherent to the process of hypothesizing a set of facets for a given composite personality dimension, as different researchers define and address the construct domain in different ways. This subjectivity is both a weakness of this process and a characteristic of which researchers can take advantage. Inspired by Sackett and Wanek (1996), I use a facet-level examination of conscientiousness in the current study.

### **Study Hypotheses**

As discussed earlier, I designed this study primarily to replicate and extend the work of Martocchio and Judge (1997) and Lee and Klein (2002) and to integrate the work of Colquitt and Simmering (1998). Thus, I hypothesize the following:

*Hypothesis 1: Self-deception will be negatively associated with learning.*

*Hypothesis 2: General Self-efficacy will be positively associated with learning.*

*Hypothesis 3: Motivation to Learn will be positively associated with learning.*

*Hypothesis 4: A model in which the relationships between facets of conscientiousness and learning are mediated by self-deception, general self-efficacy, and/or motivation to learn will achieve better model fit than a direct-effects model in which paths between facets of conscientiousness and learning are modeled directly.*

In addition, I am interested in whether the facets of conscientiousness used in the study are each associated with either beneficial or deleterious mediators of the demonstrated relationship between conscientiousness and learning, but not both. Further, I am interested in whether a facet model achieves better fit than a corresponding composite model of conscientiousness. Thus:

*Research Question 1: How will individual facets be associated with beneficial (i.e. Motivation to Learn, General Self-efficacy) and deleterious (i.e. Self-deception) mediators?*

*Research Question 2: How will the fit of a facet model of conscientiousness compare with the fit of the corresponding composite model?*

For a more complete discussion of the above topics, refer to [Appendix A](#). This appendix contains specific relationships between the predictor constructs highlighted above and other relevant constructs within the industrial and organizational literature.

## Method

### Participants

Participants were 400 students drawn from Introductory Psychology courses at a large Southeastern United States university. Students received course credit for participating in the study. Recruitment and registration of participants was conducted via an online study administration suite called Experimentrix.

### Procedures

Participants first completed an informed consent form via a separate survey administration suite (SurveyBuilder). Using this same service, participants then completed the online pre-training survey and pre-training test. An Internet link next led the participants to the training modules. Following these training modules, another link led participants to the online post-training test (hosted on SurveyBuilder).

The training entailed having participants complete four Microsoft Excel 2007 training modules made available by Microsoft ([Microsoft, 2009](#)). Behrend ([2008](#)) used a similar training program in her study. The material in each training module appeared to participants in ascending order of difficulty, starting with rudimentary topics and leading up to advanced topics. Each participant completed the same set of training modules. I expected that all participants would be exposed to new information in the training program, which covered acclimation with Excel 2007, formulae, charts, and pivot tables. Consistent with this expectation, data revealed that no participant obtained a perfect score

on the pre-training assessment of verbal knowledge (see below). During each module, participants completed several review quizzes focusing on the material covered.

## Measures

Unless otherwise noted, all measures used were on a five-point Likert-type scale, with response options ranging from *Very Inaccurate* to *Very Accurate*.

**Pre-test and post-test verbal knowledge.** I compiled all items from the quizzes used in the selected modules ([Microsoft, 2009](#)) to create a 40-item measure of verbal knowledge related to Microsoft Excel. Response options were multiple-choice, and subjects scored either correct or incorrect for each item. Sample size constraints prevented all 40 items from being entered into the model, and accordingly, item parcels were generated. To parcel the verbal knowledge items, I first calculated item difficulties for the pre-test, and sorted items by this value. Next, I assigned items to one of four parcels in rounds so that item difficulties were relatively evenly distributed across parcels.

To control for the influence of initial performance on gain score, I used a parceled gain score residualization procedure ([Cronbach & Furby, 1970](#)). I subtracted pre-test scores for each parcel from post-test scores for the same parcel to calculate ordinary gain scores. Following this, I conducted a regression for each parcel in which I regressed the gain score on the pre-test score for that parcel. Using each of the four regression equations obtained, I produced expected gain scores for each participant for each parcel

by entering actual pre-test scores. Finally, I subtracted each participant's expected gain for each parcel from the actual gain for that parcel, yielding four residualized gain scores. This procedure allowed me to identify those participants who improved more or less than expected over the course of the training program. Accordingly, positive values on this variable indicate greater-than-expected gains, while negative values indicate less-than-expected gains.

**Self-deception.** To measure self-deception, I used the 10-item PAS self-deception scale from the IPIP ([Goldberg et al., 2006](#); Cronbach's coefficient alpha = .81). Sample items include “[I] know that my decisions are correct,” and “[I] just know that I will be a success.”

**General self-efficacy.** Rather than focus on developing a separate measure of self-efficacy for each training module used in the study, I chose to focus on general self-efficacy. Research has supported the use of general self-efficacy scales in situations where task-specific self-efficacy scales are not available ([Scherbaum, Cohen-Charash, & Kern, 2006](#)). The tasks that participants attempted were very similar across training modules, and I do not believe that separate self-efficacy measures are necessary for each task. I used the 8-item scale generated by Chen, Gully, and Eden ([2001](#); Cronbach's coefficient alpha = .91). Sample items include “I will be able to achieve most of the goals that I have set for myself,” and “I am confident that I can perform effectively on many different tasks.”

**Motivation to learn.** Only a few established measures of motivation to learn are available, and these measures typically must be adapted to the training program. I developed a 5-Item measure based on the two items from Hicks ([1984](#)). The study from which these items were acquired is one of the more widely cited research studies on motivation to learn. I wrote an additional three items to measure motivation to learn, to create the five-item scale (Cronbach's coefficient alpha = .78). Sample items include “I am motivated to learn the training material in this program,” and “I will put effort forth to learn what I can from this program.”

**Conscientiousness Facets.** I acquired all items from a model of facets of conscientiousness set forth by Maulden ([2008](#)) for use in the study. This model contains four facets. The Achievement facet contained 22 items (Cronbach's coefficient alpha = .89), such as “[I] excel in what I do,” and “[I] set high standards for myself and others.” The Cautiousness facet contained 12 items (Cronbach's coefficient alpha = .80), such as “[I] avoid mistakes,” and “[I] choose my words with care.” The Dependability facet contained 16 items (Cronbach's coefficient alpha = .82), such as “[I] finish what I start,” and “[I] get to work at once.” Finally, the Order facet contained 10 items (Cronbach's coefficient alpha = .84), such as “[I] want everything to be ‘just right,’” and “[I] love order and regularity.”

## Results

I conducted analyses in a series of four stages, which I discuss sequentially below.

### **Study Variable Correlations**

Prior to the use of modeling to determine the relationships between constructs, I conducted a set of scale-level correlations. Scale scores were generated through the simple addition of item scores within scales, and these scores were correlated with each other. Given the large number of correlations, significance thresholds were set at the .001 level. For scale-level correlations and descriptive statistics, see [Table 1](#). On the one hand, self-deception is not significantly related to learning and this finding fails to support Hypothesis 1. Hypotheses 2 and 3, on the other hand, were supported because general self-efficacy and motivation to learn are each significantly and positively related to learning. These findings partially address Research Question 1 by findings that reveal that all four facets of conscientiousness correlate positively and significantly with each of these three mediators of learning. In sum, zero-order correlation analyses indicate that the individual facets of conscientiousness do not relate to only beneficial or deleterious mediators. In addressing Research Question 1, the individual facets of conscientiousness relate to both beneficial and deleterious mediators.

### **Personality Scale Item Parceling**

Although a great deal of contention exists regarding the use of parceling methods (e.g. [Bandalos, 2008](#); [Sass & Smith, 2006](#)), in order to limit the number of parameters estimated in my structural models, I used parceling on all personality measures in this study prior to conducting any structural modeling analyses. I selected a technique described by Alhija and Wisenbaker ([2006](#)) whereby I estimated the dimensionality of

scales through exploratory factor analysis. I then generated parcels based on highest factor loading (See [Table 2](#)). I determined the number of factors, and thus parcels per scale, by exploratory factor analysis model fit. As all items in each parcel were in all cases on the same metric, I summed individual item scores to generate each parcel score. I used this process for all variables included in my structural models with the exception of gain in verbal knowledge as described earlier.

### **Proximal predictors of Training Effectiveness**

I attempted to replicate the findings of Martocchio and Judge ([1997](#)) and Lee and Klein ([2002](#)), as well as to expand the list of potential mediators used in these studies to include motivation to learn. In order to do so, I tested a series of structural equation models (SEM; [Hatcher, 1994](#)) using Mplus ([Muthén & Muthén, 1998-2007](#)). To evaluate model fit, three fit indices were selected. Chi-squared values for the tested models are presented, along with significance values. As recommended in the literature ([MacCallum & Hong, 1997](#)), the Root-mean-square error of approximation (RMSEA) fit index was selected, as this index accounts for model complexity and is not heavily impacted by sample size. Additionally, the Comparative Fit Index (CFI; [Bentler, 1990](#)) was selected, which provides a relatively efficient estimate of model fit ([Goffin, 1993](#)).

These preliminary models did not include the full conscientiousness-to-learning paths, and instead focused on whether each of the hypothesized constructs related to learning. Accordingly, these constructs are considered potential proximal predictors of learning. The first of these models examined the ability of general self-efficacy and self-

deception to predict learning (see [Figure 2](#)). My original SEM revealed a lack of association between self-deception and learning (see [Table 3](#)). These results failed to support Hypothesis 1 and the findings of Martocchio and Judge ([1997](#)) and Lee and Klein ([2002](#)) with regard to self-deception. I then examined the addition of motivation to learn as a potential proximal predictor of learning to improve model fit (see [Figure 3](#)). Initially, self-deception was retained in the model (see Hypothesized Model, [Table 4](#)), but significant fit improvement occurred when this construct was eliminated (see Alternative Model in [Table 4](#)). These findings offer support for Hypotheses 2 and 3, such that general self-efficacy and motivation to learn each significantly positively relate to learning. According to these findings, only general self-efficacy and motivation to learn are proximal predictors of learning. Accordingly, only these two constructs, and not self-deception, can function as mediators in the full model ([Figure 1](#)).

### **Full Hypothesized Model Testing**

Once appropriate proximal predictors of training effectiveness had been selected, I conducted a two-stage process of model testing. First, I tested and evaluated an initial model (see [Figure 1](#)). Informed by the results of this model, I formulated and tested the final overall model (see [Figure 4](#)), as well as several alternative models. Though self-deception was shown to not significantly predict learning outcomes, it was included in the structural models in order to explore the relationships between individual facets of conscientiousness and other constructs. It is important to note that at no point during full-

model testing was adequate fit achieved, and thus the results that follow do not stand on their own. Rather, these findings are tentative and require additional research.

The hypothesized mediated model, in which self-efficacy and motivation to learn mediated the relationships between the facets of conscientiousness and gain in verbal knowledge, performed no better or worse than the three alternative models (See [Table 5](#)). The first of these alternative models includes paths directly from facets of conscientiousness to gain in verbal knowledge, yielding a “direct-effects” model. The second alternative model removed all paths between these facets and endogenous variables and added a latent “conscientiousness” factor, for which each of the facets was an indicator. This new “composite conscientiousness” factor was then modeled to predict each of the mediating (self-efficacy and motivation to learn) variables. The final alternative model retained the changes made in the second alternative model but added direct paths from the “conscientiousness” factor to gain in verbal knowledge. Because none of the three alternative models better fit the data, I decided to retain the hypothesized model. These results in part address Research Question 2, in that a facet model of conscientiousness (i.e. the hypothesized model) achieved no better or worse model fit than either of the composite conscientiousness models (i.e. the second and third alternative models). Although model fit was, in fact, somewhat better for the facet model, these differences were not significant.

These model results also answer Research Question 1 somewhat affirmatively, because two facets of conscientiousness – cautiousness and dependability – related

negatively and positively, respectively, to general self-efficacy, but did not relate significantly to self-deception. Conversely, however, achievement related positively both to motivation to learn and to self-deception, while order related negatively to both of these predictors of gain in verbal knowledge. Note that as originally proposed, however, I could not directly address Research Question 1 because self-deception did not relate significantly with learning. Answering a different question, proposed in the same spirit as the first, demonstrates that while achievement and dependability relate significantly and positively to beneficial predictors of gain in verbal knowledge, cautiousness and order both relate significantly and negatively to these beneficial predictors (See [Figure 4](#)).

### **Discussion**

This study was designed to replicate and extend the findings of Martocchio and Judge ([1997](#)) and Lee and Klein ([2002](#)), in which self-deception and self-efficacy mediate the relationship between conscientiousness and training outcomes. I accomplished this through partial replication of the models used in these prior studies as well as the addition of motivation to learn as a mediator. Another overarching question posed in the current study was whether a facet-level analysis of conscientiousness (e.g., the Maulden ([2008](#)) facet model used in this study) would achieve greater utility than a composite-level analysis (e.g., one in which facets were used as indicators of a higher-order latent variable). This question flowed in part from the work of Sackett and Wanek ([1996](#)) regarding the possible advantages of incorporating a more molecular treatment of personality dimensions. Another impetus for this question was the fact that earlier

models of training effectiveness contained conflicting pathways between conscientiousness and training outcomes that could not be resolved with the use of a composite conscientiousness measure.

The present study offers evidence somewhat to the contrary of the findings of past researchers. Although the findings concerning the relationship between self-efficacy and learning are in agreement with Martocchio and Judge ([1997](#)) and Lee and Klein ([2002](#)), the present study failed to demonstrate a link between self-deception and learning and, thus, did not replicate some of the findings of Martocchio and Judge ([1997](#)), Lee and Klein ([2002](#)), and Hirschfeld and colleagues ([2008](#)).

To further explore the findings of past research, I included motivation to learn to extend the models mediating the relationship between conscientiousness and learning. This construct did, as hypothesized, mediate the relationship between conscientiousness (here, more specifically, an individual facet of conscientiousness labeled achievement) and learning. Importantly, this construct alone mediated the relationship between achievement and learning, while general self-efficacy alone mediated the relationships between learning and each of the facets labeled cautiousness, dependability, and order. Accordingly, it appears that motivation to learn and general self-efficacy are both required in a model that includes facets of conscientiousness and learning.

The failure of self-deception to emerge as a detrimental predictor of learning rendered Research Question 1 invalid. To address the spirit of that question without

referring to self-deception, I chose to reformulate this Question. Since the main reason for introducing facets was to increase the predictive power of the conscientiousness-learning model (as suggested by [Sackett and Wanek, 1996](#)), I focused on general self-efficacy and motivation to learn. Specifically, I assumed that to be positively associated with either or both general self-efficacy and motivation to learn is to be, in the current model, a beneficial predictor of learning. Contrariwise, to be negatively associated with either of these constructs is to be a deleterious predictor of learning. Because self-deception was neither positively associated nor negatively associated with learning, it is not treated as a substantial component of the following discussion.

The present study included a different scale to measure self-deception than that used by Martocchio and Judge ([1997](#)) and Lee and Klein ([2002](#)). This may, in part, explain the dissimilar results yielded by my study. If this is the case, prior research may have suffered from mono-operation bias ([Shadish, Cook, & Campbell, 2002](#)). Future research should investigate the relationship between self-deception and learning using several operationalizations of each construct. Even if this bias was not the cause of these contradictory results, I advise caution when considering the impact of self-deceptive behaviors on learning outcomes. Perhaps self-deception's relatively high correlation with self-efficacy indicates that self-deception is not always detrimental to learning, contrary to its typical conception ([Hirschfeld et al., 2008](#)). Perhaps instead this variable addresses a similar content domain as self-efficacy, and thus may facilitate training outcomes in certain situations.

A caveat to the application of the present study's findings is that none of the full models (i.e., those models containing facets, intermediate variables, and learning) achieved adequate model fit. The following discussion regarding facets of conscientiousness is based on comparisons between models on the basis of relative model fit, not overall model fit. This is an issue that must be addressed in future research in order to draw confident conclusions about the relationships between the constructs in question.

Various pieces of evidence must be pulled together to answer the question of whether facet models are more or less useful than composite models of conscientiousness. First, one must demonstrate that particular facets of conscientiousness used by a researcher reasonably reflect the composite construct of conscientiousness. In other words, although the validity of a given factor structure is important, Stewart ([1999](#)), Holland ([2001](#)) and Maulden ([2008](#)) each indicate that the differential prediction afforded by using narrow (i.e. non-composite) personality factors is one of the features that renders these narrow facets useful. As long as the facet structures that researchers select or hypothesize remains construct-valid, they may choose any structure that yields useful prediction in their models. For this, I referred to the work of Maulden ([2008](#)), who conducted factor analyses revealing a variety of facet structures. Because of this author's work in assessing the suitability of facet structures, I believe that the use of the model selected from that study does indeed satisfy the requirement of construct validity.

Given that a facet structure reasonably reflects the composite construct in question, the model fit of facet and composite models must be compared. The results of the present study indicate that fit was somewhat decreased in models in which a composite construct of conscientiousness was modeled, thus offering tentative support to the use of a facet model. Finally, the use of facets must tell us something beyond the use of composite conscientiousness. In other words, if all facets of conscientiousness behaved equivalently, and thus predicted each of the mediators in the same manner as a composite conscientiousness predictor, then the facet model could do nothing to expand upon our understanding of the nature of the relationship between conscientiousness and learning. In the present study, however, this was not the case; analyses demonstrated relationships between only some of the mediating variables for each of the four facets of conscientiousness that I examined. Based on these findings, achievement and dependability were tentatively declared to be beneficial facets, while cautiousness and order were tentatively declared to be deleterious.

An examination of the items of each of the facet scales perhaps explains why achievement and dependability are considered beneficial with regard to learning while cautiousness and order are considered deleterious. Achievement and dependability perhaps contributes to learning because those scoring high on these scales are goal- and task-oriented and diligent. It may be that these personal characteristics inspire the learner to set and more doggedly pursue productive learning goals that lead to positive learning outcomes (see for a discussion of goal-setting theory [Locke and Latham, 1990](#)). Over

time, the tendency to see goals through may increase the learner's feelings of self-efficacy. Further, those who score high in achievement may be approaching training (and any other task) with a higher-than-normal amount of enthusiasm that contributes to higher learning motivation. Conversely, those who score high on cautiousness and order may spend an excessive amount of time ensuring that each response in a training program is correct and well-formulated. When these efforts prove unsuccessful – the participant incorrectly answers a question or fails to grasp a concept. For example, instead of taking this feedback as a learning opportunity, the participant may despair and lose self-efficacy over time.

### **Limitations and Future Research**

Little research exists related to the use of facets of conscientiousness in mediated models of training outcomes. As a result of this, the most pronounced limitation of the current study is the lack of precedent for the appropriate method of modeling relationships using facet structures. Future research may use the findings of the current study as a starting point from which to make and test hypotheses involving personality construct facet structures and learning. The outcomes that researchers might study in a manner similar to that of the current study are not limited to learning, but might include any that are traditionally linked to personality characteristics. As the results of the current study were not conclusive, the discussion of beneficial and deleterious facets that I have forwarded, above, requires additional investigation.

Future researchers should select and use a variety of measures of conscientiousness, as well as consider examining other potential deleterious predictors of learning. One of the study's main objectives was to assess whether specific facets of conscientiousness, related to learning performance, were associated with beneficial or deleterious variables (e.g. self-efficacy and self-deception, respectively) hypothesized to mediate conscientiousness and learning performance. Because the present study did not support the presence of a deleterious mediating variable, this effort was thwarted. As discussed earlier, this lack of support contradicted the findings of several past researchers, and it deserves further examination.

The present study also successfully expanded previous models of the relationship between conscientiousness and learning with the addition of motivation to learn. Researchers interested in the conscientiousness-learning relationship may seek and investigate additional beneficial predictors of learning as potential mediators of this relationship, thereby expanding our overall understanding of the antecedents of learning.

Future research should expand upon several other aspects of the present study, including the focal population, the training material, and the presentation method. To maximize external validity and to target employees of organizations specifically, researchers should conduct research that is similar to the present study within actual training programs in businesses. Investigating a variety of types of training would increase the generalizability of the present findings, leading to a greater opportunity to apply these results to training in diverse situations.

### **Practical Implications of Findings**

The findings of this study can be applied to both research and practice. In general, the findings of this study suggest that researchers should consider adopting a more facet-level stance when examining relationships between personality domains and various outcomes ([Sackett & Wanek, 1996](#)). Of course, the current study focuses on one personality domain (conscientiousness) and one outcome (learning following a training program), but a plethora of possible permutations of domains and outcomes, as well as choices for facet structures, exist. Some of these permutations and choices will be of interest to researchers, and the present study indicates that it might be preferable to use a facet-level analysis of personality factors. That said, it is important also to recognize that composite measures may at times be more useful than their facet-level alternatives ([Holland, 2001](#)). This is largely an empirical question, however, and one that is addressed easily by choosing a facet structure that successfully serves as a basis for its composite counterpart. In such a case, researchers can conduct analyses at both the facet and composite level without gathering additional data, as facet scores can be set as indicators of the overall construct. Once this is modeled, the researchers can make the decision about which one to use.

Practitioners should consider the findings of the present study when designing training programs. This study further supports the notion that employees who have high self-efficacy and who are motivated to learn will be more likely to succeed in training programs. Accordingly, those responsible for designing and implementing training

programs should think more about how to draw upon these important learner characteristics. While the present study has once again demonstrated that to some extent self-efficacy and learning motivation relate to the conscientiousness trait, specific interventions to bolster a trainee's motivation to learn and training self-efficacy require further exploration. Where these motivational influences are lacking in a trainee, substantially poorer training outcomes may be expected. However, if trainers can discover and apply techniques to increase these states in employees there will be likely substantial gains in the form of improved training outcomes reaped.

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Table 1

*Zero-order correlations and descriptive statistics for Modeled Variables*

Variable	Mean	St. Dev	RGS	SD	GSE	MTL	ACH	CAU	DEP	ORD
Learning (RGS)	0	1.6	(.85)							
Self-Deception (SD)	3.55	0.62	0.11	(.81)						
Gen. Self-Efficacy (GSE)	4.14	0.6	.21*	.54*	(.91)					
Mot. To Learn (MTL)	3.77	0.73	.23*	.27*	.32*	(.79)				
Achievement (ACH)	3.89	0.49	.18*	.59*	.72*	.49*	(.89)			
Cautiousness (CAU)	3.32	0.59	0.11	.37*	.24*	.23*	.41*	(.80)		
Dependability (DEP)	3.6	0.51	0.14	.49*	.49*	.49*	.76*	.58*	(.82)	
Order (ORD)	3.52	0.7	0.05	.27*	.29*	.32*	.52*	.43*	.66*	(.84)

*Note.*  $N = 400$ . \* designates statistical significance at the .001 level. Diagonal contains Cronbach's coefficient alpha values.

Table 2

*Exploratory Factor Analyses used for Item Parceling*

Scale	Item	Group Membership	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading
Self-Deception	X1	1	<b>0.44</b>	0.16	0.34
	X2	1	<b>0.63</b>	0.62	0.10
	X3	1	<b>0.65</b>	0.46	-0.01
	X4	1	<b>0.72</b>	0.27	0.09
	X5	1	<b>0.59</b>	0.27	-0.03
	X8	2	0.34	<b>0.90</b>	0.06
	X9	2	0.42	<b>0.85</b>	0.08
	X6	3	0.17	0.40	<b>0.48</b>
	X7	3	0.19	0.43	<b>0.57</b>
	X10	3	0.30	0.26	<b>0.41</b>
Gen. Self-Efficacy	X1	1	<b>0.76</b>	0.67	
	X2	1	<b>0.69</b>	0.63	
	X3	1	<b>0.80</b>	0.64	
	X4	2	0.79	<b>0.61</b>	
	X5	2	0.76	<b>0.67</b>	
	X6	2	0.75	<b>0.73</b>	
	X7*	3	0.62	0.76	
	X8*	3	0.68	0.81	
Mot. To Learn	X1	1	<b>0.73</b>	0.48	
	X2	1	<b>0.94</b>	0.36	
	X3	1	<b>0.88</b>	0.36	
	X4	2	0.33	<b>0.82</b>	
	X5*	3	0.34	0.48	

Table 2 (cont.)

Scale	Item	Group Membership	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading	Factor 4 Loading
Achievement	X1	1	<b>0.70</b>	0.31	0.43	0.15
	X2	1	<b>0.73</b>	0.26	0.45	0.18
	X3	1	<b>0.67</b>	0.24	0.47	0.19
	X4	1	<b>0.66</b>	0.34	0.54	0.16
	X5	1	<b>0.61</b>	0.26	0.47	0.12
	X11	1	<b>0.44</b>	0.20	0.43	0.05
	X6	2	0.12	<b>0.51</b>	0.24	0.21
	X7	2	0.27	<b>0.62</b>	0.23	0.19
	X8	2	0.33	<b>0.70</b>	0.36	0.22
	X9	2	0.32	<b>0.69</b>	0.25	0.11
	X10	2	0.12	<b>0.31</b>	0.29	0.20
	X12	3	0.53	0.33	<b>0.61</b>	0.30
	X13	3	0.46	0.27	<b>0.51</b>	0.31
	X16	3	0.35	0.20	<b>0.54</b>	0.25
	X17	3	0.42	0.20	<b>0.66</b>	0.23
	X18	3	0.36	0.24	<b>0.66</b>	0.39
	X20	3	0.39	0.23	<b>0.64</b>	0.27
	X21	3	0.45	0.28	<b>0.70</b>	0.21
	X22	3	0.50	0.29	<b>0.71</b>	0.39
	X14	4	0.20	0.39	0.39	<b>0.84</b>
	X15	4	0.40	0.20	0.56	<b>0.59</b>
	X19	4	0.29	0.33	0.51	<b>0.57</b>

Table 2 (cont.)

Scale	Item	Group Membership	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading	Factor 4 Loading
Cautiousness	X2	1	<b>0.09</b>	0.01	0.04	-0.01
	X3	1	<b>1.46</b>	0.16	0.16	0.32
	X1	2	0.12	<b>0.66</b>	0.58	0.45
	X5	2	0.03	<b>0.59</b>	0.37	0.26
	X8	2	0.11	<b>0.67</b>	0.48	0.36
	X10	2	0.10	<b>0.55</b>	0.41	0.33
	X11	2	0.08	<b>0.62</b>	0.58	0.34
	X4	3	0.08	0.18	<b>0.35</b>	0.34
	X6	3	0.10	0.63	<b>0.93</b>	0.42
	X7	3	0.04	0.71	<b>0.41</b>	0.26
	X9	4	0.13	0.38	0.40	<b>0.77</b>
	X12	4	0.19	0.35	0.23	<b>0.52</b>
Dependability	X4	1	<b>0.69</b>	0.30	0.36	-0.02
	X6	1	<b>0.64</b>	0.29	0.39	0.03
	X10	1	<b>0.56</b>	0.11	0.06	0.09
	X11	1	<b>0.56</b>	0.26	0.13	0.08
	X12	1	<b>0.55</b>	0.40	0.32	0.14
	X1	2	0.48	<b>0.53</b>	0.49	0.09
	X7	2	0.37	<b>0.61</b>	0.41	0.07
	X8	2	0.30	<b>0.92</b>	0.46	0.10
	X5	3	0.27	0.54	<b>0.72</b>	0.05
	X9	3	0.20	0.17	<b>0.32</b>	-0.06
	X13	3	0.27	0.41	<b>0.65</b>	-0.03
	X16	3	0.43	0.47	<b>0.60</b>	0.01
	X2	4	-0.03	0.04	0.09	<b>0.16</b>
	X3	4	0.15	0.25	0.44	<b>0.46</b>
	X14	4	0.45	0.20	0.08	<b>0.57</b>
X15	4	0.47	0.25	0.14	<b>0.66</b>	

Table 2 (cont.)

Scale	Item	Group Membership	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading
Order	X1	1	<b>0.75</b>	0.28	0.36
	X2	1	<b>0.89</b>	0.42	0.39
	X4	2	0.32	<b>0.84</b>	0.42
	X5	2	0.30	<b>0.88</b>	0.35
	X9	2	0.19	<b>0.64</b>	0.36
	X3	3	0.10	0.32	<b>0.61</b>
	X6	3	0.33	0.35	<b>0.81</b>
	X7	3	0.30	0.51	<b>0.70</b>
	X8	3	0.37	0.40	<b>0.86</b>
	X10	3	0.24	0.22	<b>0.58</b>

*Note.* Loadings in bold indicate the factor to which the item is assigned. \* designates forced group membership because of a failure to extract an adequate number of factors. The number of factors extracted for a given scale is a function of exploratory factor analysis fit, and thus varies across scales.

Table 3

*Fit Statistics and Model Comparisons, Self-efficacy and Self-deception on Gain in Verbal Knowledge*

Model	$\chi^2$	<i>df</i>	RMSEA (90% CI)	CFI	$\Delta\chi^2$	$\Delta df$
Null model	1825.67	45	-	-	-	-
Hypothesized model	72.08	32	.056 (.039, .073)	0.997	1753.59*	13

*Note.*  $N = 400$ . RMSEA = Root-mean-square error of approximation; CI = confidence interval; CFI = Comparative Fit Index. \* designates statistically significant improvement,  $p = .001$ .

Table 4

*Fit Statistics and Model Comparisons, Self-efficacy, Self-deception, and Motivation to Learn on Gain in Verbal Knowledge*

Model	$\chi^2$	<i>df</i>	RMSEA (90% CI)	CFI	$\Delta\chi^2$	$\Delta df$
Null model	2087.63	78	-	-	-	-
Hypothesized model	135.18	59	.057 (.044, .069)	0.962	1952.45*	19
Alternative model (Dropping Self-deception)	44.53	32	.031 (.000, .052)	0.992	90.65*	27

*Note.*  $N = 400$ . RMSEA = Root-mean-square error of approximation; CI = confidence interval; CFI = Comparative Fit Index. \* designates statistically significant improvement,  $p = .001$ .

Table 5

*Fit Statistics and Model Comparisons, Full Models*

Model	$\chi^2$	<i>df</i>	RMSEA (90% CI)	CFI	$\Delta\chi^2$	$\Delta df$
Null model	6032.82	378	-	-	-	-
Hypothesized model	1513.91	335	.094 (.089, .099)	0.792	4518.91*	43
Alternative model 1 (Direct effects)	1509.7	331	.094 (.090, .099)	0.792	4.21	4
Alternative model 2 (Composite Conscientiousness)	1709.21	340	.100 (.096, .105)	0.758	195.3†	5
Alternative model 3 (Composite Conscientiousness, Direct Effects)	1707.63	339	.100 (.096 .105)	0.758	193.7†	4

*Note.*  $N = 400$ . RMSEA = Root-mean-square error of approximation; CI = confidence interval; CFI = Comparative Fit Index. For Hypothesized model,  $\Delta\chi^2$  and  $\Delta df$  refer to Null versus Hypothesized model. For Alternative models,  $\Delta\chi^2$  and  $\Delta df$  refer to Hypothesized versus Alternative model. In all cases, \* designates statistically significant improvement,  $p = .001$ ; † designates statistically significant decrement,  $p = .001$ .

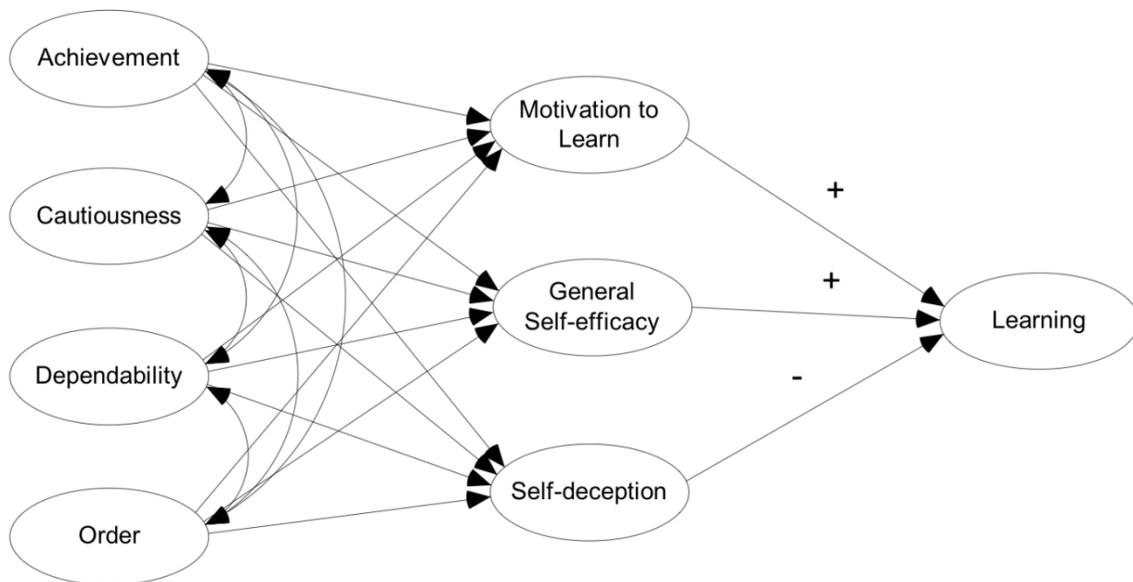
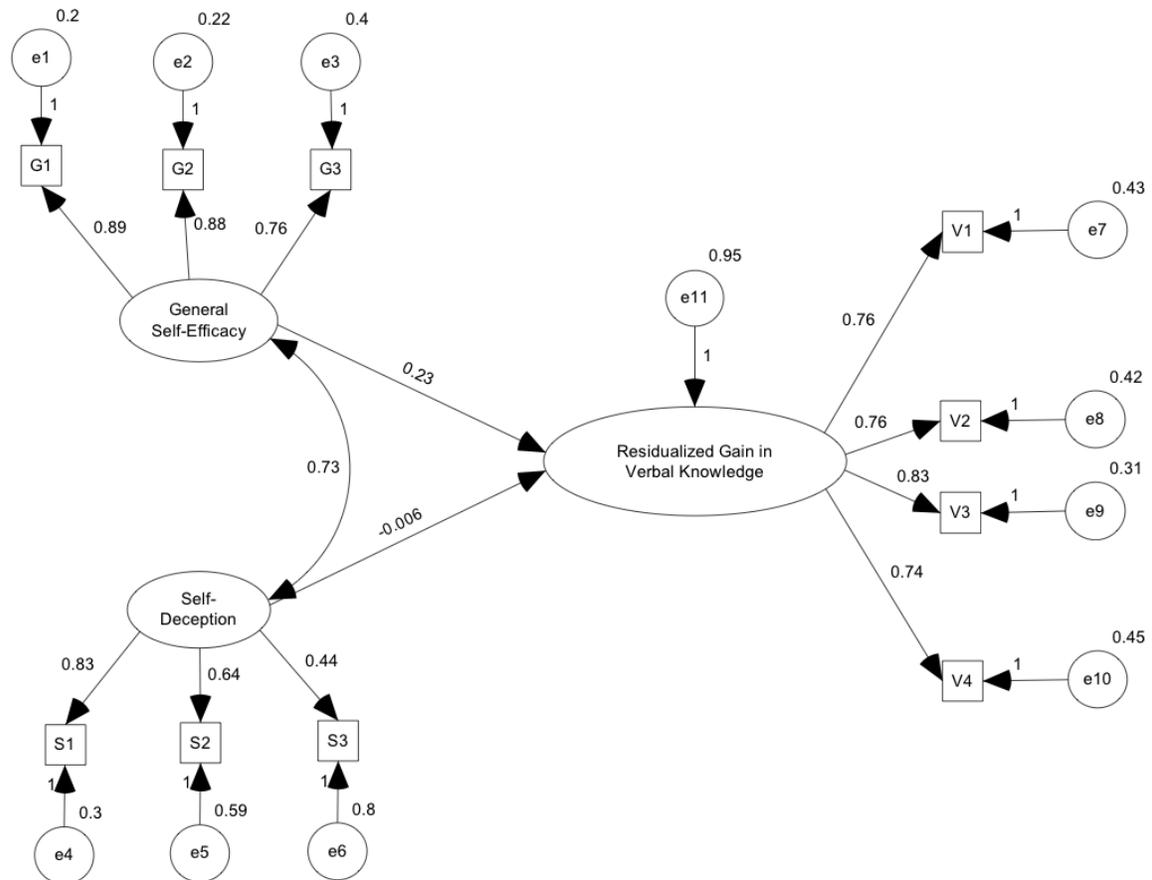


Figure 1. Proposed model.



*Figure 2.* First Proximal Predictors model. Parameter estimates for model designed to confirm Martocchio & Judge's (1997) and Lee and Klein's (2002) findings regarding self-efficacy and self-deception as predictors of learning. All paths are significant at the .05 level with the exception of that between self-deception and residualized gain in verbal knowledge (i.e. learning).

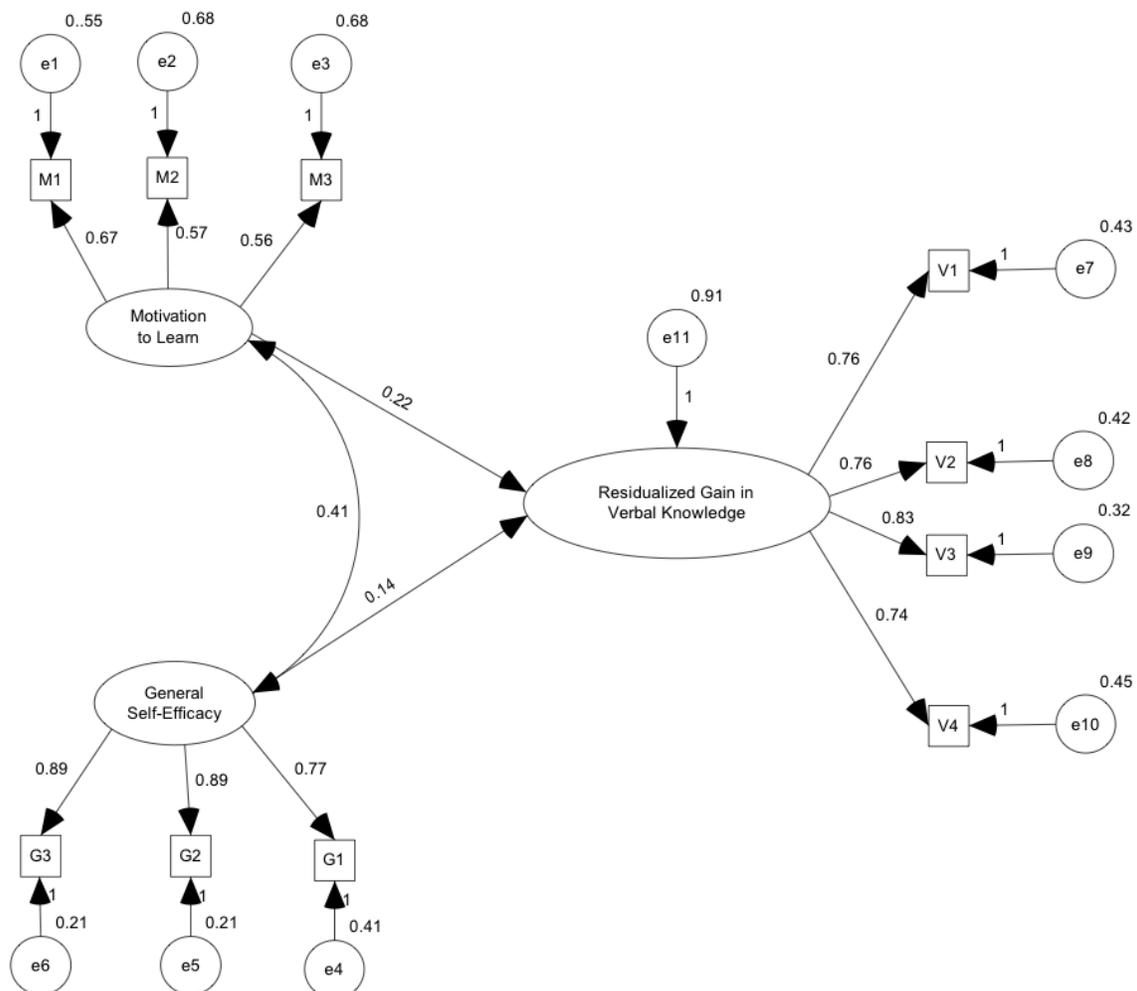


Figure 3. Second Proximal Predictors model. Parameter estimates for best-fitting model including motivation to learn. All paths are significant at the .05 level.

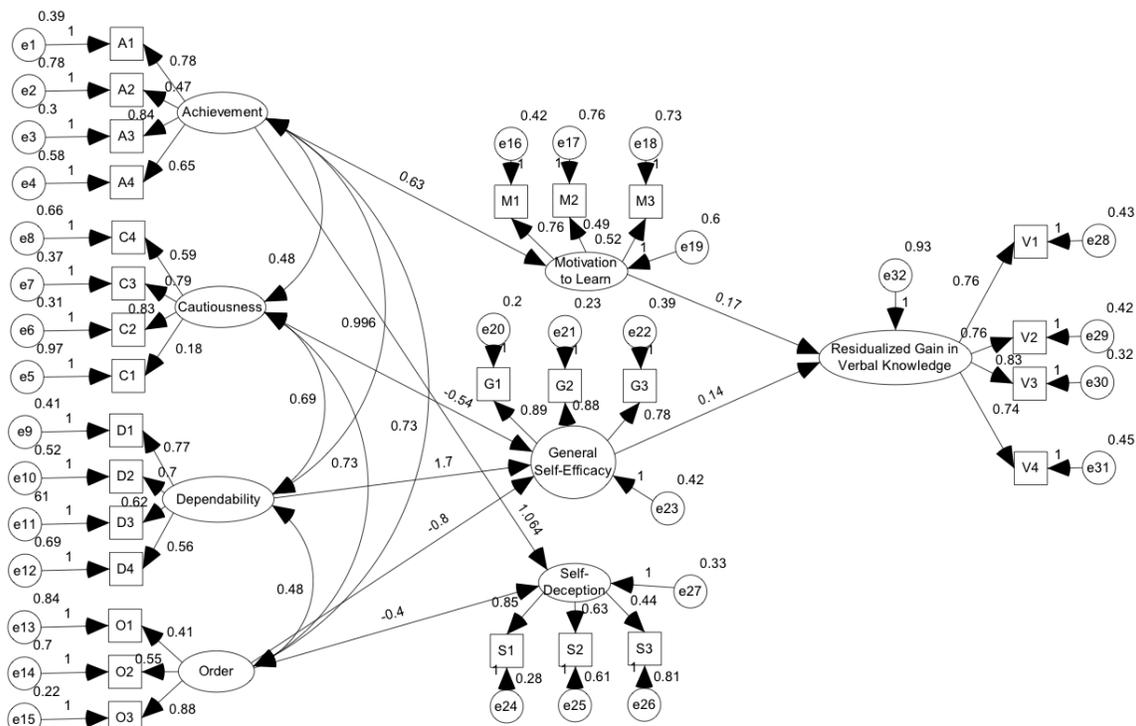


Figure 4. Parameter estimates for hypothesized model. Model addresses the relationship between individual facets of conscientiousness and learning. All paths are significant at the .05 level.

## Appendices

*Appendix A*

## Original Proposal Document

## Conscientiousness and Training Outcomes:

## The Added Utility of Facet-level Analysis

Meta-analytic work supports the notion that training programs result in reaction, learning, behavioral, and performance outcomes ([Arthur, Bennett, Edens, & Bell, 2003](#)), and validates the face-valid assumption that training can be a worthwhile investment of funds. Moreover, organizations have invested funds, and they continue to invest these funds heavily in training activities. According to an industry report, in 2007 U.S. businesses paid \$58.5 billion for formal training; up 4.8% from the prior year ([“2007 Industry Report,” 2007](#)). Training, then, is an area of substantial interest to organizations, and requires research to ensure that it is done well. A rich and broad literature has emerged to fill this need, spanning decades (e.g., [Levinson, 1962](#); [Pilati & Borges-Andrade, 2008](#)) and foci, including leadership ([Scaduto, Lindsay, & Chiaburu, 2008](#)), personality ([Tziner, Fisher, Senior, & Weisberg, 2007](#)), organizational justice ([Liao & Tai, 2006](#)), and many others. In the current work, I intend to review, integrate and expand upon several such research threads, and focus on a model of the relationship between individual differences and training outcomes.

The theoretical model that I will investigate in this work (see [Figure A1](#)) is an extension of Martocchio and Judge’s ([1997](#)) and Lee and Klein’s ([2002](#)) model of the

relationship between conscientiousness and training outcomes. The present model seeks to add motivation to learn to the list of mediators initially proposed by Martocchio and Judge ([1997](#)), which included self-efficacy and self-deception. This addition is expected to increase the overall validity of the model. In Martocchio and Judge's (1997) and Lee and Klein's (2002) studies, high conscientiousness predicted both self-efficacy and self-deception. These constructs, in turn, positively and negatively predicted training outcomes, respectively. As a result of these relationships, the overall relationship between conscientiousness and training outcomes was conflicted and weakened. A second substantial change to Martocchio and Judge's model that is included in the current model is the measurement of conscientiousness at both the superordinate level and at the facet level. The author believes that this effort may avoid the issue of overlapping prediction of positive and negative mediators, revealing a more powerful model of the relationship between individual differences and training outcomes.

While the present study is in part a replication of Martocchio and Judge's ([1997](#)) and Lee and Klein's ([2002](#)) work, the specific training outcomes in the present model are somewhat different from either of these prior works. I selected these outcomes in order to best suit the context of the training program in the present study. In the following sections, I discuss these training outcomes in more detail, as well as the predictor and mediator variables that populate the current theoretical model ([Figure A1](#)).

### **Training Outcomes**

Kraiger, Ford and Salas ([1993](#)) presented a model of training outcomes that broadened the scope of training evaluation. They forwarded three major categories of learning– cognitive, skill-based, and affective outcomes – each with several components. I will examine all components of Kraiger, Ford, and Salas’s ([1993](#)) model with special focus on those that I will use in the present study (See [Figure A2](#)).

The cognitive outcomes forwarded by Kraiger, Ford and Salas (1993) include verbal knowledge, knowledge organization, and cognitive strategies. Verbal knowledge refers to “what” information (as opposed to “how” or “why”). Knowledge organization concerns the development of mental models, which allow individuals to map the relationships between pieces of information. Cognitive strategies, the final cognitive outcome category posited by Kraiger, Ford, and Salas ([1993](#)), concern the individual development of means of accomplishing tasks – increasingly effective mental operations. In the present study, I will be measuring verbal knowledge, as this outcome is most pertinent to the brief, laboratory-based training program that I will be conducting.

Kraiger, Ford, and Salas’s (1993) next category of learning outcomes was skill-based outcomes. This category included compilation - which itself contained proceduralization and composition - and automaticity. Compilation refers the more fluid and fast execution of skills ([Kraiger, Ford, & Salas, 1993](#)). Within the category of compilation, proceduralization and composition refer to routinization and cross-linking of activities, respectively. Automaticity refers to a shift of processing from controlled and effortful to automatic with it a relative lack of cognitive strain. Each of these skill-based

outcomes concerns a gradual increase in fluidity of task accomplishment over time. The duration of the current study is too brief to expect a measurable increase in these outcomes. Accordingly, no measures of skill-based outcomes will be used in the current study.

Finally, Kraiger, Ford and Salas ([1993](#)) posit affective outcomes – both attitudinal and motivational – as important elements of learning. Attitudinal outcomes are reflected in affective changes brought about by training, and according to Kraiger and colleagues may include: creative individualism, organizational commitment, recognition of what is important to learn, group norms, and tolerance for diversity ([Kraiger, Ford, & Salas, 1993](#), p. 319). Motivational outcomes include motivational disposition, self-efficacy, and goal setting. The first of these three, motivational disposition, refers to whether the individual is mastery- or performance-oriented. Mastery-oriented individuals are interested in increasing their skills in regard to a task, while performance-oriented individuals are more interested in capable performance of the task at hand. The second motivational disposition, self-efficacy, will be addressed in a separate section, below. Because this construct is most likely to change over the course of the training program used in the present study, it will be measured. The final motivational outcome, goal setting, refers to the extent to which individuals set their own goals, the characteristics of these goals, and the effort that individuals exert in working towards goals they have set.

In summary, in the present study I have opted to focus on verbal knowledge among the cognitive outcomes and self-efficacy among the affective outcomes.

According to Kirkpatrick's (1977) model, both of these outcomes fall into learning, the second stage of training outcomes. It is important to note that Kirkpatrick highlights an additional three stages of outcomes, one prior to and two following the stage upon which I focus. The first stage, reactions, refers to feelings the trainees have about the training program. Stages three and four, behavior and results, refer to outcomes which occur beyond the immediate context of the training program. While important in training evaluation generally, these components are not central to the model I have assembled in the current study. Accordingly, no measures of elements of these three other stages will be made. I turn now to a discussion of the constructs that predict training effectiveness, particularly those that are relevant to the theoretical model (Figure A1) of the present study.

### **Predictors of Training Effectiveness**

Over the course of organizational research, investigators have examined a variety of predictors of training effectiveness (See Appendix B). Four of these predictors are of particular interest in the present work: conscientiousness, motivation to learn, self-efficacy and self-deception. The reader will note that self-efficacy is considered a training outcome by Kraiger, Ford, and Salas (1993), as well as a predictor of training effectiveness. Accordingly, self-efficacy appears as both an outcome and as a mediator in the present model (see Figure A1)

### **Conscientiousness**

Conscientiousness is one of the most pervasively studied personality factors in the realm of industrial/organizational psychology research. Furthermore, research has shown that this construct conceivably reflects a variety of traits, including conformity, dependability, will to achieve, and perseverance ([Barrick & Mount, 1991](#)).

In organizational research, conscientiousness has functioned as the *de facto* leader of the Big Five personality characteristics because high conscientiousness predicts such a wide array of constructs both in and out of the organizational setting (See [Appendices C and D](#)). The present study aims to examine conscientiousness's association with motivation to learn, self-deception, and self-efficacy. I describe these constructs in detail below.

### **Motivation to learn**

Noe and Schmitt ([1986](#)) describe motivation to learn as “a specific desire on the part of the trainee to learn the content of the training program.” As discussed earlier, research has shown that conscientiousness predicts this construct ([Colquitt & Simmering, 1998](#)), which, in turn, predicts training effectiveness ([Colquitt & Simmering, 1998](#); [Liao & Tai, 2006](#); [Tziner et al., 2007](#)). Research has also shown that organizational social support, along with whether an employee can opt into or out of training, predicts motivation to learn, and that motivation to learn then predicts motivation to transfer learning to on-the-job situations ([Green, 2002](#)). Additional research indicates that those who are intrinsically interested in training report higher motivation to learn ([Nease, 2000](#)). As designed, the current study will partially replicate and extend Colquitt and

Simmering's ([1998](#)) work by demonstrating that motivation to learn mediates the relation between conscientiousness and learning outcomes.

### **Self-efficacy**

In addition to motivation to learn, perceived self-efficacy (hereafter “self-efficacy”), as described by Bandura ([1986](#), p. 391), is “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances.” This definition highlights the subjectivity of the construct in that it emphasizes the individual’s judgment of ability and not the individual’s actual ability to execute these actions. Bandura ([1986](#)) further pointed out that a combination of skills and self-efficacy is necessary for competent functioning. Evidence exists that corroborates this claim; self-efficacy independently predicts performance, even when controlling for past performance ([Locke, Frederick, Lee, & Bobko, 1984](#); [Chen, Gully, Whiteman, & Kilcullen, 2000](#)).

Apart from being a direct predictor of employee performance (i.e., [Locke et al., 1984](#), [Chen et al., 2000](#); [Norris, 2002](#)), research has shown that self-efficacy also significantly predicts a wide array of outcomes pertinent to organizational and training settings (See [Appendix E](#)). Research has also shown that a variety of constructs predict self-efficacy (See [Appendix F](#)). It is conscientiousness, as a predictor of self-efficacy, upon which I shall focus for the current study.

Because self-efficacy is often hypothesized as being both a mediator variable of the relationship between conscientiousness and performance and as an outcome variable of training (as discussed in the section on training outcomes, above), its role in explaining the training process must be carefully distinguished.

### **Self-Deception**

As discussed in the section on conscientiousness, above, conscientiousness in part predicts self-deception. Hirschfeld, Thomas, & McNatt (2008, p. 155) define self-deception as “a disposition to maintain unwittingly an overly positive self-image, which engenders biased cognitions about and assessments of oneself.” Research indicates that self-deception is negatively associated with training outcomes (Martocchio & Judge, 1997; Lee & Klein, 2002; Hirschfeld, Thomas, & McNatt, 2008). Thus, when conceptualizing self-deception as a mediator of the relationship between conscientiousness and training outcomes, it operates in opposition to motivation to learn and self-efficacy and weakens the overall predictive power of conscientiousness. That is, when attempting to predict training outcomes, conscientiousness as a superordinate construct serves as a rather weak predictor, due in part to its positive relationship to self-efficacy and self-deception, which predict training outcomes positively and negatively, respectively. In order to develop a more fruitful model of the relationship between individual differences and training outcomes, it is necessary to resolve this issue. Below, I discuss using facets of conscientiousness as one possible means of addressing the problem.

### **Facets of Conscientiousness**

Sackett and Wanek ([1996](#)) called for a more molecular look at the Big Five personality dimensions. Such an effort, they contended, could reveal a greater contrast in relationships between facets of the larger dimensions (e.g. conscientiousness) and workplace outcomes. Suggesting that certain facets of a given personality factor could predict positive outcomes while other facets of the same dimension could predict negative outcomes, Sackett and Wanek ([1996](#)) encouraged researchers to devise facet structures of these dimensions for use in model development. Meta-analytic work reveals that there are benefits and pitfalls to using facets as opposed to dimensions depending upon the situations in which researchers are interested. For instance, a general measure of the conscientiousness dimension provides greater predictive power than any of its individual facets can provide ([Holland, 2001](#)). In this study, however, because specificity of prediction is crucial to the model, and because dimension use in similar models in the past has proven inadequate ([Martocchio & Judge, 1997](#); [Lee & Klein, 2002](#)), I will use facets.

Researchers have delineated the facets of conscientiousness in a variety of ways through factor analysis (See [Appendix G](#)). Note the similarities and differences between these models. Most models contain a facet related to orderliness, achievement, and dependability, while elements such as self-control, persistence, cautiousness, and intention-action gap (among others) appear more sporadically across studies.

Maulden ([2008](#)) conducted factor analyses on newly-gathered data to examine the validity of these and other factor structures and showed that, to various levels, the different structures demonstrated convergent validity – that is, when taken together, factor structures correlate with each other. That is to say, although each factor structure to some extent is measuring conscientiousness at the superordinate level, the hypothesized facets of these structures differ substantially (as I demonstrated in [Appendix G](#)), both in name and in the characteristics the facets measure. Such differences between facet structures demonstrate the degree of subjectivity inherent to the process of hypothesizing a set of facets for a given superordinate personality dimension. This subjectivity is both a weakness of this process and a characteristic of which researchers can take advantage.

Although certainly the validity of a given factor structure is important, Stewart ([1999](#)), Holland ([2001](#)) and Maulden ([2008](#)) each indicate that the differential prediction afforded by using narrow (subordinate) personality factors is one of the features that renders these narrow facets useful. That is to say, researchers may, as long as the facet structure they select or hypothesize remains construct-valid, choose any structure that yields useful prediction in their models. In other words, selecting a reasonably construct-valid factor structure that provides high predictive utility is more important than developing the most universally construct-valid possible factor structure of a given personality dimension. It is in this spirit that I examine conscientiousness in the current study.

To identify such a factor structure, preliminary work is necessary. I will conduct Study 1 to determine just what type of structure would possess adequate validity (i.e. coherent factor structure) as well as useful differential prediction (i.e. more various correlations with the positively- and negatively-valent mediator variables: self-efficacy and self-deception, respectively). Following this effort, the facet structure of conscientiousness selected in this study will be incorporated into a model that replicates and extends Martocchio and Judge's (1997) and Lee and Klein's (2002) work, which is the purpose of Study 2.

### **Study 1**

As I mentioned above, in response to Sackett and Wanek's (1996) call for a more molecular look at personality dimensions, researchers proposed a variety of facet models of conscientiousness. I designed the current study to both seek a valid facet structure and to yield predictive utility in populating a training outcome model. I will evaluate the predictive utility of each selected model in terms of its ability to predict both general self-efficacy and self-deception. This preliminary study will also attempt to replicate, in part, Martocchio and Judge's (1997) and Lee and Klein's (2002) findings relating conscientiousness to self-efficacy and self-deception. (See [Figure A3](#)),

*Research Question 1: Will facet models (of conscientiousness) demonstrate various levels of validity, both in terms of factor structure and in convergence with the superordinate dimension of conscientiousness?*

*Hypothesis 1: Conscientiousness will be positively related to general self-efficacy.*

*Hypothesis 2: Conscientiousness will be positively related to self-deception.*

*Research Question 2: Will facets (of conscientiousness) be related to general self-efficacy with varying strengths of relationships?*

*Research Question 3: Will facets (of conscientiousness) be related to self-deception with varying strengths of relationships?*

*Research Question 4: Will one or more facet models (of conscientiousness) demonstrate acceptable validity as well as high contrast in predicting general self-efficacy and self-deception?*

## **Method**

### **Participants**

Participants will be students drawn from Introductory Psychology courses at North Carolina State University (NCSU). These students will receive course credit for participating in the study. I will recruit these students for the study using an online study administration suite (Experimetrix).

### **Procedures**

Participants will complete an informed consent form and an online survey using a separate survey administration suite (SurveyMonkey). In this survey, participants will rate the degree to which statements accurately described themselves. The study will require 360 participants to achieve adequate statistical power ([Hatcher, 1994](#)).

## Model Selection

Three models (facet structures of conscientiousness) were selected for evaluation in the study (See [Appendix H](#)). The first model (Model 1) is that proposed by Hogan and Ones ([1997](#)). I am using it to evaluate one of the more widely accepted and referenced facet structures of conscientiousness. I selected the second and third models (Models 2 and 3) based on their demonstrated psychometric quality, as indicated by Maulden ([2008](#)), and I selected them because they are similar to one another. These models succeeded in balancing parsimony - possessing four and six factors, respectively – and validity, as indicated by a confirmatory factor analysis (CFA). It is also worth noting that all four factors of Model 2 are contained within Model 3, allowing for a demonstration of the possible utility of additional constructs within a factor structure.

I hypothesize that the facets in these models reflect the underlying superordinate dimension of conscientiousness. Descriptions of the facets contained in these models are as follow:

- *Order* describes how people use plans and their preferences for tidiness and orderliness ([Goldberg et al., 2006](#)).
- *Conformity* refers to the degree to which people require the approval of others and whether they are open to changing their behavior in order to achieve that approval ([Goldberg et al., 2006](#)).
- *Industriousness* denotes the extent to which people are goal-oriented and desire to complete tasks once they are begun ([Goldberg et al., 2006](#)).

- *Self-control* refers to the amount of discipline and impulse control people display ([Goldberg et al., 2006](#)).
- *Dependability* refers to such individual characteristics as being disciplined, planful, honest, and accepting of authority ([Maulden, 2008](#)).
- *Cautiousness* refers to the extent to which people avoid mistakes, give careful thought to their behavior, and make careful plans ([Maulden, 2008](#)).
- The *Achievement* facet refers to the work ethic and competence to which people aspire, as well as the confidence that people experience ([Maulden, 2008](#)).
- *Persistence* refers to the extent to which people stick to plans and complete projects ([Maulden, 2008](#)).
- Finally, *decisiveness* is a facet that assesses the ability people have to begin tasks and make well-considered decisions ([Maulden, 2008](#)).

## Measures

All measures used in Study 1 are on a five-point Likert-type scale, with response options ranging from *Very Inaccurate* to *Very Accurate*. I provide psychometric information for each of the measures in the following section. Please continue to refer to [Figure A3](#) for the location of each of these constructs in the study's model.

## Facets of Conscientiousness

*Model 1 Facets.* I took all measures for Model 1 from the IPIP ([Goldberg et al., 2006](#)), and selected them based on their alpha values. The four scales used were the NEO

Orderliness scale (Alpha = .82); the JPI Conformity scale (Alpha = .71); the VIA Industry scale (Alpha = .82); and the VIA Self-control scale (Alpha = .75). A complete list of items used to assess the four facets of Model 1 appears in [Appendix I](#).

*Model 2 Facets.* I took the items for each of the four facets of Model 2 from Maulden's (2008) Model 2. A complete list of items used to assess the four facets of Model 2 appears in [Appendix J](#). Maulden did not provide internal reliability estimates for these scales. The present study will generate these estimates.

*Model 3 Facets.* I took the items for each of the six facets of Model 3 from Maulden's (2008) Model 4. A complete list of items used to assess the four facets of Model 3 appears in [Appendix K](#). Once again, Maulden did not provide internal reliability estimates for these scales. The present study will generate these estimates.

### **Additional Measures**

*General Self-Efficacy.* Because this preliminary study does not involve a specific task, general self-efficacy will be measured. Research has supported the use of general self-efficacy scales ([Scherbaum, Cohen-Charash, & Kern, 2006](#)). I selected two scales of self-efficacy from the IPIP ([Goldberg et al., 2006](#)). These scales were selected based on their superior estimates of internal reliability and conceptual overlap with other scales of general self-efficacy (e.g., [Chen, Gully, & Eden, 2001](#)). These were the NEO and CPI scales of general self-efficacy (Alpha = .78 and .81, respectively). A complete list of items used to assess self-efficacy appears in [Appendix L](#).

*Self-Deception*. I acquired the PAS self-deception scale (Alpha = .80) from the IPIP ([Goldberg et al., 2006](#)). A complete list of these items appears in [Appendix M](#).

### **Proposed analysis**

I shall conduct analyses in two stages. First, I will conduct a confirmatory factor analysis (CFA; [Hatcher, 1994](#)) on the two scales of general self-efficacy used in the study. These analyses will be used to determine the validity and factor structure of each of these measures. The more apparently valid measure will then be used in the second stage.

In the second stage, I will conduct three separate latent-variables path analyses ([Hatcher, 1994](#)) to assess the adequacy of each facet model in predicting self-deception and self-efficacy. I will use the model with the best balance of validity and variously positive and negative relationships between individual facets and mediating variables (i.e. self-efficacy and self-deception) in Study 2. Having selected what seems to be the most suitable model of facets, I shall move on to Study 2 to replicate and expand the work of Martocchio and Judge's ([1997](#)) and Lee and Klein's ([2002](#)) and test a broader model of training that was described at the beginning of this proposal.

### **Study 2**

I designed this study primarily to replicate and expand the work of Martocchio and Judge ([1997](#)) and Lee and Klein ([2002](#)). Besides this, I intend to generate a more powerful model for specifically predicting training outcomes as a function of a trainee's personality characteristics. Based on the work of Study 1, above, I will select a facet

model of conscientiousness to use in the current study. In addition, motivation to learn will be included as a mediator between personality characteristics and training outcomes, to further enhance and expand upon the this theoretical model. As discussed above, I will measure two different training evaluation measures – verbal knowledge and self-efficacy – as the outcome variables of the present model (see [Figure A2](#)).

Thus, in replication and extension of these prior works, I hypothesize the following:

*Hypothesis 3: Conscientiousness (the superordinate factor) will relate positively to pre-training self-efficacy.*

*Hypothesis 4: Conscientiousness (the superordinate factor) will relate positively to self-deception.*

*Hypothesis 5: Conscientiousness (the superordinate factor) will relate positively to motivation to learn.*

*Research Question 5: How will facets of conscientiousness differentially relate to training-specific pre-training self-efficacy, self-deception, and motivation to learn?*

*Hypothesis 6: Self-deception will relate negatively to training outcomes:*

*H6A: Self-deception will relate negatively to gain in verbal knowledge.*

*H6B: Self-deception will relate negatively to post-training self-efficacy.*

*Hypothesis 7: Pre-training self-efficacy will relate positively to training outcomes:*

*H7A: Pre-training self-efficacy will relate positively to gain in verbal knowledge.*

*H7B: Pre-training self-efficacy will relate positively post-training self-efficacy.*

*Hypothesis 8: Motivation to learn will relate positively to training outcomes:*

*H8A: Motivation to learn will relate positively to gain in verbal knowledge.*

*H8B: Motivation to learn will relate positively to post-training self-efficacy.*

*Hypothesis 9: Self-deception will mediate the relationship between conscientiousness (the superordinate factor) and training outcomes.*

*HA9: Self-deception will mediate the relationship between conscientiousness (the superordinate factor) and gain in verbal knowledge.*

*HB9: Self-deception will mediate the relationship between conscientiousness (the superordinate factor) and gain in post-training self-efficacy.*

*Hypothesis 10: Pre-training self-efficacy will mediate the relationship between conscientiousness (the superordinate factor) and training outcomes.*

*HA10: Pre-training self-efficacy will mediate the relationship between conscientiousness (the superordinate factor) and gain in verbal knowledge.*

*HB10: Pre-training self-efficacy will mediate the relationship between conscientiousness (the superordinate factor) and gain in training-specific post-training self-efficacy.*

*Hypothesis 11: Motivation to learn will mediate the relationship between conscientiousness (the superordinate factor) and training outcomes.*

*HA11: Motivation to learn will mediate the relationship between conscientiousness (the superordinate factor) and gain in verbal knowledge.*

*HB11: Motivation to learn will mediate the relationship between conscientiousness (the superordinate factor) and gain in training-specific post-training self-efficacy.*

*Research Question 6: Does self-deception mediate the relationship between facets of conscientiousness and training outcomes?*

*Research Question 7: Does pre-training self-efficacy mediate the relationship between facets of conscientiousness and training outcomes?*

*Research Question 8: Does motivation to learn mediate the relationship between facets of conscientiousness and training outcomes?*

## **Method**

### **Participants**

Participants will be students drawn from Introductory Psychology courses at NCSU. Four-hundred sixty participants will be required to meet minimum guidelines of latent variable path analysis ([Hatcher, 1994](#)). I will offer students partial completion of a course research requirement for participation in the study. I will recruit and register participants for the study via an online study administration suite (Experimetrix).

### **Procedures**

Participants will complete an informed consent form and online pre-training survey via a separate survey administration suite (SurveyMonkey). An Internet link will lead participants to the training module following completion of the pre-training survey; following this training module, another link will lead participants to the online post-training survey (hosted on SurveyMonkey).

### **Training Program**

The training program will be from the Microsoft Excel 2007 training courses ([Microsoft, 2009](#)), adapted following the procedure used by Behrend ([2008](#)). The training program will include screen captures of online training modules with accompanying

explanatory text (See [Appendix N](#) for an example). The material in each training module will be arranged in ascending order of difficulty, starting with rudimentary topics and leading up to advanced topics. Each participant will be exposed to the same set of modules. It is expected that all participants will be exposed to new information in the training program. Accordingly, all participants will have room to learn new material. Following each module, participants take a brief review quiz (See [Appendix O](#) for an example).

### **Measures**

Unless otherwise noted, all measures used in Study 2 are on a five-point Likert-type scale, with response options ranging from *Very Inaccurate* to *Very Accurate*.

***Conscientiousness Facets.*** I will select facets based on the results of Study 1. I will use measures used in that study for the selected facet structure once again.

***Self-deception.*** I once again will use the PAS self-deception scale from the IPIP ([Goldberg et al., 2006](#); see Study 1). A complete list of these items appears in [Appendix M](#).

***Pre-training self-efficacy.*** I will use five items from Guthrie and Schwoerer ([1994](#); Alpha = .82), and five more from Gist, Schwoerer and Rosen ([1989](#)). I will adapt the latter five items so that they specifically address Excel training. These latter items were selected and adapted because they are very pertinent to the training material at hand. Due to its modification for the current study, an estimate of reliability is not yet available

for this latter measure. Response options for these latter five items are given on a *can accomplish* or *cannot accomplish* dichotomous scale with an accompanying certainty estimate. Responses on this latter estimate range from one to ten with anchors at “not at all” and “totally,” respectively. A complete list of items used to assess pre-training self-efficacy appears in [Appendix P](#).

***Motivation to learn.*** Only a few established measures of motivation to learn are available, and these measures typically must be adapted to the training program. I developed a 5-Item measure based on the two items from Hicks (1984). The study from which these items were acquired is one of the more widely cited research studies on motivation to learn. I wrote an additional three items to measure motivation to learn, to create the five-item measure that appears in [Appendix Q](#).

***Pre-test verbal knowledge.*** I will take items from the during-training quizzes (See [Appendix O](#) for an example) to create a pre-test measure of verbal knowledge related to Microsoft Excel. Response options will be multiple-choice, and I will score choices either correct or incorrect for each item. The number of items answered correctly will determine a participant's overall score.

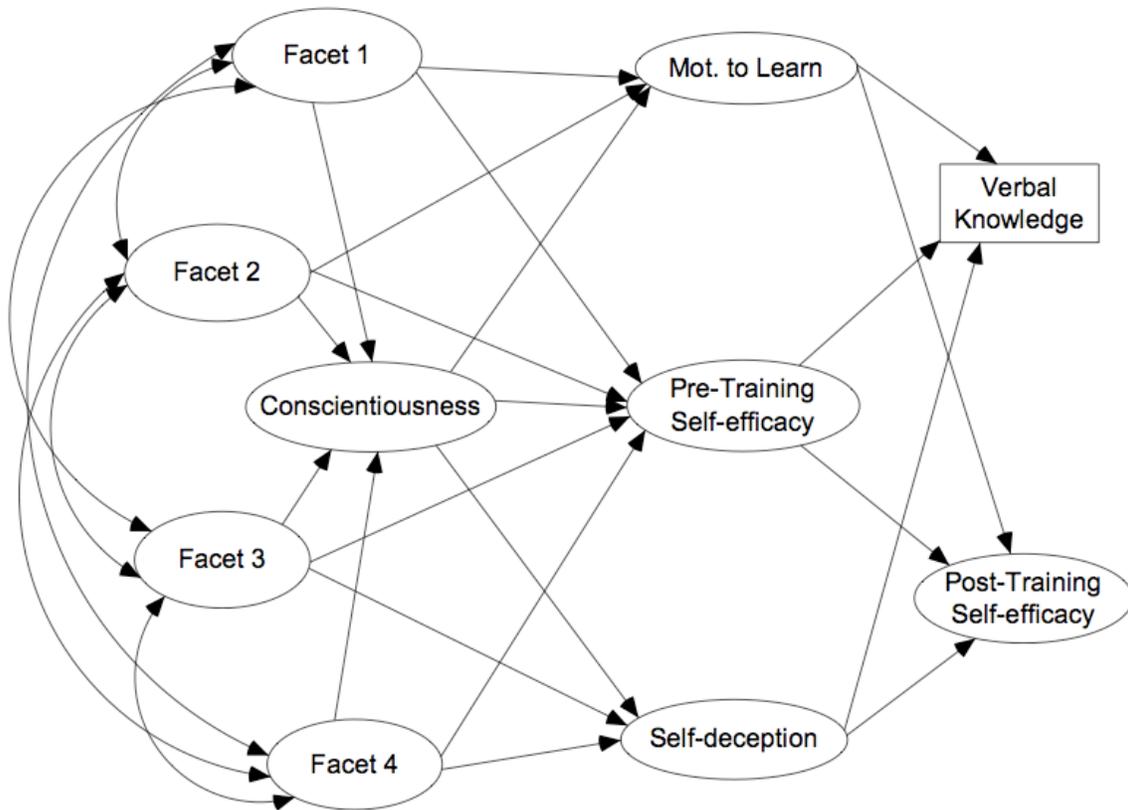
### **Post-Training Measures**

***Post-training self-efficacy.*** I will administer the same set of five items adapted from Gist, Schwoerer, and Rosen (1989). These items appear in [Appendix P](#).

*Post-test verbal knowledge.* I will use the same items from the pre-test in the post-test.

### **Proposed Analysis**

I will test the hypothesized path analytic model using Latent Factor Path Analysis ([Hatcher, 1994](#)) to determine model fit. I will also test alternative models, including conscientiousness- and facet-adaptations of Martocchio and Judge's ([1997](#)) original model. I will conduct mediation analyses as described in the work of Baron and Kenny ([1986](#)) for each of the three proposed mediators (see Hypotheses 9 through 11 and Research Questions 6 through 8).



*Figure A1.* Proposed model. Note that Facets 1 through 4 are placeholders for the facets to be determined in Study 1. In the event that a six-facet structure is selected for use in Study 2, additional facets will be added to the model. Direct-effects paths between facets and Motivation to Learn, Pre-Training Self-efficacy, and Self-deception are also placeholders pending the results of Study 1.

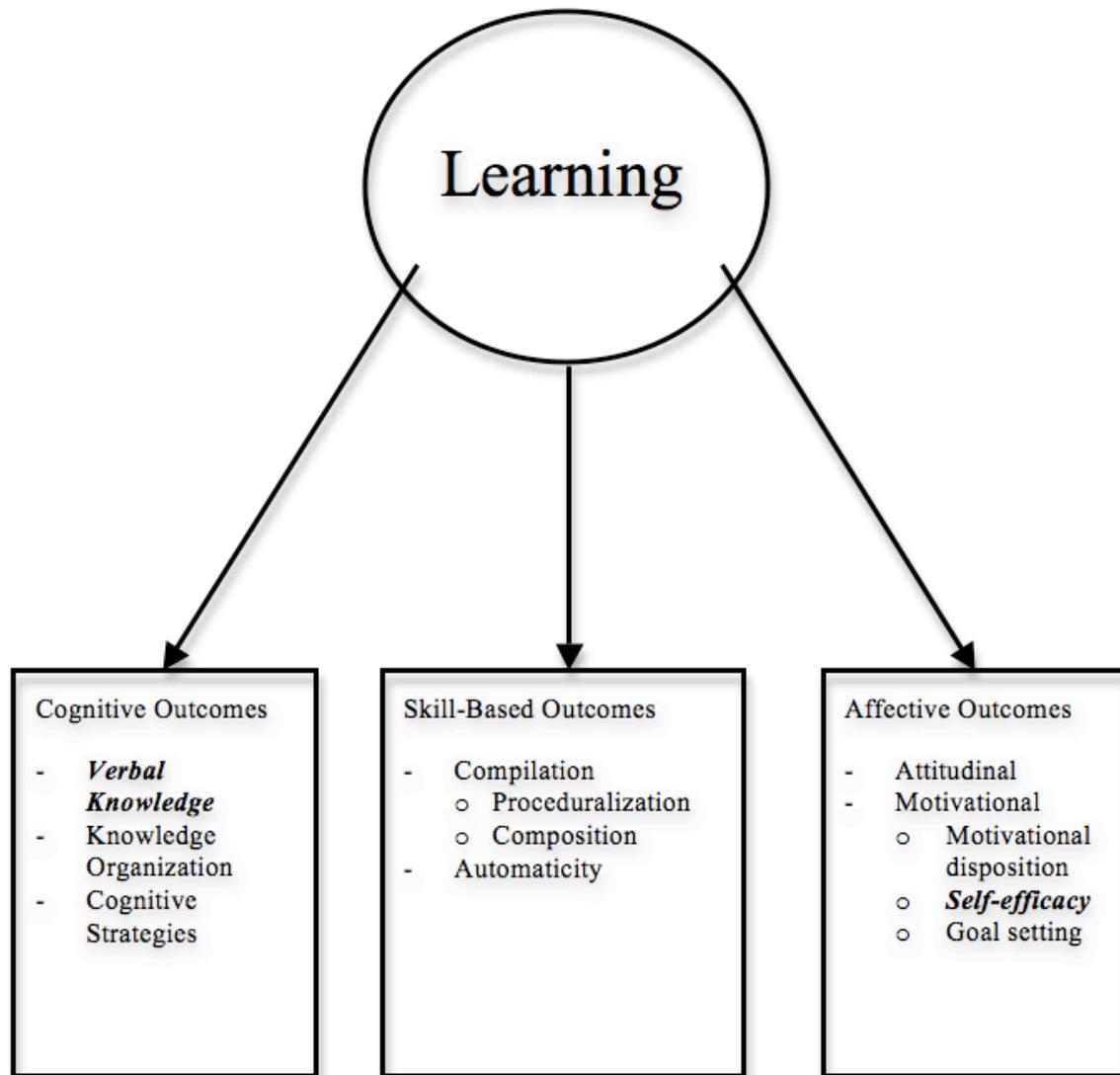
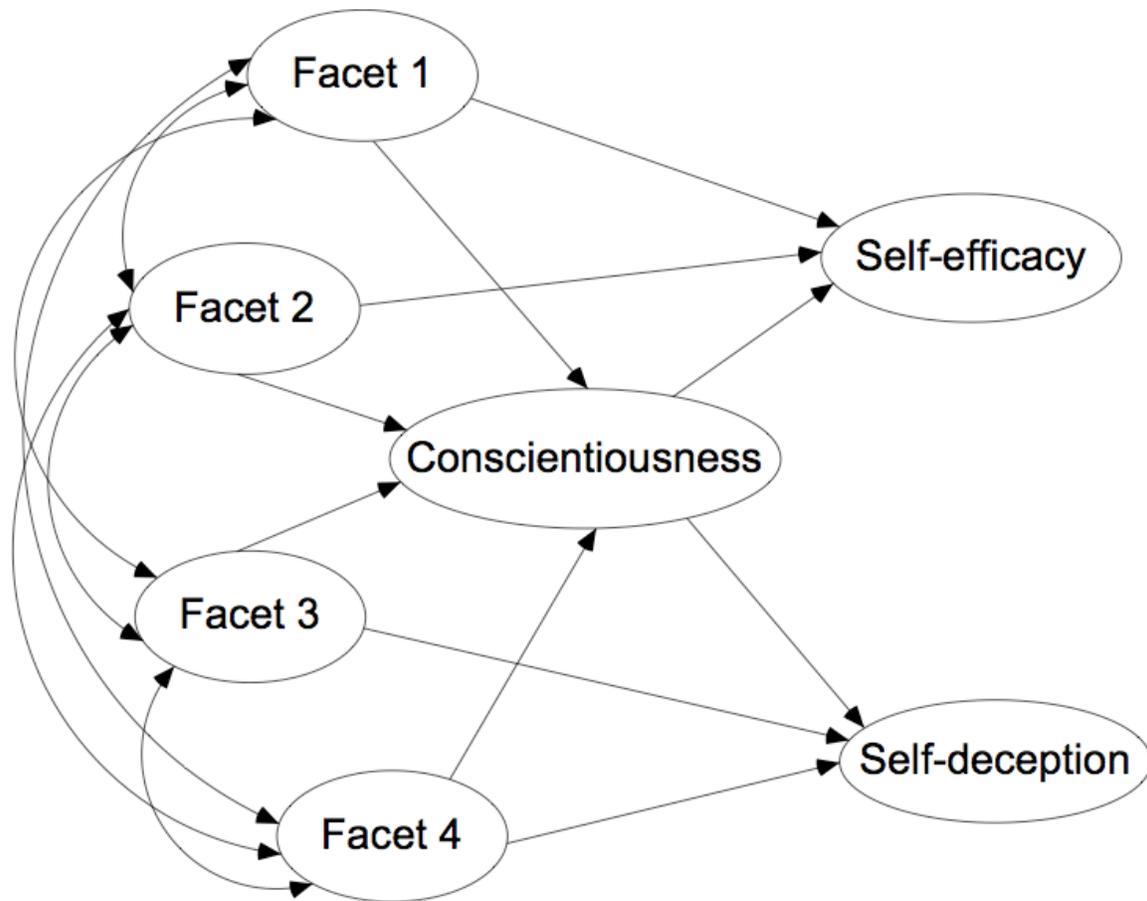


Figure A2. System of Training Outcomes. Adapted from Kraiger, Ford, & Salas (1993). Components used in the current study are in bold font.



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*Figure A3.* Model for Study 1. Note that “Facet 1” through “Facet 4” are placeholders for the facets selected for examination in Study 1. When the six-facet structure is examined, additional facets will be added to the model. Note also that direct-effects paths from facets to Self-efficacy and Self-deception are abbreviated for clarity; all facets are modeled to predict both of these outcomes.

*Appendix B*

## Demonstrated predictors of training effectiveness.

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Construct:	Citation:
Conscientiousness	<a href="#">Barrick &amp; Mount, 1991</a>
Motivation to learn	<a href="#">Colquitt &amp; Simmering, 1998</a> <a href="#">Liao &amp; Tai, 2006</a> <a href="#">Tziner et al., 2007</a> <a href="#">Pilati &amp; Borges-Andrade, 2008</a>
Self-efficacy	<a href="#">Martocchio &amp; Judge, 1997</a> <a href="#">Lee &amp; Klein, 2002</a> <a href="#">Tziner et al., 2007</a>
Self-deception	<a href="#">Martocchio &amp; Judge, 1997</a> <a href="#">Lee &amp; Klein, 2002</a>
Learning goal orientation	<a href="#">Tziner et al., 2007</a>
Cognitive reactions	<a href="#">Tan, Hall, &amp; Boyce, 2003</a>
Perceived organizational justice	<a href="#">Liao &amp; Tai, 2006</a>
Error-filled learning	<a href="#">Lorenzet, 2001</a>
Job involvement and career planning	<a href="#">Noe &amp; Schmitt, 1986</a>
Satisfaction with training	<a href="#">Pilati &amp; Borges-Andrade, 2008</a>
Quality of leader-member exchange	<a href="#">Scaduto, Lindsay, &amp; Chiaburu, 2008</a>

---

*Appendix C*

Constructs demonstrated to be positively related to conscientiousness.

Construct:	Citation:
Self-deception and self-efficacy	<a href="#">Martocchio &amp; Judge, 1997</a> <a href="#">Lee &amp; Klein, 2002</a>
Motivation to learn	<a href="#">Colquitt &amp; Simmering, 1998</a>
Employee's overall performance	<a href="#">Fallon, Avis, Kudisch, Gornet, &amp; Frost, 2000</a> <a href="#">Zimmerman, 2008</a> <a href="#">Tett, Jackson, &amp; Rothstein, 1991</a> <a href="#">Salgado 1997, 1998</a> <a href="#">Mount, Barrick, &amp; Stewart, 1998</a> <a href="#">Furnham &amp; Fudge, 2008</a> <a href="#">O'Connor &amp; Paunonen, 2007</a> <a href="#">Trapmann, Hell, Hirn, &amp; Schuler, 2007</a>
Team performance	<a href="#">Peeters, Van Tuijl, Harrie, Rutte, &amp; Reymen, 2006</a>
Employee attendance	<a href="#">Fallon et al., 2000</a>
Job and training proficiency among employees	<a href="#">Barrick &amp; Mount, 1991</a>
Citizenship performance	<a href="#">Borman, Penner, Allen, &amp; Motowidlo, 2001</a>
Supervisor's willingness to rehire an employee	<a href="#">Fallon et al., 2000</a>
Employee performance motivation	<a href="#">Judge &amp; Ilies, 2002</a>
Entrepreneurship	<a href="#">Zhao &amp; Seibert, 2006</a>
Leadership	<a href="#">Judge, Bono, Ilies, &amp; Gerhardt, 2002</a>
Job satisfaction	<a href="#">Judge, Heller, &amp; Mount, 2002</a>
Work, family, religion, and volunteer social investments	<a href="#">Lodi-Smith &amp; Roberts, 2007</a>

*Appendix D*

Constructs demonstrated to be negatively related to conscientiousness.

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Construct:

Citation:

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Accident involvement

[Clarke & Robertson, 2005](#)

Creativity

[Feist, 1998](#)

Deviant behaviors and turnover

[Salgado, 2002](#)

Procrastination

[Steel, 2007](#)

Intent to quit

[Zimmerman, 2008](#)

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See [Ones, Dilchert, Viswesvaran, & Judge, 2007](#) for other similar negatively related constructs.

*Appendix E*

Constructs demonstrated to be predicted by self-efficacy.

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Construct:	Citation:
Post-training verbal knowledge	<a href="#">Martocchio &amp; Judge, 1997</a> <a href="#">Lee &amp; Klein, 2002</a>
Procedural and delayed procedural knowledge	<a href="#">Sitzmann, Brown, Casper, Zimmerman, &amp; Ely 2008</a>
Business creation and success by entrepreneurs	<a href="#">Rauch &amp; Frese, 2007</a>
Employee task (but not job) performance	<a href="#">Judge et al., 2007</a>
Employee training reactions, post-training attitudes, cognitive learning, and transfer performance	<a href="#">Alvarez, Salas, &amp; Garofano, 2004</a>
Lower procrastination among employees	<a href="#">Steel, 2007</a>

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*Appendix F*

Constructs demonstrated to predict self-efficacy.

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Construct:	Citation:
Age, previous performance, and social persuasion	<a href="#">Chin &amp; Kameoka, 2002</a>
Active and intuitive learning styles	<a href="#">West, Kahn, &amp; Nauta, 2007</a>
Organizational climate and organizational learning	<a href="#">Tobin, Muller, &amp; Turner, 2006</a>
Skills and abilities, experience, and task-focused coping style	<a href="#">Solberg, Laberg, Johnsen, &amp; Eid, 2005</a> ),
Gender, previous exposure to and belief of the fairness and validity of cognitive ability tests, and task success	<a href="#">Maertz, Bauer, Mosley, Campion, &amp; Posthuma, 2005</a>
Learning goal orientation	<a href="#">Attenweiler, 2002</a>
Conscientiousness	<a href="#">Martocchio &amp; Judge, 1997</a> <a href="#">Lee &amp; Klein, 2002</a>

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*Appendix G*

Example of facet models of conscientiousness.

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Facets:	Citation:
Orderliness, Hard work, Conformity, and Self-control	<a href="#">Hogan &amp; Ones, 1997</a>
Dependability, Organization, Persistence, and Achievement orientation	<a href="#">Vinchur, Schippmann, Switzer, &amp; Roth, 1998</a>
Distractibility, Organization, Achievement motivation and Intention-action gap	<a href="#">Steel, 2007</a>
Achievement, Dependability, Order, and Cautiousness	<a href="#">Ones, Dilchert, Viswesvaran, &amp; Judge, 2007</a>
Achievement and Dependability	<a href="#">Dudley, Orvis, Lebiecki, &amp; Cortina, 2006</a>
Order and Achievement	<a href="#">Stewart, 1999</a>

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*Appendix H*

## Study 1 model sources and components.

	Model 1	Model 2	Model 3
Source:	Hogan & Ones ( <a href="#">1997</a> )	Maulden ( <a href="#">2008</a> ), Model 2	Maulden ( <a href="#">2008</a> ), Model 4
Components:	Order	Order	Order
	Conformity	Dependability	Dependability
	Industriousness	Cautiousness	Cautiousness
	Self-Control	Achievement	Achievement
			Persistence
			Decisiveness

*Appendix I*

Items used to assess the four facets of Model 1.

NEO: Orderliness. Alpha: .82

JPI Conformity. Alpha: .71

Positively keyed:

Positively keyed:

Do things according to a plan.

Conform to others' opinions.

Like order.

Do what others do.

Like to tidy up.

Need the approval of others.

Love order and regularity.

Want to amount to something special in others' eyes.

Want everything to be "just right."

Negatively keyed:

Negatively keyed:

Often forget to put things back in their proper place.

Worry about what people think of me.

Leave a mess in my room.

Am not concerned with making a good impression.

Leave my belongings around.

Don't care what others think.

Am not bothered by disorder.

Feel it's OK that some people don't like me.

Am not bothered by messy people.

Want to be different from others.

Want to form my own opinions.

VIA Industry. Alpha: .81

Positively keyed:

Am a goal-oriented person.

Am a hard worker.

Don't get sidetracked when I work.

Don't quit a task before it is finished.

Finish things despite obstacles in the way.

Negatively keyed:

Do not tend to stick with what I decide to do.

Don't finish what I start.

Give up easily.

VIA Self-control. Alpha: .75

Positively keyed:

Am a highly disciplined person.

Can always say "enough is enough."

Can stay on a diet.

Forego things that are bad for me in the long run even if they make me feel good in the short run.

Have no trouble eating healthy foods.

Negatively keyed:

Am not very good at getting things done.

Can't resist eating candy or cookies if they are around.

Do my tasks only just before they need to be done.

Do not exercise on a regular basis.

Give in to my urges.

Let myself be taken over by urges to spend or eat too much.

*Appendix J*

Items used to assess the four facets of Model 2.

## Order

Positively keyed:

Do things according to a plan.  
 Like order.  
 Like to tidy up.  
 Love order and regularity.  
 Want everything to be “just right.”

Negatively keyed:

Often forget to put things back in their proper place.  
 Leave a mess in my room.  
 Leave my belongings around.  
 Am not bothered by disorder.  
 Am not bothered by messy people.

## Dependability

Positively keyed:

Try to follow the rules.  
 Am always prepared.  
 Get chores done right away.  
 Make plans and stick to them.  
 Carry out my plans.

Finish what I start.

Get to work at once.

Keep my promises.

Keep myself well-groomed.

Respect authority.

Negatively keyed:

Break rules.

Find it difficult to get down to work.

Waste my time.

Need a push to get started.

Believe that there is no absolute right and wrong.

Interfere in other people’s business.

## Cautiousness

## Positively keyed:

Am not easily affected by my emotions.  
 Avoid mistakes.  
 Choose my words with care.  
 Make well-considered decisions.  
 Stick to my chosen path.

## Negatively keyed:

Do crazy things.  
 Jump into things without thinking.  
 Act without thinking.  
 Like to act on a whim.  
 Make rash decisions.  
 Often make last-minute plans.  
 Rush into things.

## Achievement

## Positively keyed:

Complete tasks successfully.  
 Am sure of my ground.  
 Believe that I am important.  
 Come up with good solutions.  
 Demand quality.  
 Do more than what's expected of me.  
 Excel in what I do.  
 Get things done quickly.  
 Go straight for the goal.  
 Handle tasks smoothly.  
 Know how to get things done.  
 Plunge into tasks with all my heart.  
 Set high standards for myself and others.  
 Turn plans into actions.  
 Work hard.

## Negatively keyed:

Do just enough work to get by.  
 Am not highly motivated to succeed.  
 Don't see the consequences of things.  
 Don't understand things.  
 Have little to contribute.  
 Misjudge situations.  
 Put little time and effort into my work.

*Appendix K*

Items used to assess the four facets of Model 3.

Order

Positively keyed:

Do things according to a plan.

Like order.

Like to tidy up.

Love order and regularity.

Want everything to be “just right.”

Negatively keyed:

Often forget to put things back in their proper place.

Leave a mess in my room.

Leave my belongings around.

Am not bothered by disorder.

Am not bothered by messy people.

Dependability

Positively keyed:

Try to follow the rules.

Am always prepared.

Get chores done right away.

Get to work at once.

Keep my promises.

Keep myself well-groomed.

Respect authority.

Negatively keyed:

Break rules.

Waste my time.

Believe that there is no absolute right and wrong.

Interfere in other people’s business.

## Cautiousness

## Positively keyed:

Am not easily affected by my emotions.  
 Avoid mistakes.  
 Choose my words with care.

## Negatively keyed:

Do crazy things.  
 Jump into things without thinking.  
 Act without thinking.  
 Like to act on a whim.  
 Make rash decisions.  
 Often make last-minute plans.  
 Rush into things.

## Achievement

## Positively keyed:

Complete tasks successfully.  
 Am sure of my ground.  
 Believe that I am important.  
 Come up with good solutions.  
 Demand quality.  
 Do more than what's expected of me.  
 Excel in what I do.  
 Get things done quickly.  
 Go straight for the goal.  
 Handle tasks smoothly.  
 Know how to get things done.  
 Plunge into tasks with all my heart.  
 Set high standards for myself and others.  
 Turn plans into actions.  
 Work hard.

## Negatively keyed:

Do just enough work to get by.  
 Am not highly motivated to succeed.  
 Don't see the consequences of things.  
 Don't understand things.  
 Have little to contribute.  
 Misjudge situations.  
 Put little time and effort into my work.

## Persistence

## Positively keyed:

Stick to my chosen path.

Make plans and stick to them.

Carry out my plans.

Finish what I start.

## Decisiveness

## Positively keyed:

Make well-considered decisions.

## Negatively keyed:

Find it difficult to get down to work.

Need a push to get started.

*Appendix L*

Items used to assess general self-efficacy.

NEO: Self-efficacy. Alpha: .78

Positively keyed:

Am sure of my ground.

Come up with good solutions.

Excel in what I do.

Handle tasks smoothly.

Know how to get things done.

Negatively keyed:

Don't see the consequences of things.

Don't understand things.

Have little to contribute.

Misjudge situations.

CPI: Self-efficacy. Alpha: .81

Positively keyed:

Am quick to understand things.

Can handle complex problems.

Formulate ideas clearly.

Have excellent ideas.

Think quickly.

Negatively keyed:

Do not have a good imagination.

Let myself be directed by others.

Let others determine my choices.

Never challenge things.

Undertake few things on my own.

*Appendix M*

Items used to assess self-deception.

PAS: Self-deception. Alpha: .80

Positively keyed:

Always know why I do things

Feel comfortable with myself.

Just know that I will be a success.

Know that my decisions are correct.

Like to take responsibility for making decisions.

Negatively keyed:

Worry about what people think of me.

Am not always honest with myself.

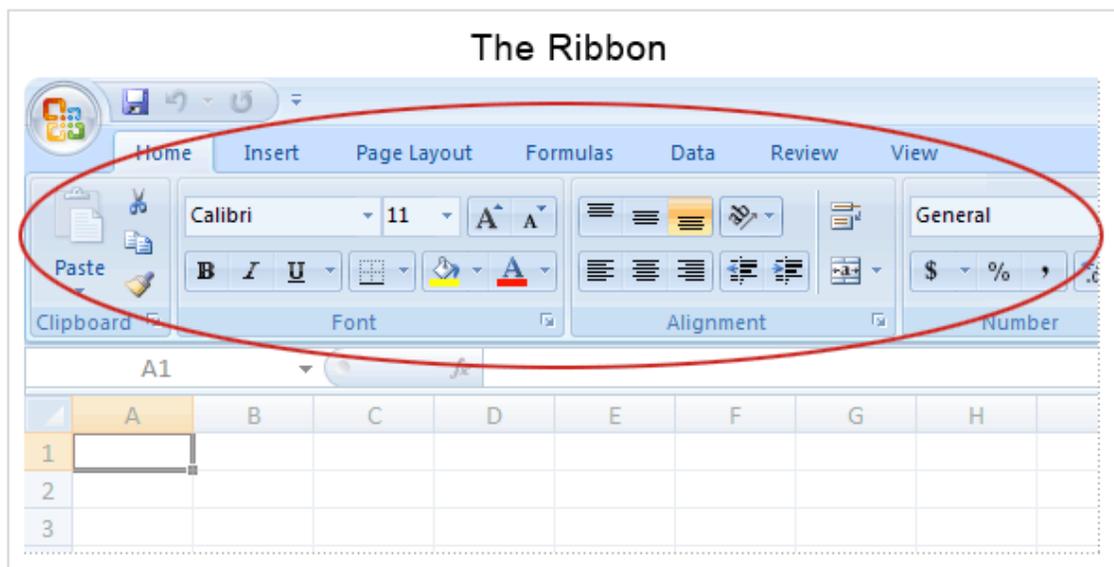
Dislike myself.

Have a low opinion of myself.

Sometimes have trouble making up my mind.

## Appendix N

Sample training page.



Your new control center, the Ribbon.

### AUDIO TEXT

Yes, there's a lot of change. It's most noticeable at the top of the window.

But it's good change. What you need is now more clearly visible and more readily available. Instead of having 30 or so undisplayed toolbars, and commands buried on menus, you have one control center — the Ribbon, which brings together the essentials and makes them very visual.

When you try the new design, you'll discover that the commands you already know how to use are grouped together in ways that make sense to you.

Learn more about the new design, and prepare to get to work with your exciting new version of Excel.

*Appendix O*

## Sample during-training quiz.

Complete the following test so you can be sure you understand the material. Your answers are private, and test results are not scored.

**You can customize Excel 2007 by adding commands to the Quick Access Toolbar.**

- True.  
 False.

**In the practice you learned that if you don't like all the white space in Page Layout view, your only option is to change to Normal view.**

- True.  
 False.

**The best thing to do to get started in Excel 2007 is to go to the \_\_\_\_.**

- View toolbar.  
 Home tab.  
 Microsoft Office Button.

**Some commands appear only when you need them.**

- True.  
 False.

*Appendix P*

Items used to assess training-specific self-efficacy.

Guthrie and Schwoerer (1994). Alpha: .82

I am confident that I can succeed in training.

I do well in training.

I am able to learn information and skills in training.

I am able to apply skills used in training.

I am able to apply what I have learned in training.

Adapted from Gist, Schwoerer, and Rosen (1989). Alpha: .XX

	Agree or Disagree? (select one)	Rating of confidence: 1 <i>not at all – 10 extremely</i>
I am capable of typing and entering numbers in cells in Microsoft Excel.	_____	_____
I am capable of writing a formula for addition in Microsoft Excel.	_____	_____
I am capable of writing a formula for division in Microsoft Excel.	_____	_____
I am capable of creating a chart in Microsoft Excel.	_____	_____
I am capable of creating a pivot table in Microsoft Excel.	_____	_____

*Appendix Q*

Items used to assess motivation to learn.

Adapted from Hicks (1984). Alpha: .XX

Positively keyed:

I am motivated to learn the training material in this program.

I will try to learn as much as I can from this program.

I will put effort forth to learn what I can from this program.

Negatively keyed:

I am not really motivated to learn the training material in this program.

I will try to get through this training program with as little effort as possible.