Abstract

Dierdorff, Erich Clinton. Dispositional Influences and Individual Differences in Work Performance: Relationships of Goal Orientation, Growth Need Strength, and Conscientiousness. (Under the direction of Mark A. Wilson.)

The purpose of this study was to investigate the roles of dispositional variables in affecting work performance. Study participants were criminal investigators from a state bureau of investigation (N = 158). The predictive potentials of growth need strength (GNS), learning orientation, performance orientation, and Conscientiousness were examined using structural equation modeling in relation to multidimensional work performance. All scales used for the study's constructs were subjected to a tetrad analysis prior to modeling in order to ensure unidimensional congeneric indicator sets. Three job performance constructs were incorporated: task performance as rating data, task performance as work activity data, and citizenship performance as rating data. GNS was shown to predict work activity task performance. Conscientiousness was found to predict citizenship performance. Learning orientation predicted both work activity task performance and citizenship performance, however the directions of the relationships were negative. Performance orientation was not found to predict any performance construct. None of the dispositional constructs significantly predicted task performance as derived from ratings. Comparing all predictors, GNS and learning orientation displayed the highest latent correlation due to their similar conceptualizations. Using different operationalizations and sources for the latent performance criteria increased their measurement distinctiveness, as well as revealing differential predictive validities. The implications of these predictive validities and the importance of using a multidimensional approach to performance in future research are discussed.

Dispositional Influences and Individual Differences in Work Performance: Relationships of Goal Orientation, Growth Need Strength, and Conscientiousness.

By

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Biography

Erich Clinton Dierdorff was born on April 1, 1973 in York, PA. At age thirteen he moved to West Palm Beach, FL. Erich graduated from Palm Beach Lakes Community High School in 1991. He then pursued undergraduate studies at the University of Florida. Graduating with high honors from the University of Florida in 1997, he received a Bachelor of Science degree in Psychology with a minor in Sociology.

In 1998, Erich moved to North Carolina in order to attend graduate school at NC State University. He earned an M.S. in Industrial/Organizational and Vocational Psychology in 2001. The topic of his thesis was a meta-analysis investigating the reliability of job analysis data.

Erich performs a variety of consulting work for organizations such as the U.S. Department of Labor, North Carolina State Bureau of Investigation, and Nortel Networks. His primary research interests are models of job performance, job analysis, psychometric theory and application, personnel selection, and work motivation.

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Introduction

The role of individual differences in characteristics or dispositional traits affecting work performance has received much attention in the recent literature (Furnham & Jackson, 1999; Hough & Oswald, 2000; Motowidlo, Borman, & Schmit, 1997). For instance, current research has demonstrated the separate effects of individual characteristics such as cognitive ability and personality (Schmidt & Hunter, 1998) in predicting job performance, as well as displaying that different abilities and motivation measures fail to yield significant interaction effects (Sackett, Gruys, & Ellingson, 1998). Moreover, a large part of this research has concentrated on variables of personality and ability. Other approaches, particularly within the training research field, have investigated individual difference variables related to motivational aspects of performance and learning (Ford, Smith, Weissbein, Gully, & Salas, 1998; Noe & Schmitt, 1986; Tannenbaum, Mathieu, Salas, & Cannon-Bowers, 1991). Some examples of factors falling within the motivational framework of performance, used in both past and present research, have been constructs such as growth need strength (Hackman & Oldham, 1980), goal orientation (Dweck, 1986), self-efficacy (Bandura, 1982), and achievement orientation (Ames, 1992). Each of these variables has shown promising relationships with work performance and of these factors self-efficacy has seemingly received the most empirical attention (Stajkovic & Luthans, 1998). Taken collectively, the evidence provided by research examining individual differences in predicting performance supports the argument that the role of various individual characteristics is both significant and influential (Colquitt, Le Pine, & Noe, 2000). The benefits stemming from research investigating the relationships between motivation, individual characteristics, and performance are substantial and the need for further investigation has been proffered (Ford et al., 1998). Indeed, demonstration of potential associations of certain traits with increases in work performance could lend powerful tools to practitioners for designing and implementing selection systems, training programs, and performance management systems.

The present study examined the relationships among individual dispositional characteristics and work performance. More specifically, growth need strength (GNS) and goal orientation were the primary independent variables of focus. The aim of the study was to investigate whether these motivational constructs are related to measures of work performance, thus extending the empirical knowledge of individual characteristic influences on performance beyond the prior research examining self-efficacy and cognitive ability. To further the knowledge already gained from personality research focused on performance, GNS and goal orientation were also analyzed in relation to the Big Five variable of Conscientiousness. The following section provides detailed descriptions of each of the study's constructs of interest. The purpose of the next section is to discuss the conceptual framework and paradigms to be invoked by the present study.

Overview

Although a great deal of past empirical and theoretical performance research has focused on motivational influences, much of this research has investigated "proximal" factors (Kanfer, 1990). Proximal influences are those situations that "set the stage" for employees to motivate themselves and hence, increase performance. Some examples of proximal approaches are the research veins within goal-setting theory and expectancy theory, each focusing on the processes by which motivation affects performance. Another category of motivational influences is comprised of variables that have been deemed as “distal” (Kanfer, 1990). These distal variables can be seen as more akin to dispositional factors in that they are possessed by individuals prior to entering a performance situation and, in turn, may affect ensuing performance. By utilizing distal influences, individual differences can be studied for their direct effects beyond moderation upon work performance. The primary distal influences included within this study are GNS, goal orientation, and the personality factor of Conscientiousness. These influences were examined for their relative associations with each other and to a multidimensional assessment of work performance. The dimensional components of work performance used within the present study were task performance and citizenship performance. The following section begins with a discussion of the study’s conceptualization of the criterion space. Next, salient aspects of the predictor domain are presented. Finally, the research questions explored by the study are presented.

Conceptualization of Performance

A great deal of recent research has pointed to the importance of conceptualizing and measuring performance as a multidimensional phenomenon (Borman & Brush, 1993; Campbell, McCloy, Oppler, & Sager, 1993; Hough & Oswald, 2000; Motowidlo, Borman, & Schmit 1997). Perhaps the most commonly accepted multidimensional performance distinction is that of “contextual” or “citizenship” performance and “task” performance (Arvey & Murphy, 1998; Borman & Penner, 2001). Task performance generally consists of job-specific activities, such core job duties, and is more likely to be affected by cognitive ability and experience (Borman, Hanson, & Hedge, 1997). In addition, the task performance domain has been conceptually broken-out into two different components called procedural knowledge and declarative knowledge (Campbell et al., 1993; Wilson & Grant, 1997). This performance distinction has been described within the training literature as well (Anderson, 1982). Declarative knowledge refers to the application of knowledge and skills about the facts of a job (i.e., "knowing the job"), whereas procedural knowledge consists of knowledge and skills about performing the job (i.e., "doing the job"; Fisher & Ford, 1998; McCloy, Campbell, & Cudeck, 1994).

The notion of citizenship performance derives from research examining constructs such as organizational citizenship behavior and prosocial organizational behavior (Brief & Motowidlo, 1986; Organ, 1997). Citizenship performance generally comprises non-job-specific activities that benefit the organization by helping to attain organizational goals, yet are independent of the task at hand (Motowidlo et al., 1997). Coleman and Borman (2000) describe three categories of citizenship performance: personal support (benefits other employees), organizational support (benefits organization), and conscientious initiative (benefits work itself). Furthermore, citizenship performance is more likely than task performance to be influenced by volition and personality (Borman & Motowidlo, 1993; Motowidlo & Van Scotter, 1994). Importantly, it has been argued that organizations consistently require both task and citizenship performance (Kiker & Motowidlo, 1999) and it has been shown that both performance dimensions exert effects upon overall ratings of performance (Conway, 1999; Motowidlo

& Van Scotter, 1994).

In practice, the citizenship and task performance dimensions can be measured in both qualitatively similar and unique ways. Because of the nature of the construct, measures of citizenship performance are almost exclusively gleaned from performance rating data (e.g., Conway, 1999; Motowidlo & Van Scotter, 1994; Van Scotter & Motowidlo, 1996; Van Scotter, Motowidlo, & Cross, 2000). Likewise, task performance can be assessed through the use of performance ratings. However, task performance may also be summarized using more traditional measures of objective data such as work activities or productivity records. These potentially disparate sources of task performance information could tap into qualitatively different constructs of such performance. Moreover, performance dimensions that utilize similar methods of assessment could be expected to display higher correlations. For instance, if a criterion space included task and citizenship performance dimensions that were both derived from supervisory ratings the expected correlation between these dimensions would likely be higher than in the situation in which task performance was only derived from work activity data. This magnitude increase in correlation could even be attributed to an underlying general “p” factor of performance (Arvey & Murphy, 1998), or simply to common method variance. Thus, the inclusion of both a task performance dimension derived from ratings, as well as one derived from activity data, would provide a meaningful and perhaps more complete assessment of the job performance criterion space.

The present study utilized a multidimensional approach to performance measurement. More specifically, the criterion space was examined relative to the two broad categorizations of citizenship and task performance. Two separate perspectives were utilized to investigate the criterion space. The first perspective used a two-construct approach incorporating citizenship performance, as derived from ratings, and task performance composed of work activity data. The second perspective added a third construct to the criterion space by incorporating a perception of task performance construct derived from ratings. The intention was that through a multidimensional assessment of performance more meaningful relationships would be revealed by the study's investigations. This approach allowed the presentation of specific associations between the components and operationalizations of work performance, as well as any differential relationships with the study's latent dispositional variables within the predictor domain. Employing this broader assessment of work performance across the two perspectives, which included citizenship performance, task performance, and perception of task performance, suited the explanatory purposes of the study.

Predictors: Growth Need Strength

Hackman and Oldham (1980) originally formulated growth need strength under the rubrics of Job Characteristics Theory. It had been described as an individual difference variable that moderates the effects of core job dimensions (e.g., skill variety, task identity and significance), psychological states (e.g., meaningfulness of work), and personal and work outcomes such as satisfaction and performance (Hackman, Oldham, Janson, & Purdy, 1975). Das (1991) defined GNS as the level of higher-order need for personal growth and development in the work situation. Importantly, what becomes evident from these descriptions is that GNS should be conceptualized as a dispositional factor and therefore certain individuals can be expected to have greater trait levels of GNS than others. Hackman & Oldham (1980) spoke to the dispositional nature of GNS when they wrote, “Not all individuals appreciate such opportunities [growth, learning, or challenge within the job], even among employees who would be able to perform the work competently.” (p.85). Within Job Characteristics Theory, the moderating role of GNS has generally received affirming results (Medcof, 1991). For example, GNS has been specifically shown to moderate relationships among job characteristics and academic performance (Bartlett, 1996), intrinsic motivation (Cellar & Furst, 1992), satisfaction and quantitative productivity (Das, 1991), and qualitative productivity (Graen & Scandura, 1986).

Interestingly, GNS has not received much empirical attention outside of Job Characteristics Theory. Furthermore, the amount of recent research incorporating GNS has noticeably diminished. In fact despite the demonstration of construct-related validity of GNS measures, the latent variable has not been investigated as a standalone construct in relation work performance. Likewise, GNS has not been examined for its potential association with a multidimensional operationalization of performance. Considering the rapidity of change and ambiguity of structure within the modern workplace (Cascio, 1997), it would seem highly likely that GNS would serve more as a driving force behind motivation and work performance than simply as a moderating influence. This study sought to investigate the potential relationship between GNS and work performance. Moreover, examining these associations in relation to a multidimensional performance domain is a novel empirical undertaking within the GNS research vein, which is typically focused only on task performance.

Predictors: Goal Orientation

Another individual characteristic that has been described to affect performance is goal orientation (Dweck, 1986; Dweck & Leggett, 1988). Dweck and her colleagues have delineated two types of goal orientation upon which individuals may characteristically differ: performance (ego) orientation and learning (mastery) orientation. Both goal orientations foster different response patterns. A performance orientation is characterized by a response pattern displaying a desire to prove one's competence relative to others, an avoidance of challenges, and a deterioration of performance in the face of obstacles (Diener & Dweck, 1978). Persons who are performance-oriented tend to think that their performance reflects their ability (Schraw, Horn, Thorndike-Christ, & Bruning, 1995) and that task success should come with little effort. With performance-oriented individuals, performance failure may also be associated with negative affect and withdraw from task completion. Conversely, learning orientation is characterized by a desire to acquire new skills and knowledge purely for the sake of learning or mastery (Bouffard, Boisvert, Vezeau, & Larouche, 1995). Persons who are learning-oriented tend to seek out challenges, maintain persistence under difficult performance conditions or failure, and successfully achieve self-referenced standards of task mastery upon which to gauge their progress (Elliot & Dweck, 1988). Although situations may be constructed using performance- or learning-type goals, Dweck's motivational theory suggests that goal orientation can be conceptualized as a relatively stable dispositional trait as well (Bempechat, London, & Dweck, 1991; Duda & Nicholls 1992). Furthermore, evidence has been provided for both the convergent and discriminate validity of a two-factor model of goal orientation and the distinction between the situational and dispositional aspects of goal orientation (Button, Mathieu, & Zajac, 1996; Farr, Hofmann, & Ringenbach, 1993; Kozlowski, Gully, Brown, Salas, Smith, & Nason, 2001).

Brett and VandeWalle (1999) found that dispositional goal orientation was related to the content of chosen goals under training conditions, with learning goals leading to more successful performance. Goal orientation, as related to motivation, has also been suggested to affect the allocation of attentional effort in skill acquisition, amount of metacognitive activity (Ford, Smith, Weisbein, Gully, & Salas, 1998), personal beliefs about performance (Duda and Nicholls, 1992), and effort leading to performance (VandeWalle, Cron, & Slocum, 2001). Although these results are promising, it would be fruitful to investigate whether these findings within training performance research are generalizable to work performance. Moreover, much research surrounding goal orientation has used student samples or laboratory settings and has only utilized task-related performance criteria. Thus, investigations of goal orientation within real-life organizational environments are important research endeavors. Finally, Button et al. (1996) have called for empirical comparisons of the learning and performance orientation constructs with other dispositional latent variables, specifically citing GNS. The present study investigated each of these research interests utilizing the two-construct conceptualization of goal orientation. The intention was to further the understanding of both learning orientation and performance orientation in relation to work performance and other dispositional constructs (e.g., Conscientiousness and GNS) within the predictor space.

Predictors: Conscientiousness

The third dispositional influence to be incorporated into the study's analyses was the personality factor of Conscientiousness. Conscientiousness is one of the "Big five" (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) personality dimensions. Individuals high in Conscientiousness have been described as responsible, dependable, organized, and persistent (Barrick & Mount, 1991). The rationale for selecting Conscientiousness as a predictor for this study stems from prior research that generally shows the personality factor to be positively related to many aspects of job performance (Caligiuri, 2000; Dalton & Wilson, 2000; Frink & Ferris, 1999; Hurtz & Donovan, 2000; Mount & Barrick, 1998; Vinchur & Schippman, 1998). Although these results are promising, some cautions have been warranted (Hogan, Rybicki, Motowidlo, & Borman 1998; Hough, 1997). For instance, the effects of Conscientiousness on job performance may only be realized within certain work contexts such as those with opportunities for advancement, jobs that do not require much creativity or innovation, or those incorporating highly complex tasks (Chen, Casper, & Cortina, 2001; Van Scotter, Motowidlo, & Cross, 2000). Additionally, Conscientiousness may have a greater influence on citizenship performance than task performance (Hattrup, O'Connell, & Wingate, 1998; LePine & Van Dyne, 2001; Miller, Griffin, & Hart, 1999), however some exceptions have been found (e.g., Hurtz & Donovan, 2000). Also, there are some recent findings that suggest Conscientiousness does not have a significant influence on aspects of job performance (Robertson, Barron, Gibbons, MacIver, & Nyfield, 2000; Wilson & Grant, 1997).

Given these results, the present study investigated the role of Conscientiousness in predicting task performance, perception of task performance, and citizenship performance. Furthermore, the present study allowed Conscientiousness to be compared to the predictors of performance orientation, learning orientation, and GNS. To date, these four constructs have not been empirically examined for their potential interrelationships. Finally, it has been suggested that the amount of autonomy found within a job may affect the role of Conscientiousness (Barrick & Mount, 1993; Gellatly & Irving, 2001). The present study may indirectly shed some light on this topic, considering the intended participants perform their work duties under conditions of high autonomy.

Research Questions and Hypotheses

The primary goal of the study was to analyze the relationships between the predictors of learning orientation, performance orientation, GNS, and Conscientiousness and the criteria of task performance, perception of task performance, and citizenship performance. The following section describes the relevant research questions to be examined by the study, as well as any specific hypotheses pertaining to these questions.

Given the previous discussion of GNS research that has shown relationships to both motivation and performance within Job Characteristics Theory, the present study examined potential associations outside the purview of Job Characteristics Theory. In other words, GNS was assessed as a standalone construct independent of a work redesign effort. This research question asked the following: Are higher levels of GNS associated with increased levels of job performance? Since individuals that are high in GNS have been shown to have a greater need for personal growth, it was hypothesized that these same individuals may also exhibit greater levels of task performance and perception of task performance. This becomes especially salient when considering that the typical job redesign strategies employed within Job Characteristics Theory collectively target the actual work being performed. Finally, GNS was not hypothesized to be significantly predictive of citizenship performance.

In regard to goal orientation, past research has pointed to relationships between learning orientation and increased work performance above levels associated with performance orientation. Response patterns associated with learning orientation such as persistence in the face of difficulty and learning for the sake of learning, suggest that learning orientation should be more related to aspects of job performance than would performance orientation. Furthermore, it seems that learning orientation would be associated with more sustained levels of internal motivation to perform successfully. Thus the research question asked the following: Does the extent to which a person is learning-oriented, versus performance-oriented, affect ensuing levels of job performance? It was hypothesized that learning orientation would be a stronger predictor of the constructs of task performance and perception of task performance, than would performance orientation. Performance and learning orientation were not expected to predict citizenship performance.

As already discussed, prior research has suggested that Conscientiousness predicts job performance reasonably well. Moreover, Conscientiousness is suggested to be more related with citizenship performance than task performance. However, a recent meta-analysis by Hurtz and Donovan (2000) found the true validity coefficients for Conscientiousness and various aspects of performance (task, interpersonal facilitation, and job dedication) to range from .15 to .18, as well as .20 for overall measures of performance. Hence, the research question to be answered was as follows: Is Conscientiousness differentially related to different constructs of job performance? It was hypothesized that Conscientiousness would predict citizenship performance more than perception of task performance and task performance. Additionally, similar to previous research (Barrick & Mount, 1991; Hurtz & Donovan, 2000; Salgado, 1997) it was expected that Conscientiousness would also predict perception of task performance due to its composition of ratings.

At the overall model level of analysis, the study further investigated the interrelationships within and between constructs in both the predictor and criterion spaces. The study's theoretical model is presented as Figure 1. This figure shows the model for the three-factor conceptualization of the criterion space. Hypothesized relationships remain the same for the two-factor model, with the exception of any connections to the extra task performance factor. The set of research questions stemming from the study's inquiries asked: What is the nature of the relationships among the four dispositional predictors? How differentiated are the three dependant latent performance variables? To what extent do the four latent predictor variables differentially affect job performance? Which criterion conceptualization better fits the observed data, a two-factor or a three-factor? It was predicted that the strongest correlation among the predictor constructs would be found for learning orientation and GNS due to conceptual similarities such as the desire for personal growth. Furthermore, it was predicted that learning orientation would not be highly correlated with performance orientation consistent with results found in previous research (Button et al., 1996; Farr, Hoffman, & Ringenbach, 1993; Ford et al., 1998). No other specific relational hypotheses were made in regard to the dispositional variables within the predictor domain. On the criterion side, similar to past research (Van Scotter et al., 2000) perception of task performance was expected to display a significant positive correlation with citizenship performance and task performance, but the relationship was predicted to be larger between the perception of task performance and citizenship performance constructs because of rating composition. Finally, no prediction was made as to whether a two- or three-factor criterion model would better fit the observed data.

Methods

Participants

The participants in the present research were from the North Carolina State Bureau of Investigation (SBI). The data were gathered in conjunction with an ongoing selection system design and validation study. The participants were individuals employed under the job title of "Field Agent" within the SBI. The Field Agent job designation occurs across four levels: Agent I, Agent II, Agent III, and Criminal Specialist. Individuals from the levels of Agent I to Agent III were included within the sample. Criminal Specialists were not included within the sample because their primary job duties were that of a first-line supervisor managing the work of other Field Agents in the three lower levels. The sample size was 158 participants representing the vast majority (97%) of the population of potential respondents. Generally, SBI Field Agents specialize in the investigation of a wide variety of criminal activity ranging from illegal drugs and homicide, to arson and police corruption. An interesting aspect of the Field Agent job is that it offers much autonomy in both the execution of work duties, such as criminal investigation, and career development opportunities. This particular job aspect provided a promising context within which to examine the role of dispositional individual differences in work performance (Chen et al., 2001), since arguably a substantial component of successful performance as a Field Agent may be attributable to an individual's motivation. The sample consisted of 80% males and 20% females and ranged in tenure from 1 to 37 years (M = 10.89, SD = 7.90).

Measures: Predictors

Growth need strength was assessed using items developed for the Job Diagnostic Survey (Hackman & Oldham, 1980, p.287). All items are presented in Table 1. Trait goal orientation was assessed using an instrument developed by Button et al. (1996). This instrument consists of two scales totaling 16 items, with 8 items measuring performance orientation and 8 items measuring learning orientation. The complete sets of items are displayed in Table 2. The GNS, learning orientation, and performance orientation scales were incorporated into a single survey entitled the "Work Attitudes Survey" (WAS) which is located in Appendix A of this document. Finally, Conscientiousness was assessed using the self-report Conscientiousness scale of the NEO-PI Revised Personality Inventory (Costa & McRae 1992). The measures for all predictor scales were administered simultaneously in conjunction with other research instruments as part of the aforementioned selection validation study. The data collection took place in the spring of 2001.

Measures: Criteria

The study's multidimensional conceptualization of work performance required three latent variables of performance: perception of task performance, task performance, and citizenship performance. Performance data for these latent variables were gathered from both archival records and concurrent measures. The attempt to include both subjective ratings and quantitative data as manifest variables was meant to ensure extensive assessment of the job performance domain. The composition of manifest variables for the latent variable of task performance included only work activity data (e.g., number or percentage of cases closed). The construct of perception of task performance was comprised of manifest variables such as subjective performance ratings on various job duty components (e.g., supervisory ratings on writing case reports) delineated by a prior job analysis of the Field Agent position (Dierdorff, Carter, Wilson, 2001). Measures gathered for the citizenship performance construct consisted of supervisory ratings from the first-line managers (i.e., Criminal Specialists) and district managers (i.e., Special Agents-in-Charge) on various citizenship behaviors (Organ & Ryan, 1995). Please see Table 3 for a list of the manifest variables meant to assess citizenship performance. The performance appraisal form used to gather the performance ratings can be found in Appendix A. The criterion data were also collected and compiled in the spring of 2001.

Analyses

The analysis of both the predictor and criterion data occurred across four steps. First, the means, standard deviations, and correlations for all manifest variables were calculated. Second, every latent variable's set of corresponding indicators (e.g., the eight items measuring learning orientation and the eight items measuring performance orientation) was subjected to a tetrad analysis (Bollen & Ting, 1993) using the Purify module of the TETRAD III software (Callahan & Sorenson, 1992; Spirtes & Glymour, 1998; Spirtes, Scheines, & Glymour, 1990). The purpose of the tetrad analyses was to identify congeneric items for each of the latent variables. In short, through a series of Bonferroni tests on the vanishing tetrads within the observed correlation data of each scale, TETRAD helps to eliminate "impure" (multidimensional) items and thereby build unidimensional scales. A Bonferroni test is a heuristic statistic used in multiple comparisons, in this case used for simultaneously testing multiple tetrad equations. The third analysis step subjected all items retained by the tetrad analyses to confirmatory factor analysis (CFA) using CALIS from SAS, version 8.2. The purpose of the CFA procedures was to assess the goodness-of-fit of the congeneric sets of items, as well as to serve as the initial procedure to structural equation modeling also known as the construction and assessment of the measurement model (Anderson & Gerbing, 1988). The fourth step comprised analyzing two hypothesized path models using structural equation modeling (SEM) techniques (Bollen, 1989), also within CALIS from SAS version 8.2. The purpose of this final step was to investigate the extent to which the sample data fit the two hypothesized models. From this step, results displayed whether the two-factor and three-factor criteria models provided good fit to the data, as well as the magnitude and statistical significance of relationships among the models' latent variables. Additionally, the results of the structural equation modeling showed which of the two predicted models provided a better fit of the data.

Results

Scale Refinement

A table of the means, standard deviations, and correlations for all tested variables, as well as an item key, is found in Appendix B. The complete results of all tetrad analyses for each of the predictor and criterion constructs are shown in Appendix C. The TETRAD program will output the best approximation of a congeneric set of indicators for a given scale based upon the pattern of vanishing tetrads within the observed data. This output greatly aids in the development of unidimensional scales, but by no means guarantees adequate model fit within a confirmatory factor analysis. Importantly, items used as input to the tetrad analyses were only those that were theoretically prescribed for a given scale. For instance, items meant to measure GNS were not included as input to the same congeneric tetrad analysis undertaken for Conscientiousness. All variables used as input for each construct in the tetrad analyses are shown in Tables 1 through 5. The following paragraphs describe the results of each tetrad analysis.

GNS. Only the items described as measuring GNS by Hackman and Oldham (1980, p.305) of the Job Diagnostic Survey were subjected to the tetrad analysis. These select items were numbers 2, 3, 6, 8, 10, and 11 as shown in Table 1. With GNS represented by all six items, 8 of 45 tetrads failed to pass the Bonferroni test. After dropping items 3 and 6, all tetrads passed the Bonferroni test. These four items were retained for entry into the ensuing CFA and SEM analyses.

Conscientiousness. All six subscales of Conscientiousness from the NEO-PIR (Costa & McRae, 1992) were input into the tetrad analysis. No subscales were dropped because none of the 45 tetrads suggested by a unidimensional construct failed the Bonferroni test. Thus, the six subscales were retained for entry within the ensuing CFA and SEM analyses.

Goal Orientation. The two scales for learning orientation and performance orientation were input simultaneously into the tetrad analysis. The rationale behind the simultaneous analysis was to assess whether a two-factor operationalization of goal orientation was indeed tenable. The items included as input into the tetrad analysis are shown in Table 2. The tetrad analysis occurred in two stages. First, each construct was analyzed individually. Second, a cross-construct tetrad analysis was conducted. This second stage helped to eliminate potential cross-loaders (i.e., items significantly loading on both learning and performance orientation constructs). A total of 4 of 210 tetrads failed the Bonferroni test for the initial item set of performance orientation. After dropping items 1 and 5, no tetrads failed the Bonferroni test. The initial item set for learning orientation produced nine tetrads that failed the Bonferroni test. Dropping items 3 and 7 allowed all tetrads to pass the Bonferroni test. The cross-construct tetrad analysis yielded no failed Bonferroni tests, displaying evidence for the absence of potential cross-loaders. Therefore, six items for each goal orientation construct were retained for entry within the ensuing CFA and SEM analyses.

Citizenship Performance. Ratings from both supervisory sources (Special Agent-in-Charge and Criminal Specialists) on the four citizenship dimensions shown in Table 3 underwent tetrad analysis. This initial set of measures produced 72 of 210 tetrads that failed the Bonferroni tests. After dropping citizenship items 1, 2, and 3 from the Special Agents-in-Charge and item 3 from Criminal Specialists, no tetrads failed the Bonferroni test. Therefore, the final measurement set retained for CFA and SEM analyses included Special Agent-in-Charge ratings on citizenship item 4, and Criminal Specialist ratings on items 1, 2, and 4.

Perception of Task Performance. All ratings on the performance dimensions displayed in Table 5 from Special Agents-in-Charge were subjected to a tetrad analysis. The initial set resulted in 42 of 2145 tetrads that failed the Bonferroni test. After dropping the dimensions of managing case reports, arrest procedures, other investigative activities, and forms and reports, all 378 tetrads passed the Bonferroni test. All of these performance measures were retained for CFA and SEM analyses.

Task Performance. Five measures of task performance derived from activity data were entered into the tetrad analysis. These measures are presented in Table 4. No variable deletion was necessary for this construct since all 15 tetrads given by the variable set passed the Bonferroni test. All measures were retained for CFA and SEM analyses.

Measurement Models

For both the two-factor and three-factor criterion space models, the CFAs were performed on the covariance matrices containing all variables suggested by the tetrad analyses. The purpose of testing a measurement model is to assess the relationships between latent factors and manifest variables. A tested measurement model allows all latent variables to intercorrelate, while constraining all factor variances to unity, thereby testing the least restrictive model implied for the observed data. All tested measurement models were independent clusters models (McDonald & Ho, 2002), in that no single indicator loaded on more than one common factor. Based upon recommendations from the relevant literature, several model fit indices were used for judging the adequacy of the measurement model's fit of the observed data. The first fit index to be used was the chi-square statistic, which serves as a measure of absolute fit. However, the chi-square statistic is greatly influenced by sample size and number of parameters estimated (Jackson, 2001), and statistically significant chi-square values may not necessarily indicate poor fitting models (Medsker, Williams, Holahan, 1994). Additionally, an overall chi-square/df value less than 2 can generally suggest that other fit indices should be consulted in order to assess model fit (Hatcher, 1994). Consistent with the recommendations of MacCallum and Austin (2000) and others (e.g., Marsh, Balla, & McDonald, 1988), four additional indices were consulted. These indices were the non-normed fit index (NNFI; Bentler & Bonett, 1980), comparative fit index (CFI; Bentler, 1990), the standardized root mean square residual (SRMSR; Hu & Bentler, 1998, 1999), and the root mean square error of approximation estimate with an accompanying 90% confidence interval (RMSEA; Browne & Cudeck, 1993). Values for the NNFI and CFI, above .90 are considered indicators of reasonable model fit. Vandenberg and Lance (2000) suggest that SRMSR value of less than .08 indicative of excellent fit, with .10 as an upper limit. Browne and Cudeck (1993) suggest that RMSEA values less than .05 to represent good model fit, and values less than .08 as representing reasonable fit. Table 6 displays the fit statistics for tests of all ensuing measurement models.

Model 1. The complete SAS output for the CFA analyses involved in testing the measurement model for the two-factor criterion space (task and citizenship performance only) are found in Appendix E. The chi-square statistic was highly significant, 516.76 (390), $p < .0001$, but the chi-square/df was 1.3. The other fit indices indicated that measurement model provided a fairly reasonable fit of the observed data (NNFI = .94; CFI = .95; SRMSR = .07; RMSEA = .05, [.03-.06]). All of the manifest variables significantly loaded on their corresponding constructs ($p < .05$). The majority of the standardized loadings for the manifest variables were greater than .70. Two indicators were relatively low loaders (< .45) when compared to the other standardized estimates. Although statistically significant, the Conscientiousness subscale 2 and the Special Agent-in-Charge citizenship rating were both below the .45 estimate level. Based upon these relatively low loadings, the relatively large standardized residuals for these two variables, and the low r-square values associated with the variables (see Appendix E), both of these variables were dropped and a revised measurement model was analyzed. Additional rationale for dropping the Special Agent-in-Charge citizenship rating came from the suggestion that citizenship ratings should come from sources close to the level of the rated individual (W. C. Borman, personal communication; Conway, 1999), which was not the case for the deleted indicator. The complete CFA results of the revised measurement model are also shown in Appendix E. Deleting the two items resulted in a significant reduction of the model chi-square estimate, $\Delta\chi^2$ (55) = 89.62, p = .002. Improvements of the other fit indices were also evident (NNFI = .96; CFI = .96; SRMSR = .06; RMSEA = .04, [.03-.05]). Importantly, the CFA for the revised measurement model also provided an estimate of the correlation between the criterion constructs; an estimate that is unable to be assessed within the ensuing structural equation models due to model non-recursiveness. The correlation between the task performance and citizenship performance constructs was .27 (p < .05).

Model 2. The complete SAS output for the CFA analyses testing the measurement model for the three-factor criterion space (task performance, citizenship performance, and perception of task performance) is found in Appendix F. Again, the chi-square statistic was highly significant, 1089.61 (681), p < .0001 and the chi-square/df was 1.6. Based upon the other fit indices, the measurement model provided relatively poor fit of the observed data (NNFI = .88; CFI = .89; SRMSR = .08; RMSEA = .06, [.05-.07]). All manifest variables were significantly loaded on their corresponding constructs (p < .05). As with the two-factor criterion space model, a revised measurement model was analyzed. To maintain logical consistency and to avoid capitalizing on the idiosyncrasies of the data, the same two items (Conscientiousness subscale 2 and SAC citizenship rating) were dropped and another CFA was conducted. The complete results of the revised measurement model for the three-factor criterion space are also shown in Appendix F. The revised model again resulted in a significant reduction of the model chi-square estimate, $\Delta\chi^2$ (73) = 248.59, p < .0001. Improvements of the other fit indices were also evident (NNFI = .93; CFI = .94; SRMSR = .06; RMSEA = .05, [.04-.06]). Unlike the initial model, the revised model provided reasonably good fit of the observed data. All criterion constructs were significantly correlated ($p < .05$). Task performance was correlated .27 with citizenship performance and .25 with perception of task performance. Citizenship performance was correlated .42 with perception of task performance. Thus, evidence supported the hypothesized comparative magnitude of these correlations as citizenship performance and perception of task performance displayed a higher correlation than did citizenship performance and task performance. Interestingly, the lowest correlation among the three criteria was between the two task-related constructs.

Structural Equation Models

The complete results from the structural equation modeling (SEM) analyses for both the two-factor and three-factor criterion space models are shown in Appendices G and H, respectively. These analyses were run using the congeneric items gleaned from the previously developed measurement models. In contrast to the CFA analyses of the measurement models, SEM places theoretical model constraints upon the covariance matrix of the observed data. In other words, the incorporation of hypothesized relationships, usually a set of conjectured causal paths between latent variables, are empirically assessed. As with the measurement models, model fit was assessed using the chi-square estimate, NNFI, CFI, SRMSR, and RMSEA statistics and the analyses were performed on covariance matrices. Appendix D contains a table of the means, standard deviations, and correlations for all variables included within the SEM models. Table 6 displays the fit statistics for the tests of both structural models.

Model 1. The complete SAS output for the SEM analysis for the two-factor criterion space model is found in Appendix G. The chi-square statistic was significant, 435.80 (336), $p = .0002$, while the chi-square/df value was 1.3. Other fit indices suggested an acceptable fit (NNFI = .95; CFI = .96; SRMSR = .07; RMSEA = .04, [.03-.05]). As in the corresponding measurement model, all manifest variables significantly loaded on their corresponding constructs ($p < .05$). The results for the model's structural parameters are displayed in Figure 2, which contains standardized path coefficients and the corresponding standard errors of the unstandardized estimates within parentheses below each coefficient. Congruent with the study's hypotheses, GNS significantly predicted task performance (.20) and did not predict citizenship performance. Hypotheses regarding learning and performance orientations received mixed support. Learning orientation was a significant predictor of task performance (-.23) and was larger in magnitude than performance orientation. However, contrary to expectations, learning orientation was also related to citizenship performance (-.27). Moreover, these parameters were negatively signed which is contrary to the findings of previous research investigating trait goal orientations. Performance orientation was found not to be predictive of either performance construct. Finally, the hypothesis for Conscientiousness was partially confirmed since the personality latent variable was significantly predictive of citizenship performance (.22), but was not predictive of task performance.

Examination of the predictor space shows that all but one latent variable correlation was significant ($p > .05$). The first hypothesis regarding the predictor space was confirmed in that GNS and learning orientation displayed the strongest correlation

(.44) among the latent predictor variables. The second hypothesis was not supported as performance orientation and learning orientation were found to be significantly correlated (.32). Although no other specific hypotheses pertaining to relative magnitude were explicitly offered, the results provide some interesting relationships. Performance orientation was more strongly related to GNS (.36) than to learning orientation (.32), but was not significantly correlated with Conscientiousness. Finally, Conscientiousness was correlated equally with both learning orientation and GNS (.31).

Model 2. The complete SAS output for the SEM analysis for the three-factor criterion space model is found in Appendix H. The chi-square statistic was significant, 877.04 (611), $p < .0001$ and the chi-square/df value was 1.4. Fit indices suggested a reasonably acceptable fit (NNFI = .92; CFI = .93; SRMSR = .09; RMSEA = .05, [.04-.06]). Again, all manifest variables significantly loaded on their corresponding constructs ($p < .05$). The standardized path coefficients and the standard errors of the unstandardized estimates for the model's structural parameters are displayed in Figure 3. None of the latent predictors were significantly related to the additional construct of perception of task performance, although a trend toward significance was evident for Conscientiousness (.14, $p = .06$). The three-factor criterion space model did yield some minor differences in the magnitudes of predictor standardized path coefficients when compared to the two-factor model. GNS was again predictive of task performance (.21) and learning orientation was predictive of both task performance (-.24) and citizenship performance (-.28). Although not significant, learning orientation was negatively related to perception of task performance, which displayed the consistency of its inverse relationship with the other two performance constructs. Similarly, Conscientiousness was again predictive of citizenship performance (.22). No magnitude differences in intercorrelations between the predictor latent variables were evident within the three-factor criterion space model as compared to the two-factor criterion space model.

Discussion

The results gleaned from this study's investigations serve to extend empirical work examining various dispositional predictors of work performance. Although this study did not follow one theoretical framework, the latent predictors of interest were all variables that have received much prior empirical attention and have been suggested to influence work performance. In general, this study found evidence to support the notion that dispositional variables do exert influence on work performance. To place this evidence within a theoretical context, the findings within this study should be framed within what has been termed in the performance literature as "performance determinants" (Campbell et al., 1993). More specifically, the predictors used in this study fall within the indirect determinant category of motivation, of which Campbell (1999) describes as "the independent variables stipulated by research and theory in motivation" (p.409). By framing the results in the context of more general discussions of work performance, this research helps to delineate potentially useful individual characteristic variables of motivation. Also, the examination of the motivational variables and the personality construct of Conscientiousness within designated predictive roles is a valuable contribution, particularly since these predictors were investigated in relation to a multidimensional conceptualization of performance which can potentially lead to an increase in the understanding of differential selection test validities (Borman & Motowidlo, 1997). Indeed, research within the motivation and work performance vein is still within its infancy and only a few unifying frameworks have been empirically examined, such as in training research (e.g., Colquitt et al., 2000). Furthermore, the present study focused on associations at the latent level of analyses and included participants from a work rather than academic setting. Both of these characteristics help to bolster the unique implications and potential utility of the study's findings beyond prior literature. Finally, this study also provided results that help to explicate the criterion space by exploring the various interrelationships among constructs of work performance, as well as the effects of different operationalizations of these constructs. Specific implications and interpretations of the results are discussed in the ensuing sections, followed by a section dealing with the study's limitations and potential areas for future research.

Predictor Domain

Interestingly, GNS demonstrated both construct-related validity and predictive usefulness as a standalone construct. GNS was found to predict task performance, as operationalized with work activity data, and was unrelated to citizenship performance and ratings of task performance. These results are fairly consistent with the rationale underlying Job Characteristics Theory (Hackman & Oldham, 1980) in which job redesign efforts are directly focused on the tasks performed within a targeted work role. These results are also an extension of prior research as GNS was shown to be a predictor of work performance, in and of itself, whereas all previous literature has examined GNS as a moderating influence. Thus, individuals high in GNS were found to be higher performers in relation to task performance outside the scope of a job redesign effort.

Congruent with past research, learning orientation was found to predict work performance. A novel empirical extension from the results is that learning orientation was found to predict both task and citizenship performance. However, contrary to the vast majority of previous research, learning orientation was shown to be an inverse predictor of these performance constructs. In other words, individuals that were low in trait learning orientation were also those that displayed higher levels of task performance and received higher ratings of citizenship performance. At least two explanations for these inverse relationships are feasible. First, the job context in which the study participants work could be a reason for the antonymous role of learning orientation. The Field Agent job context is specifically centered on criminal investigation and is one that is necessarily very evaluative in nature. The environmental cues denoting successful performance are fairly clear and recognizable. For instance, individuals who are closing high numbers of criminal cases, as well as those failing to solve cases, are very visible to both peers and supervisors and the ramifications of such performance have extreme, real-life implications. Perhaps it is this strong externally evaluative context that overrides, or at least mitigates, the opportunity for relying on self-referenced standards of performance, which is a characteristic of individuals high in learning orientation. Individuals low in trait learning orientation tend to engage in less self-referencing and, thus, may thrive in a job context that does not require this performance strategy. One caveat however, is that it was also shown that performance orientation was not significantly predictive of any performance construct which suggests that the evaluative job context may not be the primary cause of the inverse relationship. A second explanation stems from the high pressure to close cases as quickly and efficiently as possible. This time restriction could translate into a substantial decrease in the opportunities for self-development or chances for novel learning. Moreover in an organizational culture valuing such expediency, those individuals that are more learning orientated and enjoy learning for the sake of learning may also be viewed as social loafers, or even as mavericks foraying outside of established organizational policies and procedures. This also could explain trait learning orientation's inverse relationship with both task and citizenship performance.

Evidence was supportive of the predictive nature of Conscientiousness and citizenship performance. This finding is consistent to much past theoretical literature. However, Conscientiousness was not related to task performance or perceptions of task performance, which is contrary to some recent empirical evidence suggesting otherwise (e.g., Hurtz & Donovan, 2000). Based on the present evidence, Conscientiousness did display differential prediction of work performance across performance dimensions. Thus, this evidence lends support to prior arguments purporting that personality is a better predictor of citizenship performance than task performance.

Within the predictor space, some intriguing relationships emerged. Important to note, is that these results must be interpreted with caution because of possible common method variance among GNS, learning orientation, and performance orientation which were all administered within the same survey instrument. This may be evidenced by the positive correlations found among all predictors, except between performance orientation and Conscientiousness. Despite this potential influence, the relative magnitudes of these latent correlations are still interpretable. One interesting finding is that learning orientation and GNS were found to have the highest correlation among the latent predictor variables, but at the same time they predicted task performance in opposite directions. It may be the case that these two constructs, which are highly similar in conceptualization, are two sides of the same motivational coin. GNS measures may reflect more current job- or work-specific attitudes, while learning orientation measures may represent more generic work attitudes. In other words, individuals responding to GNS measures may be using their current work situation as a frame-of-reference, but may employ a more general work concept when responding to the learning orientation scale. This may also help to explain the discrepancy in predictive direction of GNS as compared to learning orientation. Evidence was also found for the two-factor conceptualization of goal orientation, although the correlation between the two latent variables was substantial. Taken collectively, these results are useful as investigative expeditions into individual differences in dispositional performance determinants and have potential utility in personnel selection and training contexts.

Criterion Space

The importance of using a multidimensional notion of work performance was clearly evidenced by the differential predictive relationships found in the study's analyses. Without the multidimensional criterion space, many of the study's findings may not have even been realized. In addition, the results of the present study extend the literature investigating the nature of work performance itself. Both the two-factor and the three-factor criterion space models reasonably fit the observed data, thus suggesting that multiple operationalizations of the latent criterion space were feasible.

A novel finding stems from further examination of the correlations among the latent criterion variables. These estimates were obtained from the study's revised measurement models. By composing the task performance construct with only work activity data, the latent correlation between citizenship performance and task performance was greatly reduced. This reduction became apparent when the correlation between the task performance construct composed of ratings (perception of task performance) and citizenship performance, also composed of ratings, was shown to be .42. Compare this estimate to the correlation between the activity data-derived task performance construct and citizenship performance, which was .27, a substantial decrease of .15. Furthermore, the correlation between the two rating-derived performance constructs was substantially higher than values reported in previous literature (Motowidlo & Van Scotter, 1994; Van Scotter & Motowidlo, 1996; Van Scotter et al., 2000). This increase in correlation as compared to prior findings may be due to a difference in examining observed correlations, as in previous research, as opposed to the underlying correlations among latent constructs that were assessed in the present study. In fact, correlations among performance criteria can be expected to be even higher in situations where ratings are taken from the same source, which was not the case within the present study. Nevertheless, the correlations displayed among the latent criteria do help to display the distinctiveness of task and citizenship performance as found in previous research (e.g., Conway, 1999), and suggest that different operationalizations of these constructs may change the levels of distinction.

Indeed different operationalizations of the performance constructs affected the magnitude of their interrelationships. Moreover, despite the utilization of different sources for performance ratings (i.e., perception of task performance containing ratings from higher-level supervisors and citizenship performance containing ratings from line-supervisors), the correlation between these two rating-derived constructs was still substantial. Interestingly, perception of task performance was actually correlated less with the content-similar construct of task performance (.25) than it was with citizenship performance (.27). This finding may perhaps be best explained by the different rater sources sharing congruent mental models of overall performance, which is similar to previous research showing the reciprocal influence of task and citizenship dimensions on ratings of overall performance (Borman & Motowidlo, 1993; Motowidlo & Van Scotter, 1994). Based on this cumulative evidence, it would be beneficial for researchers and practitioners to utilize different data sources and data types, particularly if the goal is to expand coverage of the criterion space of work performance and provide unique and informative constructs within a multidimensional performance perspective.

Limitations & Future Directions

Several limitations within the present study are of particular note. These conditions can be seen as limitations of both inclusion and exclusion. Inclusive limitations result from the content contained within the scope of the study, whereas exclusive limitations stem from issues not addressed by, but are possibly relevant to, the present study. Through the elucidation of these limitations, avenues for future research can be realized and the results of the present study may be relatively interpreted.

One such inclusive limitation is the cross-sectional nature of the data collected for examination. This type of design only allows for the evaluation of relationships among variables at one point in time. Thus, any inference of causal model parameters, such as those regarding work performance, can be problematic if temporal effects are suspected to be of importance. However, all of the predictors included within this study are conceptualized as traits and thereby should be viewed as fairly stable constructs over time. The stable nature of the trait predictors allows a reasonable assumption that the causal relationships within the model are tenable.

Another inclusive limitation lies within the selected sample. The size of the sample precluded any possible cross-validations of the structural models, thus limiting the generalizability of the findings. Arguably, this limitation may be offset by the advantage of drawing a sample from a field setting, a context in which it can be difficult to conduct performance determinant research. More research is necessary to provide evidence of the generalizability for the findings of the present study. Specifically, it would be intriguing to examine whether learning orientation would be significantly predictive of both citizenship and task performance in other field samples, and whether this relationship would again be inverse. Also, it was shown that Conscientiousness predicted citizenship performance. Because of mixed findings within the associated literature, additional research is still needed to investigate this relationship that could also be moderated by factors such as opportunities for advancement (Hogan et al., 1998).

Finally, a possible limitation surrounds the predictor of growth need strength. Within the present study it was shown that GNS was a valid, standalone predictor of task performance. However, in Job Characteristics Theory from which the construct was derived, GNS was described as a moderating influence. Again, the sample size limited the potential investigation of the moderating role of GNS. More research is needed to explore the validity and utility of using GNS as a standalone predictor of work performance, as well as a possible moderator of this relationship outside the bounds of Job Characteristics Theory.

There are several exclusive limitations of the present study, each of which stems from a lack of indicators for a given individual characteristic or performance construct. In the predictor domain, the present study did not include other Big Five factors of personality (e.g., Openness to Experience) or more specific facets of these factors as in the circumplex model (Hofstee, de Raad, & Goldberg, 1992; Johnson & Ostendorf, 1993). Hough and Oswald (2000) in their recent review of personnel selection research suggest that personality variables other than Conscientiousness may demonstrate predictive validity. Moreover, some preliminary research has shown significant correlations among learning orientation, performance orientation, and Big Five personality variables of Emotional Stability and Openness to Experience (Connolly & Viswesvaran, 2002). Future investigations should examine GNS and trait goal orientation in relation to the full spectrum of personality variables in order to determine their utility and relatedness. Also, research is needed to study the latent relationships of self-efficacy with GNS and particularly goal orientation, of which potential relationships have been recently found (Phillips & Gully, 1997; VandeWalle et al., 2001). Although some preliminary research has shown that learning orientation does not have incremental predictive validity beyond general cognitive ability and Conscientiousness (McKinney & Carlson, 2002), this research was focused at the observable variable level and used a unidimensional concept of performance consisting of task-related measures. The present study found prediction at the latent level of learning orientation and differences in prediction across a multidimensional concept of performance. Future research should incorporate cognitive ability within the predictor domain of their models, which would likely display differential relationships across the dimensions of performance while demonstrating its relationship with other dispositional constructs. Finally, recent literature has argued that goal orientation is best conceptualized as three constructs (performance-avoid, performance-prove, and learning orientations) and that the separate performance orientations lead to different affective, cognitive, and behavioral outcomes (Dobbins, Bell, & Kozlowski, 2002; VandeWalle, 1997; VandeWalle, Brown, Cron, & Slocum, 1999). This conceptualization should be considered in future research as well.

In the criterion space, another fruitful avenue for ensuing research would be to explore the present study's predictors in relation to more specific task performance components such as procedural or declarative performance dimensions. For instance, Fisher and Ford (1998) found differential relationships between learning and performance orientation and training outcomes such as knowledge and application tests. It would be interesting to see if these relationships held within the context of work performance as well. Finally, the present study utilized an idiosyncratic scale for assessing citizenship performance. Arguably, the items used to represent this construct do indeed fall within behaviors typically defined as indicative of citizenship performance, and they also produced an adequate fitting model, however future research should incorporate established measures of citizenship performance that are meant to tap into a more extensive conceptualization of the citizenship performance domain. For instance, assessment items from the Coleman and Borman (2000) three-factor model of citizenship would prove to be beneficial for exposing the complex predictive nature of individual trait characteristics and the different facets of citizenship performance.

Conclusion

The present study adds to the burgeoning literature investigating potential for motivating constructs that may serve as work performance determinants. The explication of dispositional predictors of work performance has both theoretical and practical significance. By exploring the nature of the relationships among various individual trait characteristics, the theoretical predictor domain can be conceptually and empirically mapped. Through the implication that dispositional traits do indeed predict work performance, the ensuing vein of research could also provide tools for practitioners designing personnel selection systems, performance management systems, and training programs. The importance of utilizing a multidimensional approach in regard to work performance, as well as employing various operationalizations of performance constructs, is yet another salient ramification of the present study. In particular, the multidimensionality of the criterion space more adequately allows for a deeper investigation of the criterion-related validity of various trait predictors. Finally, more research is clearly needed to further examine the generalizability of individual traits in predicting work performance, as well as the convergent and discriminant validity of these constructs.

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Table 1.

Growth Need Strength Scale

1. High respect and fair treatment from my supervisor.
2. Stimulating and challenging work. *
3. Chances to exercise independent thought and action in my job.
4. Great job security.
5. Very friendly co-workers.
6. Opportunities to learn new things from my work.
7. High salary and good fringe benefits.
8. Opportunities to be creative and imaginative in my work. *
9. Quick promotions.
10. Opportunities for personal growth and development in my job. *
11. A sense of worthwhile accomplishment in my work. *

Note. All items rated on a 5-pt Likert scale: "How much would you like to have each item in your job?" 1 = would like having this only a moderate amount (or less); 3 = would like having this very much; 5 = would like having this extremely much. Items 2, 3, 6, 8, 10, and 11 measure GNS. Items retained in final structural models are marked by '*'.

Table 2.

Goal Orientation Scale

Performance orientation

1. I prefer to do things that I can do well rather than things that I do poorly.

2. I'm happiest at work when I perform tasks on which I know that I won't make any errors. *

3. The things I enjoy the most are the things I do the best. *

4. The opinions others have about how well I can do certain things are important to me. *

5. I feel smart when I do something without making any mistakes.

6. I like to be fairly confident that I can successfully perform a task before I attempt it. *

7. I like to work on tasks that I have done well on in the past. *

8. I feel smart when I can do something better than most other people. *

Learning Orientation

1. The opportunity to do challenging work is important to me. *

2. When I fail to complete a difficult task, I plan to try harder the next time I work on it. *

3. I prefer to work on tasks that force me to learn new things.

4. The opportunity to learn new things is important to me. *

5. I do my best when I'm working on a fairly difficult task. *

6. I try hard to improve on my past performance. *

7. The opportunity to extend the range of my abilities is important to me.

8. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work. *

Note. All items rated on a 5-pt Likert scale: 1 = Strongly Disagree, to 5 = Strongly Agree. Items retained in final structural models are marked by '*'.

Table 3.

Citizenship Performance Scale

Citizenship Dimension	
1.	Willingly help other Agents *
2.	Apply extra effort *
3.	Display initiative
4.	Endorse, support & defend organizational objectives *

Note. All items were rated on a 7-pt Likert scale: 1 = Poor to 7 = Exceptional. Items retained in final structural models are marked by '*'.

Table 4.

Task Performance Measures

1. Number of cases opened within the previous year
2. Number of cases closed within the previous year
3. Number of cases opened in previous month (April 2001)
4. Number of cases closed in previous month (April 2001)
5. Number of hours logged under investigative activities and law enforcement

Table 5.

Perception of Task Performance Scale

Performance Dimensions
Other Investigative Activities
Interviewing and Interrogation *
Identification and Collection of Evidence *
Knowledge and Application of Policies, Procedures and Laws *
Officer Safety *
Forms and Reports
Administrative Activities *
Intelligence Gathering and Analysis *
Special Duties and Assignments *
Arrest Procedures
Courtroom Preparation and Testimony *
Specialized Instruction *
Managing Case Reports

Note. All dimensions were rated on a 7-pt Likert scale: 1 = Poor to 7 = Exceptional by each Field Agent's corresponding Special Agent-in-Charge. Items retained in final structural models are marked by '*'.

Table 6.

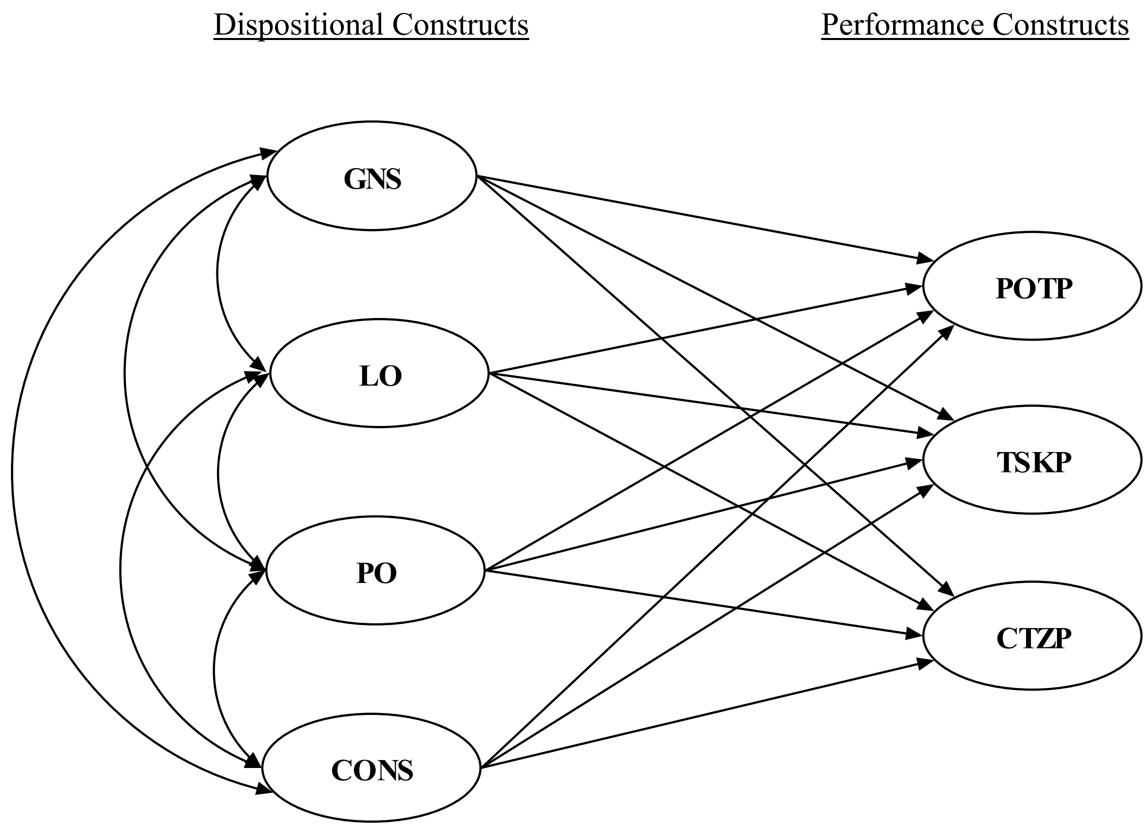
Fit Indices for Measurement and Structural Models

Model	X^2	ΔX^2	NNFI	CFI	SRMSR	RMSEA
Measurement Models						
Model 1						
Initial Model	516.76**		.94	.95	.07	.05 (.03-.06)
Revised Model	427.13**	89.62**	.96	.96	.06	.04 (.03-.05)
Model 2						
Initial Model	1089.61**		.88	.89	.08	.06 (.05-.07)
Revised Model	841.02**	248.59**	.93	.94	.06	.05 (.04-.06)
Structural Models						
Model 1	435.80**		.95	.96	.07	.04 (.03-.05)
Model 2	877.04**		.92	.93	.09	.05 (.04-.05)

Note. Model 1 represents the 2-factor criterion space model; Model 2 represents the 3-factor criterion space model; NNFI = non-normed fit index; CFI = comparative fit index; SRMSR = standardized root mean square residual; RMSEA = root mean square error of approximation estimate 90% confidence interval shown in parentheses.
**$p < .01$

Figure 1.

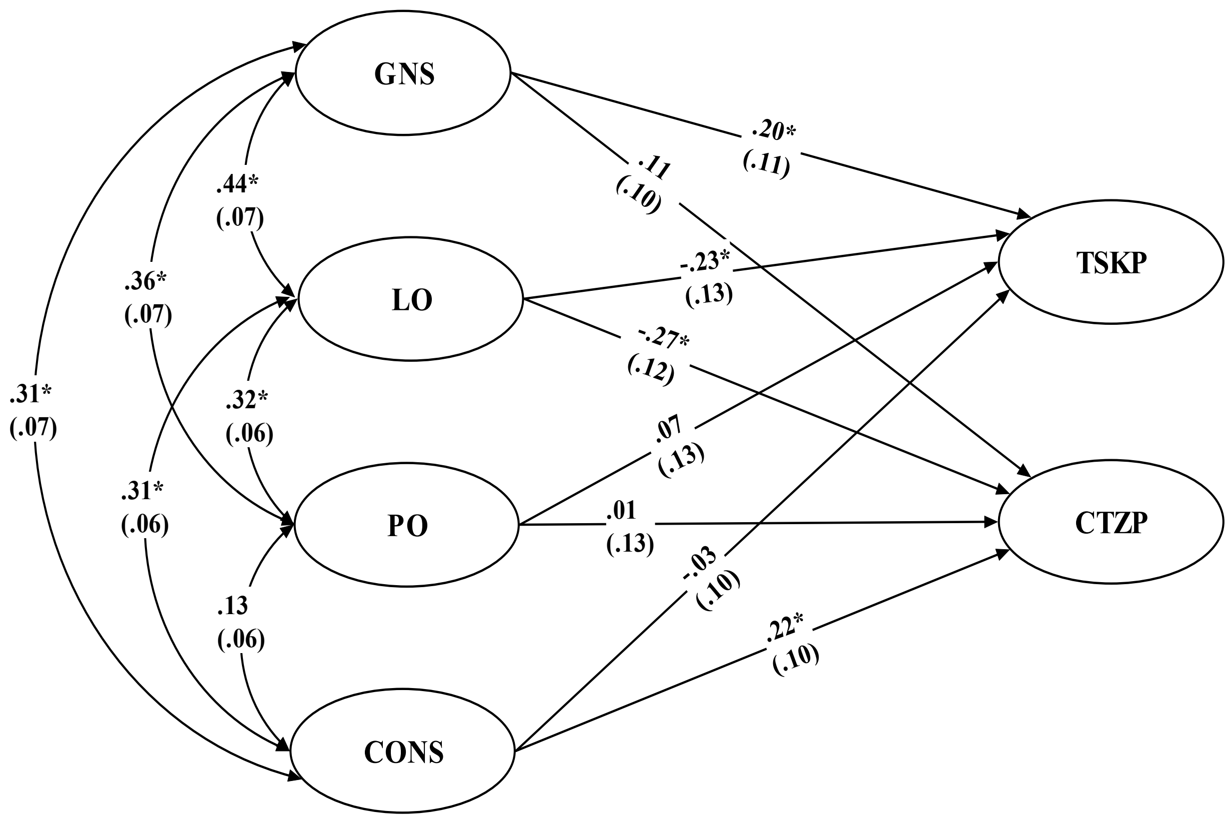
Theoretical Path Model



Note. GNS = Growth Need Strength; LO = Learning Orientation; PO = Performance Orientation; CON = Conscientiousness; TSKP = Task Performance; CTZP = Citizenship Performance; POTP = Perception of Task Performance.

Figure 2.

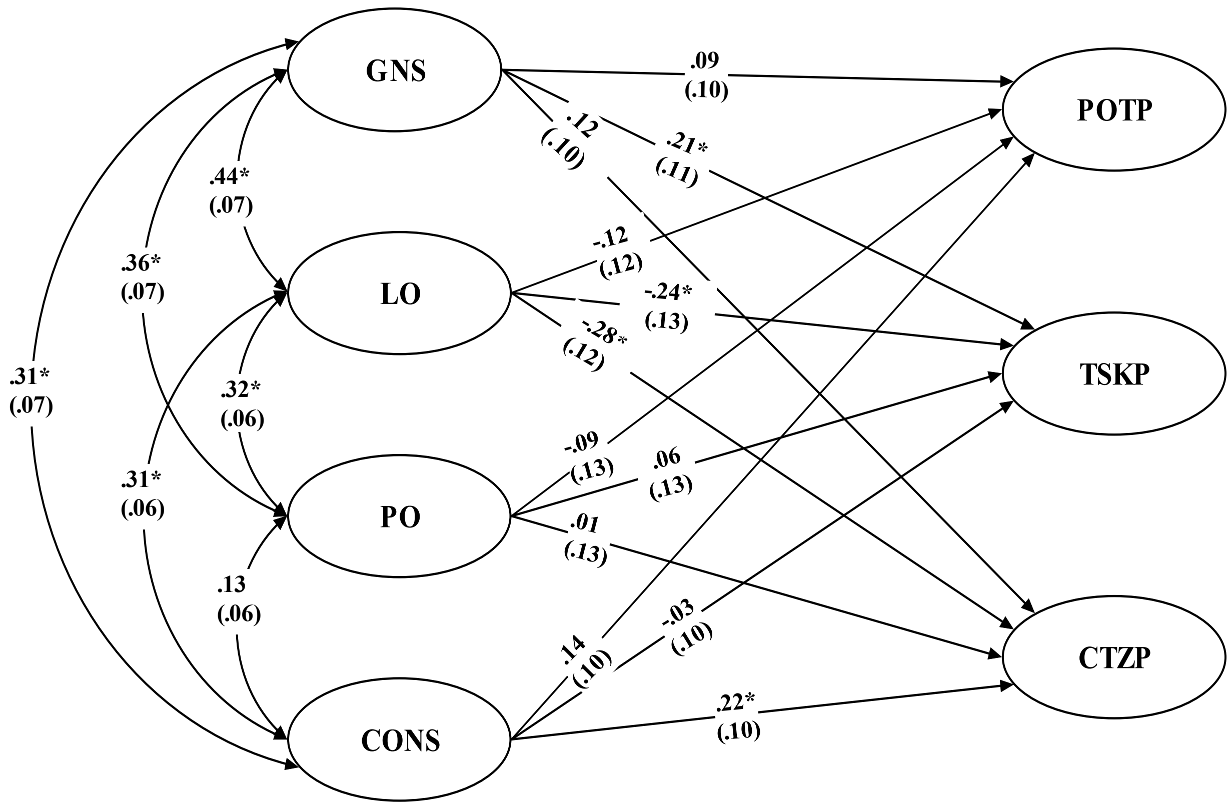
SEM Model of Two-factor Criterion Space



Note. GNS = Growth Need Strength; LO = Learning Orientation; PO = Performance Orientation; CON = Conscientiousness; TSKP = Task Performance; CTZP = Citizenship Performance. All estimates are standardized and standard errors are in parentheses.
* p < .05

Figure 3.

SEM Model of Three-factor Criterion Space



Note. GNS = Growth Need Strength; LO = Learning Orientation; PO = Performance Orientation; CON = Conscientiousness; TSKP = Task Performance; CTZP = Citizenship Performance; POTP = Perception of Task Performance. All estimates are standardized and standard errors are in parentheses.
* p < .05

Appendices

Work Attitudes Survey

This booklet contains twenty-seven statements individuals sometimes make about their jobs. These statements are about the attitudes, feelings, and experiences people may have about the work they do.

There are no true “right” or “wrong” answers. The statements represent opinions that you may or may not feel strongly about. When considering each statement, use the appropriate rating scale that is shown at the top of each page. There are two different ratings scales, so be sure to use the scale shown above the statements you are reading. You may choose not to answer a given question, but this survey will be most effective if you could provide responses to all of the statements.

Your effort and honesty are greatly appreciated. Your answers are very important and will provide a significant contribution to the study of people’s attitudes toward their work.

Please review the 11 statements below. For each statement, ask yourself the question shown below and choose your answer using the rating scale.

"How much would you like to have this item in your job?"

1	2	3	4	5
only a <u>moderate</u> (or less) amount		<u>very</u> much		<u>extremely</u> much

---

1. High respect and fair treatment from my supervisor.
2. Stimulating and challenging work.
3. Chance to exercise independent thought and action in my job.
4. Great job security.
5. Very friendly co-workers.
6. Opportunities to learn new things from my work.
7. High salary and good fringe benefits.
8. Opportunities to be creative and imaginative in my work.
9. Quick promotions.
10. Opportunities for personal growth and development in my job.
11. A sense of worthwhile accomplishment in my work.

Please review the 16 statements below. For each statement, use the rating scale to indicate the extent to which you agree or disagree with the statement.

1	**2**	**3**	**4**	**5**
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

12. I prefer to do things that I can do well rather than things that I do poorly.
13. I am happiest at work when I perform tasks on which I know that I won't make any errors.
14. The things I enjoy the most are the things I do best.
15. The opinions others have about how well I do certain things are important to me.
16. I feel smart when I do something without making any mistakes.
17. I like to be fairly confident that I can successfully perform a task before I attempt it.
18. I like to work on tasks that I have done well on in the past.
19. I feel smart when I can do something better than most other people.
20. The opportunity to do challenging work is important to me.
21. When I fail to complete a difficult task, I plan to try harder the next time I work on it.
22. I prefer to work on tasks that force me to learn new things.
23. The opportunity to learn new things is important to me.
24. I do my best when I am working on a fairly difficult task.
25. I try hard to improve on my past performance.
26. The opportunity to extend the range of my abilities is important to me.
27. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.

North Carolina State University
INFORMED CONSENT FORM

The Roles of Goal Orientation, Growth Need Strength, and Conscientiousness in Work Performance

Erich C. Dierdorff, M.S. Mark A. Wilson, Ph.D.

You are invited to participate in a research study. The purpose of this study is to investigate whether workers have certain types of attitudes that affect their motivation to perform in their jobs.

INFORMATION

1. You are asked to answer the 27 attached questions to the best of your ability. Each question asks you about different types of preferences you may have regarding your job.

2. Completion of all 27 items should not take more than 30 minutes of your time.

RISKS
There are no foreseeable risks involved in your participation. All of your responses are for research purposes only and are completely confidential.

BENEFITS
This research is important in that it will help develop ways in which certain individuals can be matched to certain jobs. This will hopefully lead to more satisfied, and higher performing workers.

CONFIDENTIALITY
The information in the study records will be kept strictly confidential. Data will be stored securely and will be made available only to persons conducting the study unless you specifically give permission in writing to do otherwise. No reference will be made in oral or written reports which could link you to the study. The results are for research purposes only.

CONTACT
If you have questions at any time about the study or the procedures, you may contact the researcher, **Erich Dierdorff**, at **Dept. of Psychology, Campus Box 7801, NC State University**, or **919.960.3547**. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Matthew Zingraff, Chair of the NCSU IRB for the Use of Human Subjects in Research Committee, Box 7514, NCSU Campus (919/513-1834) or Mr. Matthew Ronning, Assistant Vice Chancellor, Research Administration, Box 7514, NCSU Campus (919/513-2148)

PARTICIPATION
Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

CONSENT

I have read and understand the above information. I agree to participate in this study.

Subject's signature_______________________________________ **Date** _________________

Investigator's signature__________________________________ **Date** _________________

Performance Ratings

Thank you for taking the time to complete the Performance Rating form for each of the Agents that you supervise.

The ratings that you are providing are for research purposes only and are completely confidential. Please rate as honestly and accurately as possible. These ratings will be used to validate selection devices that may be used to select SBI Agents in the future. The ratings that you provide today may impact the Agents that you work with in the future.

It is for this reason that we ask you to be as objective and accurate as possible.

Instructions

Fill in the name and social security number of the agent you are rating as well as your name and title.

Review the Rating Zone definitions provided on the bottom of this Instruction sheet.

After familiarizing yourself with the definitions, please read the tasks associated with each of the performance dimensions included in the Performance Rating Form *prior* to assigning your rating.

Circle the number that best describes the Agent's performance in that performance dimension.

After rating each performance dimension, please rate each of the Citizenship behaviors.

Finally, assign the rating that you feel best represents the Agent's Overall Performance.

Place completed forms in a SEALED envelope. Deliver this sealed envelope to the NC State Test Administrator who will be in your District the week of April 30th.

Rating Zone Definitions

- The **POOR** Zone, a Rating of '1', identifies Agents who *make Critical Errors that Require Immediate Corrective Action.*

- The **PASSABLE** Zone, Ratings of '2' or '3', can be viewed as the zone where 'People Make Mistakes.' Forms or Reports have to be returned. The Agent may *make Mistakes that need to be Corrected but have a Minor Impact/Aren't Critical Errors.*
    - '2' indicates performance well below expectations
    - '3' indicates performance below expectations

- The **GOOD** Zone, Ratings of '4, '5', or '6', identifies Agents that *Perform Their Expected Job Duties.*
    - '4' indicates performance that meets expectations (i.e., does the job)
    - '5' indicates performance above expectations (i.e., does the job well)
    - '6' indicates performance well above expectations (i.e., does the job extremely well)

- The **EXCELLENT** Zone, a Rating of '7', indicates that an Agent has *No Room for Improvement*. This Agent symbolizes the Level of Performance Every Agent should strive for.

Performance Rating Form

Agent's Name: ______________________________ Agent's SSN: ________________________

Rater's Name: ______________________________ Rater's Title: ________________________

Performance Area	Rating						
	Poor	Passable		Good			Exceptional
Officer Safety ▪ Conduct proper search of suspect for weapons ▪ Clearly display proper ID during raid	1	2	3	4	5	6	7
Forms and Reports ▪ Complete SBI 691B, SBI 33 etc.	1	2	3	4	5	6	7
Intelligence Gathering and Analysis ▪ Maintain surveillance log ▪ Acquire pertinent info about suspect ▪ Follow suspect by car, boat, plane etc.	1	2	3	4	5	6	7
Administrative Activities ▪ Attend various trainings, district meetings ▪ Send completed forms to district office	1	2	3	4	5	6	7
Community Relations ▪ Attend job fairs to recruit potential Agents ▪ Present crime scenarios to schools	1	2	3	4	5	6	7
Special Duties and Assignments ▪ Participate in special investigations	1	2	3	4	5	6	7
Arrest Procedures ▪ Assess risk of arrest to determine method of arrest ▪ Read Miranda warning prior to interview	1	2	3	4	5	6	7
Court Preparation and Testimony ▪ Remain calm and composed when cross-examined ▪ Testify in court ▪ Read reports/interview notes to prepare to testify	1	2	3	4	5	6	7
Specialized Instructions ▪ Pass annual firearms qualification ▪ Conduct field training for new Agents	1	2	3	4	5	6	7

Performance Area	Rating						
	Poor	Passable		Good			Exceptiona l
Equipment Use	1	2	3	4	5	6	7
▪ Use and operate professional equipment							
Citizenship							
▪ Willingly help other Agents	1	2	3	4	5	6	7
▪ Apply extra effort	1	2	3	4	5	6	7
▪ Display initiative	1	2	3	4	5	6	7
▪ Endorse, support & defend organizational objectives	1	2	3	4	5	6	7
OVERALL PERFORMANCE	1	2	3	4	5	6	7

Rating Zone Definitions

- The **POOR** Zone, a Rating of '1', identifies Agents who *make Critical Errors that Require Immediate Corrective Action.*

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- The **GOOD** Zone, Ratings of '4, '5', or '6', identifies Agents that *Perform Their Expected Job Duties.*
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- The **EXCELLENT** Zone, a Rating of '7', indicates that an Agent has *No Room for Improvement*. This Agent symbolizes the Level of Performance Every Agent should strive for.

Table of Correlations for All Tested Variables

	C1	C2	C3	C4	C5	C6	ITM2
MEAN	23.981	19.304	24.285	20.880	23.120	19.418	4.171
STD	3.262	3.458	4.011	3.735	3.383	3.501	0.883
N	158	158	158	158	158	158	158
C1	1						
C2	0.32516*	1					
C3	0.65117*	0.30229*	1				
C4	0.63485*	0.3771*	0.63525*	1			
C5	0.64718*	0.40794*	0.69825*	0.7053*	1		
C6	0.44292*	0.32195*	0.5067*	0.48164*	0.53352*	1	
ITM2	0.22006*	-0.00459	0.20378*	0.22257*	0.07411	0.02415	1
ITM3	0.2527*	0.04454	0.26206*	0.26894*	0.16653*	0.08623	0.81326*
ITM6	0.26094*	-0.01808	0.29339*	0.25676*	0.1042	0.04282	0.78916*
ITM8	0.18767*	0.07321	0.25639*	0.21347*	0.06693	0.09221	0.66494*
ITM10	0.23378*	0.05258	0.33352*	0.26721*	0.14005	0.13483	0.6979*
ITM11	0.29088	0.17931*	0.36661*	0.30159*	0.17195*	0.13911	0.70158*
ITM12	0.09172	0.15167	0.11966	0.06885	0.00018	0.04979	0.37395*
ITM13	0.02011	0.32345*	0.14213	0.04398	0.00428	0.06716	0.14976
ITM14	0.09238	0.16015*	0.18841*	0.12544	0.01295	0.00426	0.22777*
ITM15	0.10783	0.13529	0.17466*	0.09795	0.11302	0.1549	0.18913*
ITM16	0.13871	0.15315	0.13918	0.08715	0.09498	0.16578*	0.03582
ITM17	0.02382	0.17097*	0.06123	0.06812	0.03675	0.16723*	0.14167
ITM18	0.01944	0.1715*	0.08133	0.01989	0.014	0.03092	0.06224
ITM19	0.08603	0.13773	0.07547	0.08313	0.06449	0.09321	-0.00176
ITM20	0.12625	-0.13337	0.26452*	0.2777*	0.1664*	0.04546	0.33884*
ITM21	0.06794	0.03041	0.25981*	0.24813*	0.1805*	0.18691*	0.23176*
ITM22	0.03385	-0.07381	0.07417	0.1354	0.01667	0.08797	0.21055*
ITM23	0.06466	-0.05113	0.16692*	0.11454	0.04544	0.14165	0.32571*
ITM24	0.08404	-0.02109	0.14751	0.23627*	0.10788	0.03698	0.26835*
ITM25	0.17542*	0.05602	0.34202	0.36617*	0.25344*	0.29802*	0.3194*
ITM26	0.17504*	-0.08737	0.30397*	0.34848*	0.21859*	0.23995*	0.27081*
ITM27	0.03341	-0.08607	0.02766	0.12027	-0.0534	0.07934	0.03562
OPN_MM	-0.06323	0.03775	0.00456	-0.09885	-0.06018	-0.05308	0.11624
CLS_MM	-0.00863	-0.03343	0.05825	-0.04442	-0.02913	-0.10931	0.10082
OPN_YR	-0.025	-0.05874	0.06236	-0.043	-0.07955	-0.07918	0.07666
CLS_YR	-0.00314	-0.01771	0.0228	-0.05279	-0.06688	-0.07503	0.04795
INV_ENF_HRS	0.09836	-0.07421	0.04271	0.05322	0.03937	0.11917	-0.02454
SAC_CZP1	0.08371	-0.00227	0.06434	0.0995	0.088	0.05603	0.06125
SAC_CZP2	0.10206	0.06799	0.08209	0.18198*	0.18473*	0.02392	0.00342
SAC_CZP3	0.03378	0.03373	0.06089	0.1361	0.12584	0.06652	-0.0522
SAC_CZP4	0.10708	0.02239	0.10172	0.12949	0.19277*	0.08655	-0.05494
CS_CZP1	0.09397	0.19802*	0.08825	0.14306	0.13068	0.06268	0.03395
CS_CZP2	0.06912	0.10549	0.07174	0.14839	0.14465	0.04318	0.04254
CS_CZP3	-0.02566	0.08134	-0.0131	0.08125	0.09227	-0.02897	-0.01283
CS_CZP4	0.12429	0.1603*	0.13429	0.16944*	0.19424*	0.15014	-0.00344
SAC_OIA	0.02837	0.00298	0.04958	0.09469	0.1433	0.02347	-0.0229

SAC_II	0.05534	0.06219	0.02887	0.11508	0.14222	0.08655	-0.02006
SAC_ICE	0.06069	0.03774	0.07328	0.05432	0.17306*	0.09496	-0.04462
SAC_KKA	0.06077	0.00765	0.05602	0.05488	0.10125	0.03018	-0.00914
SAC_OS	0.02566	0.02725	0.01554	0.06765	0.08023	0.07499	0.05459
SAC_FR	0.0643	0.11104	0.03004	0.10694	0.11897	0.19516*	-0.07596
SAC_IGA	-0.008	0.05155	0.02215	0.09825	0.12023	0.03133	-0.02088
SAC_AA	0.05202	0.05785	-0.02062	0.0743	0.12815	0.01926	-0.09722
SAC_SDA	0.07444	-0.00657	0.08956	0.10015	0.11465	0.10722	0.01601
SAC_AP	0.09405	0.08023	0.06854	0.13376	0.13723	0.05888	0.01738
SAC_CPT	0.09117	0.06247	0.01895	0.08714	0.09676	0.04801	0.0073
SAC_SI	0.08949	0.04852	0.05397	0.11599	0.15374	0.11472	0.03243
SAC_MCR	0.04012	0.14748	0.05106	0.16161*	0.20098*	0.08802	-0.1168

	ITM3	**ITM6**	**ITM8**
MEAN	4.203	4.070	3.962
STD	0.963	0.952	0.977
N	158	158	158
ITM3	1		
ITM6	0.72826*	1	
ITM8	0.76688*	0.71541*	1
ITM10	0.71682*	0.77479*	0.76922*
ITM11	0.71171*	0.73399*	0.74836*
ITM12	0.35506*	0.33556*	0.29278*
ITM13	0.2148*	0.10378	0.21395*
ITM14	0.25639*	0.29051*	0.24133*
ITM15	0.26215*	0.27064*	0.21543*
ITM16	0.14019	0.14199	0.14252
ITM17	0.17284*	0.18445*	0.1515
ITM18	0.11278	0.12395	0.08537
ITM19	0.10036	0.0767	0.07914
ITM20	0.28369*	0.41102*	0.23039*
ITM21	0.15414	0.2492*	0.2243*
ITM22	0.12638	0.3202*	0.26384*
ITM23	0.25417*	0.43948*	0.36582*
ITM24	0.22976*	0.39786*	0.28843*
ITM25	0.27884*	0.39673*	0.30545*
ITM26	0.25446*	0.40618*	0.26258*
ITM27	0.06574	0.17346*	0.11742
OPN_MM	0.08837	0.06005	0.0348
CLS_MM	0.12883	0.03888	0.05358
OPN_YR	0.09609	0.03967	0.09755
CLS_YR	0.08321	0.01138	0.06168
INV_ENF_HRS	0.01327	-0.01332	-0.04112
SAC_CZP1	0.02697	0.08476	0.10233
SAC_CZP2	0.01761	0.06158	0.05563
SAC_CZP3	-0.02571	-0.00189	0.05339
SAC_CZP4	-0.02634	0.03121	0.05718

CS_CZP1	0.03083	-0.01174	0.06502
CS_CZP2	0.0763	0.0406	0.023
CS_CZP3	0.0399	-0.03966	-0.00891
CS_CZP4	0.0424	-0.04424	0.00615
SAC_OIA	-0.07709	0.02447	-0.02671
SAC_II	-0.02455	0.04509	0.05659
SAC_ICE	-0.0892	0.00009	-0.06892
SAC_KKA	-0.02792	0.04773	0.07779
SAC_OS	0.03324	0.09051	0.11617
SAC_FR	-0.08003	-0.00927	0.02573
SAC_IGA	-0.03487	0.03152	0.05461
SAC_AA	-0.10989	-0.03121	-0.0496
SAC_SDA	-0.05244	0.02745	0.00884
SAC_AP	-0.01958	0.06003	0.06852
SAC_CPT	-0.05159	0.04315	0.0275
SAC_SI	0.00009	0.01967	0.04584
SAC_MCR	-0.10191	-0.05035	-0.0464

	ITM11	**ITM12**	**ITM13**	**ITM14**	**ITM15**	**ITM16**	**ITM17**	**ITM18**
MEAN	4.329	4.101	3.481	3.804	3.791	3.620	3.487	3.766
STD	0.906	0.815	0.820	0.833	0.749	0.857	0.858	0.733
N	158	158	158	158	158	158	158	158
ITM11	1							
ITM12	0.41155*	1						
ITM13	0.1543	0.39371*	1					
ITM14	0.27179*	0.43273*	0.4844*	1				
ITM15	0.2896*	0.37896*	0.28918*	0.38306*	1			
ITM16	0.17846*	0.2469*	0.37979*	0.38589*	0.47113*	1		
ITM17	0.23491*	0.32064*	0.35309*	0.41113*	0.30815*	0.37488*	1	
ITM18	0.1168	0.29573*	0.40082*	0.50855*	0.38598*	0.44585*	0.56779*	1
ITM19	0.08801	0.12774	0.31975*	0.3081*	0.38358*	0.60672*	0.3267*	0.33368*
ITM20	0.29459*	0.23423*	0.05095	0.2566*	0.23527*	0.09796	0.21017*	0.15304*
ITM21	0.21017*	0.19575*	0.12715	0.28007*	0.17608*	0.16439*	0.19305*	0.18016*
ITM22	0.20678*	0.00114	-0.02833	0.05315	0.13275	0.12501	0.18792*	0.0222
ITM23	0.28286*	0.15666*	0.04059	0.19501*	0.17934*	0.18571*	0.19957*	0.13606
ITM24	0.27979*	0.07141	-0.00824	0.04392	0.05978	0.07585	0.04842	0.0185
ITM25	0.31715*	0.24149*	0.10553	0.22632*	0.27282*	0.20207*	0.2195*	0.15111
ITM26	0.26058*	0.12374	0.10376	0.19483*	0.16734*	0.15719*	0.22141*	0.11453
ITM27	0.0394	-0.02454	-0.01197	0.08298	0.05595	0.18105*	0.08272	0.05344
OPN_MM	0.1299	0.12783	0.08526	-0.03723	0.1711*	0.01268	0.13766	0.11228
CLS_MM	0.00274	0.05677	0.07554	0.07233	0.06172	-0.01656	-0.01633	0.00536
OPN_YR	0.1458	0.07904	0.06458	-0.00998	0.11113	0.01817	0.06235	0.0198
CLS_YR	0.10248	0.09347	0.08546	-0.0139	0.10162	0.0454	0.0622	-0.0077
INV_ENF_HRS	-0.00966	-0.04182	-0.05082	-0.09014	0.03359	0.002	0.00206	-0.13333
SAC_CZP1	0.09523	0.08213	0.11807	-0.01373	-0.00602	-0.01797	0.07102	0.02256
SAC_CZP2	0.05452	0.0104	0.05803	-0.03939	0.0374	-0.03202	0.0098	-0.01036
SAC_CZP3	0.04126	0.05242	0.05305	-0.0585	0.03044	0.03978	0.0462	-0.01909

SAC_CZP4	0.02598	-0.00407	-0.01542	-0.12434	-0.01898	-0.07654	-0.01953	-0.01401
CS_CZP1	0.10244	0.03613	0.12436	0.05696	0.1072	-0.0095	-0.01622	-0.07998
CS_CZP2	0.10044	-0.00133	-0.01705	-0.04325	0.09426	0.00328	-0.02556	-0.08041
CS_CZP3	0.06027	-0.03248	-0.03172	-0.08384	0.04844	0.00505	-0.01086	-0.07435
CS_CZP4	0.07395	-0.01746	0.01993	-0.07688	0.10457	-0.02946	-0.00181	-0.03554
SAC_OIA	0.01171	0.01729	-0.03154	-0.09907	0.02634	-0.02062	0.01847	-0.01719
SAC_II	0.05545	0.05334	-0.04965	-0.10117	0.07136	-0.02327	-0.03669	-0.04844
SAC_ICE	0.02821	-0.00601	-0.05373	-0.1422	0.04581	-0.00276	-0.00735	0.00131
SAC_KKA	0.1084	-0.0001	-0.06363	-0.14059	0.02307	-0.07173	-0.06519	-0.03788
SAC_OS	0.09993	0.07634	-0.04834	-0.02565	0.06655	0.00194	0.00216	0.04153
SAC_FR	0.045	0.10592	0.02335	-0.07562	0.05287	0.02477	0.03531	0.00216
SAC_IGA	0.00482	0.02686	-0.01467	-0.11534	-0.01688	-0.08357	-0.09136	-0.06791
SAC_AA	0.03766	0.07386	0.04932	-0.10129	0.05855	-0.05234	0.0063	0.01284
SAC_SDA	0.01731	0.00967	-0.0392	-0.12672	0.00151	-0.09252	-0.09579	0.01242
SAC_AP	0.03467	-0.00715	-0.01622	-0.06849	0.03045	-0.06686	-0.12077	-0.02578
SAC_CPT	0.05773	0.02959	-0.03539	-0.06985	0.04468	-0.04466	-0.10628	-0.04273
SAC_SI	0.04097	-0.01204	-0.05291	-0.1222	0.04788	-0.10667	-0.11548	-0.03293
SAC_MCR	0.03587	0.04529	-0.02391	-0.09926	0.05256	0.00862	-0.00449	0.02646

	ITM19	ITM20	ITM21
MEAN	3.563	4.278	4.253
STD	0.855	0.585	0.597
N	158	158	158
ITM19	1		
ITM20	0.20637*	1	
ITM21	0.08074	0.52666*	1
ITM22	0.07072	0.42967*	0.56006*
ITM23	0.13268	0.55895*	0.50822*
ITM24	0.14692	0.48931*	0.4595*
ITM25	0.05991	0.54605*	0.65881*
ITM26	0.0895	0.55726*	0.49522*
ITM27	0.20128*	0.42243*	0.35776*
OPN_MM	0.10321	0.00915	0.03547
CLS_MM	-0.03512	0.1064	0.09813
OPN_YR	0.06077	-0.05065	-0.02938
CLS_YR	0.07341	-0.08748	-0.08404
INV_ENF_HRS	-0.09776	-0.13024	-0.04856
SAC_CZP1	0.13203	0.05949	0.04536
SAC_CZP2	0.08706	0.03238	0.01112
SAC_CZP3	0.12111	-0.00238	0.03324
SAC_CZP4	0.01034	0.00041	0.02794
CS_CZP1	0.12919	-0.12637	-0.04318
CS_CZP2	0.11046	-0.0805	-0.15244
CS_CZP3	0.10506	-0.14297	-0.17951*
CS_CZP4	0.10255	-0.06008	-0.09094
SAC_OIA	0.07204	0.03891	0.05908
SAC_II	0.04699	0.01534	0.01864
SAC_ICE	0.01259	0.03606	0.04901

SAC_KKA	0.02238	-0.02037	0.00524
SAC_OS	0.07026	0.06203	0.05413
SAC_FR	0.04582	-0.01536	0.02036
SAC_IGA	-0.03539	0.07289	0.08
SAC_AA	0.02889	-0.02629	-0.04019
SAC_SDA	0.02319	-0.00258	0.04414
SAC_AP	0.042	-0.0028	0.02381
SAC_CPT	-0.00145	0.00184	0.04641
SAC_SI	0.01012	-0.07425	0.04702
SAC_MCR	0.07276	-0.01276	0.02606

	ITM22	**ITM23**	**ITM24**	**ITM25**	**ITM26**	**ITM27**	**OPN_MM**
MEAN	3.994	4.196	3.930	4.259	4.291	4.184	1.595
STD	0.691	0.591	0.669	0.610	0.590	0.617	2.168
N	158	158	158	158	158	158	158
ITM22	1						
ITM23	0.71984*	1					
ITM24	0.50886*	0.46949*	1				
ITM25	0.5632*	0.52913*	0.51317*	1			
ITM26	0.52022*	0.5291*	0.56842*	0.67425*	1		
ITM27	0.43624*	0.47705*	0.38645*	0.36388*	0.57031*	1	
OPN_MM	-0.07398	-0.06677	-0.05031	0.0752	-0.13632	-0.09174	1
CLS_MM	-0.06392	0.07701	-0.01044	0.10751	0.01537	0.05812	0.39*
OPN_YR	-0.18031*	-0.1463	-0.122	-0.01663	-0.17071*	-0.16482*	0.70316*
CLS_YR	-0.25373*	-0.18643*	-0.17458*	-0.05645	-0.21209*	-0.20792*	0.65494*
INV_ENF_HRS	-0.09943	-0.12389	-0.02627	0.06459	-0.01047	-0.02983	0.13597
SAC_CZP1	0.05187	0.00716	0.0408	0.10364	0.13271	-0.0286	0.09556
SAC_CZP2	0.05665	-0.02331	0.02557	0.07086	0.07713	-0.02762	0.08644
SAC_CZP3	0.07274	-0.02552	-0.02333	0.07378	0.03375	-0.08726	0.13254
SAC_CZP4	0.05109	-0.03593	-0.00709	0.08202	0.13462	-0.06163	0.04066
CS_CZP1	-0.01853	-0.11976	-0.07945	-0.09797	-0.17118*	-0.18488*	0.19376*
CS_CZP2	-0.01039	-0.07548	-0.02762	-0.06296	-0.07261	-0.16929*	0.17872*
CS_CZP3	-0.07285	-0.15029	-0.10896	-0.11673	-0.16682*	-0.21389*	0.21079*
CS_CZP4	-0.08982	-0.11706	-0.07254	-0.03088	-0.10217	-0.20127*	0.25245*
SAC_OIA	0.0323	-0.04445	-0.03483	-0.0103	0.03888	-0.16749*	0.02713
SAC_II	-0.04159	-0.06657	-0.03497	0.04404	-0.01969	-0.10434	0.12684
SAC_ICE	0.02546	-0.05698	-0.03115	-0.0603	0.03473	-0.10975	-0.05475
SAC_KKA	-0.07185	-0.07295	-0.11784	-0.08865	-0.07825	-0.15525	0.17569*
SAC_OS	0.00692	0.03613	-0.02509	0.08305	0.0976	0.01266	0.07002
SAC_FR	-0.00662	-0.09355	-0.09492	-0.01569	0.02257	-0.11525	0.01347
SAC_IGA	0.01456	0.04351	-0.04486	0.02716	0.0382	-0.06253	-0.06312
SAC_AA	-0.05221	-0.16339*	-0.11023	-0.02255	-0.05716	-0.18992*	0.14529
SAC_SDA	-0.10017	-0.01198	-0.01925	-0.01713	0.00754	-0.08563	0.15352
SAC_AP	-0.04631	0.02348	-0.03165	-0.01859	0.02038	-0.0813	0.0771
SAC_CPT	-0.05177	-0.1224	-0.04189	-0.0244	0.05675	-0.10643	0.03377
SAC_SI	-0.08116	-0.0947	-0.03783	-0.00218	0.03853	-0.12352	0.09999
SAC_MCR	-0.01389	-0.10943	-0.10281	0.03118	-0.05299	-0.13612	0.082

	CLS_MM	OPN_YR	CLS_YR	INV_ENF_HRS
MEAN	2.101	20.234	19.627	164.032
STD	4.455	20.484	21.225	201.073
N	158	158	158	158
CLS_MM	1			
OPN_YR	0.37551*	1		
CLS_YR	0.40238*	0.91794*	1	
INV_ENF_HRS	0.22398*	0.30024*	0.31733*	1
SAC_CZP1	-0.02859	0.11761	0.13662	-0.0033
SAC_CZP2	-0.00333	0.07203	0.09373	-0.02341
SAC_CZP3	-0.03989	0.13097	0.14138	0.0003
SAC_CZP4	0.03567	0.01513	0.05023	0.04871
CS_CZP1	0.07879	0.23008*	0.25696*	0.07587
CS_CZP2	0.08802	0.1951*	0.21662*	0.11172
CS_CZP3	0.07502	0.23206*	0.24526*	0.11686
CS_CZP4	0.17388*	0.25318*	0.28126*	0.073
SAC_OIA	-0.06579	0.10123	0.16367*	-0.05582
SAC_II	-0.14505	0.22537*	0.28583*	-0.05025
SAC_ICE	-0.09578	0.01785	0.1082	-0.01525
SAC_KKA	-0.01201	0.25203*	0.31685*	0.05726
SAC_OS	-0.01371	0.1494	0.22754*	0.0492
SAC_FR	-0.10897	0.10582	0.20034*	-0.04359
SAC_IGA	0.0507	0.07283	0.12573	0.04347
SAC_AA	-0.08224	0.18731*	0.25267*	0.02929
SAC_SDA	0.14453	0.21983*	0.28484*	0.0172
SAC_AP	0.10364	0.20706*	0.30314*	0.04806
SAC_CPT	0.08015	0.16248*	0.23426*	0.03091
SAC_SI	0.06568	0.16584*	0.25389*	0.09939
SAC_MCR	-0.19711*	0.12888	0.18454*	-0.0462

	SAC_CZP1	SAC_CZP2	SAC_CZP3	SAC_CZP4	CS_CZP1	CS_CZP2	CS_CZP3
MEAN	5.981	5.722	5.665	5.658	5.810	5.576	5.532
STD	0.885	1.094	1.098	1.021	1.089	1.263	1.324
N	158	158	158	158	158	158	158
SAC_CZP1	1						
SAC_CZP2	0.84359*	1					
SAC_CZP3	0.81295*	0.90852*	1				
SAC_CZP4	0.76852*	0.79303*	0.76677*	1			
CS_CZP1	0.37286*	0.48467*	0.44172*	0.34801*	1		
CS_CZP2	0.38586*	0.53176*	0.44787*	0.37098*	0.81585*	1	
CS_CZP3	0.38369*	0.51632*	0.48707*	0.34264*	0.77686*	0.91985*	1
CS_CZP4	0.29555*	0.42212*	0.35827*	0.37155*	0.7518*	0.78374*	0.74961*
SAC_OIA	0.66154*	0.62887*	0.6345*	0.66673*	0.40319*	0.4238*	0.42079*
SAC_II	0.54228*	0.53328*	0.55633*	0.57662*	0.31341*	0.27304*	0.28542*
SAC_ICE	0.49727*	0.47396*	0.49037*	0.55826*	0.31315*	0.2872*	0.28344*
SAC_KKA	0.62393*	0.62148*	0.63773*	0.67003*	0.39779*	0.35273*	0.37151*
SAC_OS	0.63462*	0.55887*	0.54673*	0.64564*	0.26609*	0.21693*	0.20312*

SAC_FR	0.55644*	0.5492*	0.60534*	0.62088*	0.42308*	0.34003*	0.34487*
SAC_IGA	0.55078*	0.56564*	0.56262*	0.59436*	0.22543*	0.22179*	0.17978*
SAC_AA	0.63737*	0.64657*	0.67207*	0.64322*	0.45414*	0.40927*	0.42423*
SAC_SDA	0.59637*	0.58909*	0.59255*	0.602*	0.33768*	0.28788*	0.2739*
SAC_AP	0.57432*	0.59352*	0.57781*	0.64654*	0.35341*	0.28977*	0.24849*
SAC_CPT	0.57218*	0.57214*	0.53227*	0.6718*	0.35101*	0.32438*	0.28299*
SAC_SI	0.50825*	0.52072*	0.47806*	0.57521*	0.4047*	0.33505*	0.25647*
SAC_MCR	0.61984*	0.63584*	0.63856*	0.63533*	0.42341*	0.39988*	0.41421*

	CS_CZP4	**SAC_OIA**	**SAC_II**	**SAC_ICE**
MEAN	5.354	5.487	5.582	5.544
STD	1.195	0.995	0.979	0.921
N	158	158	158	158
CS_CZP4	1			
SAC_OIA	0.33591*	1		
SAC_II	0.27443*	0.70073*	1	
SAC_ICE	0.21714*	0.71638*	0.55051*	1
SAC_KKA	0.32666*	0.72885*	0.74473*	0.67098*
SAC_OS	0.16298*	0.58277*	0.63731*	0.6666*
SAC_FR	0.33*	0.67115*	0.63157*	0.75557*
SAC_IGA	0.1819*	0.64224*	0.6209*	0.61086*
SAC_AA	0.34952*	0.64202*	0.61131*	0.63218*
SAC_SDA	0.30034*	0.6232*	0.65888*	0.58012*
SAC_AP	0.32006*	0.65491*	0.71534*	0.61421*
SAC_CPT	0.30016*	0.68253*	0.62195*	0.67597*
SAC_SI	0.31239*	0.61404*	0.54347*	0.65475*
SAC_MCR	0.32147	0.68735*	0.7016*	0.62307*

	SAC_KKA	**SAC_OS**	**SAC_FR**	**SAC_IGA**	**SAC_AA**	**SAC_SDA**	**SAC_AP**	**SAC_CPT**
MEAN	5.563	5.620	5.304	5.430	5.418	5.551	5.551	5.519
STD	0.954	0.826	0.969	0.906	0.985	0.961	0.885	0.976
N	158	158	158	158	158	158	158	158
SAC_KKA	1							
SAC_OS	0.76595*	1						
SAC_FR	0.73015*	0.72565*	1					
SAC_IGA	0.68352*	0.68795*	0.67757*	1				
SAC_AA	0.7442*	0.66539*	*	0.59676*	1			
SAC_SDA	0.74313*	0.68982*	0.64662*	0.64796*	0.61632*	1		
SAC_AP	0.77665*	0.73152*	0.67234*	0.79087*	0.62534*	0.7789*	1	
SAC_CPT	0.77205*	0.68841*	0.71475*	0.70445*	0.65426*	0.71203*	0.77304*	1
SAC_SI	0.67764*	0.72483*	0.68883*	0.66911*	0.61448*	0.67882*	0.72214*	0.74531*
SAC_MCR	0.70261*	0.61092*	0.74813*	0.59213*	0.77399*	0.58779*	0.5896*	0.62439*

	SAC_SI	**SAC_MCR**
MEAN	5.468	5.437
STD	0.969	1.037
N	158	158
SAC_MCR	0.54954*	1

Note. * $p < .05$

Manifest Variable Key

Variable Name	Item description
C1	Conscientiousness Subscale 1
C2	Conscientiousness Subscale 2
C3	Conscientiousness Subscale 3
C4	Conscientiousness Subscale 4
C5	Conscientiousness Subscale 5
C6	Conscientiousness Subscale 6
ITM1	High respect and fair treatment from my supervisor.
ITM2	Stimulating and challenging work.
ITM3	Chance to exercise independent thought and action in my job.
ITM4	Great job security.
ITM5	Very friendly co-workers.
ITM6	Opportunities to learn new things from my work.
ITM7	High salary and good fringe benefits.
ITM8	Opportunities to be creative and imaginative in my work.
ITM9	Quick promotions.
ITM10	Opportunities for personal growth and development in my job.
ITM11	A sense of worthwhile accomplishment in my work.
ITM12	I prefer to do things that I can do well rather than things that I do poorly.
ITM13	I am happiest at work when I perform tasks on which I know that I won't make any errors.
ITM14	The things I enjoy the most are the things I do best.
ITM15	The opinions others have about how well I do certain things are important to me.
ITM16	I feel smart when I do something without making any mistakes.
ITM17	I like to be fairly confident that I can successfully perform a task before I attempt it.
ITM18	I like to work on tasks that I have done well on in the past.
ITM19	I feel smart when I can do something better than most other people.
ITM20	The opportunity to do challenging work is important to me.
ITM21	When I fail to complete a difficult task, I plan to try harder the next time I attempt it.
ITM22	I prefer to work on tasks that force me to learn new things.
ITM23	The opportunity to learn new things is important to me.
ITM24	I do my best when I am working on a fairly difficult task.
ITM25	I try hard to improve on my past performance.
ITM26	The opportunity to extend the range of my abilities is important to me.
ITM27	When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.
OPN_MM	Sum total of criminal cases opened during April 2001
CLS_MM	Sum total of criminal cases closed during April 2001
OPN_YR	Sum total of criminal cases opened 2001
CLS_YR	Sum total of criminal cases closed 2001
INV_ENF_HRS	Number of total hours logged under the investigative and law enforcement category
SAC_CZP1	Willingly help other Agents. (Special Agent-in-Charge rating)
SAC_CZP2	Apply extra effort. (Special Agent-in-Charge rating)
SAC_CZP3	Display initiative. (Special Agent-in-Charge rating)
SAC_CZP4	Endorse, support & defend organizational objectives. (Special Agent-in-Charge rating)

CS_CZP1	Willingly help other Agents. (Criminal Specialist rating)
CS_CZP2	Apply extra effort. (Criminal Specialist rating)
CS_CZP3	Display initiative. (Criminal Specialist rating)
CS_CZP4	Endorse, support & defend organizational objectives. (Criminal Specialist rating)
SAC_OIA	Other Investigative Activities (Special Agent-in-Charge rating)
SAC_II	Interviewing and Interrogation (Special Agent-in-Charge rating)
SAC_ICE	Identification and Collection of Evidence (Special Agent-in-Charge rating)
SAC_KKA	Knowledge and Application of Policies, Procedures and Laws (Special Agent-in-Charge rating)
SAC_OS	Officer Safety (Special Agent-in-Charge rating)
SAC_FR	Forms and Reports (Special Agent-in-Charge rating)
SAC_IGA	Intelligence Gathering and Analysis (Special Agent-in-Charge rating)
SAC_AA	Administrative Activities (Special Agent-in-Charge rating)
SAC_SDA	Special Duties and Assignments (Special Agent-in-Charge rating)
SAC_AP	Arrest Procedures (Special Agent-in-Charge rating)
SAC_CPT	Courtroom Preparation and Testimony (Special Agent-in-Charge rating)
SAC_SI	Specialized Instruction (Special Agent-in-Charge rating)
SAC_MCR	Managing Case Reports (Special Agent-in-Charge rating)

Results of Tetrad Analysis for Growth Need Strength Scale

TETRAD II - Version 3.1
by
Peter Spirtes, Richard Scheines,
Christopher Meek, Thomas Richardson, Clark Glymour
Anne Boomsam and Herbert Hoijtink

Output file: gnsout
Graph file: gns.txt
Graph: F -> itm2 F -> itm3 F -> itm6 F -> itm8 F -> itm10 F -> itm11

Parameters:

Sample Size: 158
Continuous Data

Covariance Matrix

itm2	itm3	itm6	itm8	itm10	itm11
1.0000					
0.8130	1.0000				
0.7890	0.7280	1.0000			
0.6650	0.7670	0.7150	1.0000		
0.6980	0.7170	0.7750	0.7690	1.0000	
0.7020	0.7120	0.7340	0.7480	0.8220	1.0000

Correlation Matrix

itm2	itm3	itm6	itm8	itm10	itm11
1.0000					
0.8130	1.0000				
0.7890	0.7280	1.0000			
0.6650	0.7670	0.7150	1.0000		
0.6980	0.7170	0.7750	0.7690	1.0000	
0.7020	0.7120	0.7340	0.7480	0.8220	1.0000

P-value for Correlations

itm2	itm3	itm6	itm8	itm10	itm11
0.0000					
0.0000	0.0000				
0.0000	0.0000	0.0000			
0.0000	0.0000	0.0000	0.0000		
0.0000	0.0000	0.0000	0.0000	0.0000	
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Significance: 0.0500
Weight: 0.1000

PURIFY:
A Program to Find Unidimensional Measurement Models

Initially Specified Measurement Model

Indicators of F: [itm2 itm3 itm6 itm8 itm10 itm11]
INTRA-CONSTRUCT PHASE.

F –
Original Status: 8   of 45   tetrads fail the Bonferroni test.
Dropped itm3 Without it, 2   of 15   tetrads fail the Bonferroni test.
Dropped itm6 Without it, 0   of 3   tetrads fail the Bonferroni test.

CROSS-CONSTRUCT PHASE.

3x1 Phase

Output Measurement Model

Indicators of F: [itm2 itm8 itm10 itm11]

ALL tetrad equations implied by this measurement model pass the Bonferroni test.

/graph
F itm2
F itm8
F itm10
F itm11

Results of Tetrad Analysis for Conscientiousness Scale

TETRAD II - Version 3.1
by
Peter Spirtes, Richard Scheines,
Christopher Meek, Thomas Richardson, Clark Glymour
Anne Boomsam and Herbert Hoijtink

Output file: consout
Graph file: cons.txt
Graph: F -> c1 F -> c2 F -> c3 F -> c4 F -> c5 F -> c6

Parameters:

Sample Size: 158
Continuous Data

Covariance Matrix

c1	c2	c3	c4	c5	c6
1.0000					
0.3250	1.0000				
0.6510	0.3020	1.0000			
0.6350	0.3770	0.6350	1.0000		
0.6470	0.4080	0.6980	0.7050	1.0000	
0.4430	0.3220	0.5070	0.4820	0.5340	1.0000

Correlation Matrix

c1	c2	c3	c4	c5	c6
1.0000					
0.3250	1.0000				
0.6510	0.3020	1.0000			
0.6350	0.3770	0.6350	1.0000		
0.6470	0.4080	0.6980	0.7050	1.0000	
0.4430	0.3220	0.5070	0.4820	0.5340	1.0000

P-value for Correlations

c1	c2	c3	c4	c5	c6
0.0000					
0.0002	0.0000				
0.0000	0.0001	0.0000			
0.0000	0.0000	0.0000	0.0000		
0.0000	0.0000	0.0000	0.0000	0.0000	
0.0000	0.0002	0.0000	0.0000	0.0000	0.0000

Significance: 0.0500
Weight: 0.1000

PURIFY:
A Program to Find Unidimensional Measurement Models

Initially Specified Measurement Model

Indicators of F: [c1 c2 c3 c4 c5 c6]

INTRA-CONSTRUCT PHASE.

F –
Original Status: Needs NO pruning.
0   of 45   tetrads fail the Bonferroni test.

CROSS-CONSTRUCT PHASE.

3x1 Phase

Output Measurement Model

Indicators of F: [c1 c2 c3 c4 c5 c6]

ALL tetrad equations implied by this measurement model pass the Bonferroni test.

/graph
F c1
F c2
F c3
F c4
F c5
F c6

<u>Results of Tetrad Analysis for Goal Orientation Scale</u>

```
                         TETRAD II - Version 3.1
                                   by
                   Peter Spirtes, Richard Scheines,
         Christopher Meek, Thomas Richardson, Clark Glymour
                  Anne Boomsam and Herbert Hoijtink

                          Copyright (C) 1999
Output file: GOout
Graph file: go.txt
Graph:  F1 -> itm12    F1 -> itm13    F1 -> itm14    F1 -> itm15    F1 -> itm16    F1 -> itm17
   F1 -> itm18    F1 -> itm19
   F2 -> itm20    F2 -> itm21    F2 -> itm22    F2 -> itm23   F2 -> itm24    F2 -> itm25
   F2 -> itm26    F2 -> itm27

Parameters:

  Sample Size: 158
  Continuous Data

Covariance Matrix
itm12   itm13   itm14   itm15   itm16   itm17   itm18   itm19   itm20   itm21   itm22   itm23
itm24   itm25   itm26   itm27
1.0000
0.3940  1.0000
0.4330  0.4840  1.0000
0.3790  0.2890  0.3830  1.0000
0.2470  0.3800  0.3860  0.4710  1.0000
0.3210  0.3530  0.4110  0.3080  0.3750  1.0000
0.2960  0.4010  0.5090  0.3860  0.4460  0.5680  1.0000
0.1280  0.3200  0.3080  0.3840  0.6070  0.3270  0.3340  1.0000
0.2340  0.0510  0.2570  0.2350  0.0980  0.2100  0.1530  0.2060  1.0000
0.1960  0.1270  0.2800  0.1760  0.1640  0.1930  0.1800  0.0810  0.5270  1.0000
0.0010  -0.0280  0.0530  0.1330  0.1250  0.1880  0.0220  0.0710  0.4300  0.5600  1.0000
0.1570  0.0410  0.1950  0.1790  0.1860  0.2000  0.1360  0.1330  0.5590  0.5080  0.7200 1.0000
0.0710  -0.0080  0.0440  0.0600  0.0760  0.0480  0.0190  0.1470  0.4890  0.4600  0.5090
0.4690  1.0000  0.2410  0.1060  0.2260  0.2730  0.2020  0.2190  0.1510  0.0600  0.5460
0.6590  0.5630  0.5290  0.5130  1.0000  0.1240  0.1040  0.1950  0.1670  0.1570  0.2210
0.1150  0.0900  0.5570  0.4950  0.5200  0.5290  0.5680  0.6740  1.0000  -0.0250  -0.0120
0.0830  0.0560  0.1810  0.0830  0.0530  0.2010  0.4220  0.3580  0.4360  0.4770  0.3860
0.3640  0.5700  1.0000

Correlation Matrix
itm12   itm13   itm14   itm15   itm16   itm17   itm18    itm19   itm20   itm21   itm22   itm23
itm24   itm25   itm26   itm27
1.0000
0.3940  1.0000
0.4330  0.4840  1.0000
0.3790  0.2890  0.3830  1.0000
0.2470  0.3800  0.3860  0.4710  1.0000
0.3210  0.3530  0.4110  0.3080  0.3750  1.0000
0.2960  0.4010  0.5090  0.3860  0.4460  0.5680  1.0000
```

0.1280 0.3200 0.3080 0.3840 0.6070 0.3270 0.3340 1.0000
0.2340 0.0510 0.2570 0.2350 0.0980 0.2100 0.1530 0.2060 1.0000
0.1960 0.1270 0.2800 0.1760 0.1640 0.1930 0.1800 0.0810 0.5270 1.0000
0.0010 -0.0280 0.0530 0.1330 0.1250 0.1880 0.0220 0.0710 0.4300 0.5600 1.0000
0.1570 0.0410 0.1950 0.1790 0.1860 0.2000 0.1360 0.1330 0.5590 0.5080 0.7200
1.0000 0.0710 -0.0080 0.0440 0.0600 0.0760 0.0480 0.0190 0.1470 0.4890 0.4600
0.5090 0.4690 1.0000 0.2410 0.1060 0.2260 0.2730 0.2020 0.2190 0.1510 0.0600
0.5460 0.6590 0.5630 0.5290 0.5130 1.0000 0.1240 0.1040 0.1950 0.1670 0.1570
0.2210 0.1150 0.0900 0.5570 0.4950 0.5200 0.5290 0.5680 0.6740 1.0000 -0.0250
-0.0120 0.0830 0.0560 0.1810 0.0830 0.0530 0.2010 0.4220 0.3580 0.4360 0.4770
0.3860 0.3640 0.5700 1.0000

P-value for Correlations
itm12 itm13 itm14 itm15 itm16 itm17 itm18 itm19 itm20 itm21 itm22 itm23
itm24 itm25 itm26 itm27
0.0000
0.0000 0.0000
0.0000 0.0000 0.0000
0.0000 0.0002 0.0000 0.0000
0.0017 0.0000 0.0000 0.0000 0.0000
0.0001 0.0000 0.0000 0.0001 0.0000 0.0000
0.0001 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.1095 0.0001 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000
0.0033 0.5259 0.0011 0.0032 0.2213 0.0079 0.0548 0.0090 0.0000
0.0131 0.1125 0.0003 0.0270 0.0400 0.0147 0.0234 0.3121 0.0000 0.0000
0.9900 0.7275 0.5097 0.0962 0.1185 0.0176 0.7841 0.3761 0.0000 0.0000 0.0000
0.0492 0.6097 0.0136 0.0243 0.0188 0.0113 0.0884 0.0962 0.0000 0.0000 0.0000
0.0000 0.3761 0.9203 0.5842 0.4553 0.3435 0.5503 0.8128 0.0655 0.0000 0.0000
0.0000 0.0000 0.0000 0.0024 0.1861 0.0044 0.0005 0.0105 0.0056 0.0578 0.4553
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.1216 0.1942 0.0136 0.0361 0.0492
0.0050 0.1513 0.2613 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.7555
0.8810 0.3006 0.4853 0.0225 0.3006 0.5097 0.0109 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000

Significance: 0.0500
Weight: 0.1000

PURIFY:
A Program to Find Unidimensional Measurement Models

Initially Specified Measurement Model

Indicators of F1: [itm12 itm13 itm14 itm15 itm16 itm17 itm18 itm19]
Indicators of F2: [itm20 itm21 itm22 itm23 itm24 itm25 itm26 itm27]

INTRA-CONSTRUCT PHASE.

F1 --
Original Status: 4 of 210 tetrads fail the Bonferroni test.
Dropped itm12 Without it, 4 of 105 tetrads fail the Bonferroni test.
Dropped itm16 Without it, 0 of 45 tetrads fail the Bonferroni test.
F2 --
Original Status: 9 of 210 tetrads fail the Bonferroni test.

```
 Dropped itm26     Without it, 4    of 105  tetrads fail the Bonferroni test.
 Dropped itm22     Without it, 0    of 45   tetrads fail the Bonferroni test.

CROSS-CONSTRUCT PHASE.
----------------------

3x1 Phase
--------

--------------------------------------------------------------
Output Measurement Model

Indicators of F1: [ itm13    itm14    itm15    itm17    itm18    itm19 ]
Indicators of F2: [ itm20    itm21    itm23    itm24    itm25    itm27 ]

ALL tetrad equations implied by this measurement model pass the Bonferroni test.
--------------------------------------------------

/graph
F1 itm13
F1 itm14
F1 itm15
F1 itm17
F1 itm18
F1 itm19
F2 itm20
F2 itm21
F2 itm23
F2 itm24
F2 itm25
F2 itm27
```

Results of Tetrad Analysis for Citizenship Performance Scale

TETRAD II - Version 3.1
by
Peter Spirtes, Richard Scheines,
Christopher Meek, Thomas Richardson, Clark Glymour
Anne Boomsam and Herbert Hoijtink

Output file: cxtallou
Graph file: cxtall.txt
Graph: F -> sczp1 F -> sczp2 F -> sczp3 F -> sczp4
F -> cczp1 F -> cczp2 F -> cczp3 F -> cczp4

Parameters:

Sample Size: 159
Continuous Data

Covariance Matrix

sczp1	sczp2	sczp3	sczp4	cczp1	cczp2	cczp3	cczp4
1.0000							
0.8440	1.0000						
0.8130	0.9090	1.0000					
0.7690	0.7930	0.7670	1.0000				
0.3860	0.4870	0.4390	0.3510	1.0000			
0.3860	0.5330	0.4540	0.3730	0.8240	1.0000		
0.3840	0.5160	0.4870	0.3430	0.7750	0.9330	1.0000	
0.2890	0.4160	0.3560	0.3640	0.7570	0.7950	0.7690	1.0000

Correlation Matrix

sczp1	sczp2	sczp3	sczp4	cczp1	cczp2	cczp3	cczp4
1.0000							
0.8440	1.0000						
0.8130	0.9090	1.0000					
0.7690	0.7930	0.7670	1.0000				
0.3860	0.4870	0.4390	0.3510	1.0000			
0.3860	0.5330	0.4540	0.3730	0.8240	1.0000		
0.3840	0.5160	0.4870	0.3430	0.7750	0.9330	1.0000	
0.2890	0.4160	0.3560	0.3640	0.7570	0.7950	0.7690	1.0000

P-value for Correlations

sczp1	sczp2	sczp3	sczp4	cczp1	cczp2	cczp3	cczp4
0.0000							
0.0000	0.0000						
0.0000	0.0000	0.0000					
0.0000	0.0000	0.0000	0.0000				
0.0000	0.0000	0.0000	0.0000	0.0000			
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

```
 Significance:     0.0500
 Weight:          0.1000


PURIFY:
A Program to Find Unidimensional Measurement Models

Initially Specified Measurement Model

Indicators of F: [ sczp1    sczp2    sczp3    sczp4    cczp1    cczp2    cczp3    cczp4]

INTRA-CONSTRUCT PHASE.
----------------------
F --
Original Status:   72   of 210   tetrads fail the Bonferroni test.
 Dropped sczp3     Without it, 36   of 105  tetrads fail the Bonferroni test.
 Dropped sczp1     Without it, 13   of 45   tetrads fail the Bonferroni test.
 Dropped sczp2     Without it, 1    of 15   tetrads fail the Bonferroni test.
 Dropped cczp3     Without it, 0    of 3    tetrads fail the Bonferroni test.

CROSS-CONSTRUCT PHASE.
----------------------
3x1 Phase
--------

---------------------------------------------------------------
Output Measurement Model

Indicators of F: [ sczp4    cczp1    cczp2    cczp4]

ALL tetrad equations implied by this measurement model pass the Bonferroni test.
--------------------------------------------------

/graph
F sczp4
F cczp1
F cczp2
F cczp4
```

Results of Tetrad Analysis for Perception of Task Performance Scale

TETRAD II - Version 3.1
by
Peter Spirtes, Richard Scheines,
Christopher Meek, Thomas Richardson, Clark Glymour
Anne Boomsam and Herbert Hoijtink

Output file: sctskou
Graph file: sctask.txt
Graph: F -> scoia F -> scii F -> scice F -> sckka F -> scos F -> scfr F -> sciga F -> scaa F -> scsda F -> scap F -> sccpt F -> scsi F -> scmcr

Parameters:

Sample Size: 159
Continuous Data

Covariance Matrix

scoia	scii	scice	sckka	scos	scfr	sciga	scaa	scsda	scap	sccpt	scsi	scmcr
1.0000												
0.7010	1.0000											
0.7160	0.5510	1.0000										
0.7290	0.7450	0.6710	1.0000									
0.5830	0.6370	0.6670	0.7660	1.0000								
0.6710	0.6320	0.7560	0.7300	0.7260	1.0000							
0.6420	0.6210	0.6110	0.6840	0.6880	0.6780	1.0000						
0.6420	0.6110	0.6320	0.7440	0.6650	0.7740	0.5970	1.0000					
0.6230	0.6590	0.5800	0.7430	0.6900	0.6470	0.6480	0.6160	1.0000				
0.6550	0.7150	0.6140	0.7770	0.7320	0.6720	0.7910	0.6250	0.7790	1.0000			
0.6830	0.6220	0.6760	0.7720	0.6880	0.7150	0.7040	0.6540	0.7120	0.7730	1.0000		
0.6140	0.5440	0.6550	0.6780	0.7250	0.6890	0.6690	0.6150	0.6790	0.7220	0.7450		
1.0000	0.6870	0.7020	0.6230	0.7030	0.6110	0.7480	0.5920	0.7740	0.5880	0.5900		
0.6240	0.5500	1.0000										

Correlation Matrix

scoia	scii	scice	sckka	scos	scfr	sciga	scaa	scsda	scap	sccpt	scsi	scmcr
1.0000												
0.7010	1.0000											
0.7160	0.5510	1.0000										
0.7290	0.7450	0.6710	1.0000									
0.5830	0.6370	0.6670	0.7660	1.0000								
0.6710	0.6320	0.7560	0.7300	0.7260	1.0000							
0.6420	0.6210	0.6110	0.6840	0.6880	0.6780	1.0000						
0.6420	0.6110	0.6320	0.7440	0.6650	0.7740	0.5970	1.0000					
0.6230	0.6590	0.5800	0.7430	0.6900	0.6470	0.6480	0.6160	1.0000				
0.6550	0.7150	0.6140	0.7770	0.7320	0.6720	0.7910	0.6250	0.7790	1.0000			
0.6830	0.6220	0.6760	0.7720	0.6880	0.7150	0.7040	0.6540	0.7120	0.7730	1.0000		
0.6140	0.5440	0.6550	0.6780	0.7250	0.6890	0.6690	0.6150	0.6790	0.7220	0.7450		
1.0000	0.6870	0.7020	0.6230	0.7030	0.6110	0.7480	0.5920	0.7740	0.5880	0.5900		
0.6240	0.5500	1.0000										

P-value for Correlations

scoia	scii	scice	sckka	scos	scfr	sciga	scaa	scsda	scap	sccpt	scsi	scmcr
0.0000												
0.0000	0.0000											
0.0000	0.0000	0.0000										
0.0000	0.0000	0.0000	0.0000									
0.0000	0.0000	0.0000	0.0000	0.0000								
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000							
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000					
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
0.0000	0.0000	0.0000										

Significance: 0.0500
Weight: 0.1000

PURIFY:
A Program to Find Unidimensional Measurement Models

Initially Specified Measurement Model

Indicators of F: [scoia scii scice sckka scos scfr sciga scaa scsda scap sccpt scsi scmcr]

INTRA-CONSTRUCT PHASE.

F --
Original Status: 42 of 2145 tetrads fail the Bonferroni test.
Dropped scmcr Without it, 14 of 1485 tetrads fail the Bonferroni test.
Dropped scap Without it, 5 of 990 tetrads fail the Bonferroni test.
Dropped scoia Without it, 1 of 630 tetrads fail the Bonferroni test.
Dropped scfr Without it, 0 of 378 tetrads fail the Bonferroni test.

CROSS-CONSTRUCT PHASE.

3x1 Phase

Output Measurement Model

Indicators of F: [scii scice sckka scos sciga scaa scsda sccpt scsi]

ALL tetrad equations implied by this measurement model pass the Bonferroni test.

/graph
F scii
F scice
F sckka

F scos
F sciga
F scaa
F scsda
F sccpt
F scsi

Results of Tetrad Analysis for Task Performance Scale

TETRAD II - Version 3.1
by
Peter Spirtes, Richard Scheines,
Christopher Meek, Thomas Richardson, Clark Glymour
Anne Boomsam and Herbert Hoijtink

Output file: taskout
Graph file: task.txt
Graph: F -> opnmm F -> clsmm F -> opnyr F -> clsyr F -> invenf

Parameters:

Sample Size: 158
Continuous Data

Covariance Matrix

opnmm	clsmm	opnyr	clsyr	invenf
1.0000				
0.3900	1.0000			
0.7032	0.3755	1.0000		
0.6549	0.4024	0.9179	1.0000	
0.1360	0.2240	0.3092	0.3173	1.0000

Correlation Matrix

opnmm	clsmm	opnyr	clsyr	invenf
1.0000				
0.3900	1.0000			
0.7032	0.3755	1.0000		
0.6549	0.4024	0.9179	1.0000	
0.1360	0.2240	0.3092	0.3173	1.0000

P-value for Correlations

opnmm	clsmm	opnyr	clsyr	invenf
0.0000				
0.0000	0.0000			
0.0000	0.0000	0.0000		
0.0000	0.0000	0.0000	0.0000	
0.0884	0.0046	0.0001	0.0000	0.0000

Significance: 0.0500
Weight: 0.1000

PURIFY:
A Program to Find Unidimensional Measurement Models

Initially Specified Measurement Model

Indicators of F: [opnmm clsmm opnyr clsyr invenf]

INTRA-CONSTRUCT PHASE.

F --
Original Status: Needs NO pruning.
0   of 15   tetrads fail the Bonferroni test.

CROSS-CONSTRUCT PHASE.

3x1 Phase

Output Measurement Model

Indicators of F: [opnmm   clsmm   opnyr   clsyr   invenf]

ALL tetrad equations implied by this measurement model pass the Bonferroni test.

/graph
F opnmm
F clsmm
F opnyr
F clsyr
F invenf

Table of Correlations for Variables Included in Final Structural Models

	C1	C3	C4	C5	C6	itm2	itm8
MEAN	23.98	24.28	20.88	23.12	19.42	4.17	3.96
STD	3.26	4.01	3.74	3.38	3.50	0.88	0.98
N	158	158	158	158	158	158	158
C1	1.00						
C3	0.65 *	1.00					
C4	0.63 *	0.64 *	1.00				
C5	0.65 *	0.70 *	0.71 *	1.00			
C6	0.44 *	0.51 *	0.48 *	0.53 *	1.00		
itm2	0.22 *	0.20 *	0.22 *	0.07	0.02	1.00	
itm8	0.19 *	0.26 *	0.21 *	0.07	0.09	0.66 *	1.00
itm10	0.23 *	0.33 *	0.27 *	0.14	0.13	0.70 *	0.77 *
itm11	0.29 *	0.37 *	0.30 *	0.17 *	0.14	0.70 *	0.75 *
itm13	0.02	0.14	0.04	0.00	0.07	0.15	0.21 *
itm14	0.09	0.19 *	0.13	0.01	0.00	0.23 *	0.24 *
itm15	0.11	0.17 *	0.10	0.11	0.15	0.19 *	0.22 *
itm17	0.02	0.06	0.07	0.04	0.17 *	0.14	0.15
itm18	0.02	0.08	0.02	0.01	0.03	0.06	0.09
itm20	0.13	0.26 *	0.28 *	0.17 *	0.05	0.34 *	0.23 *
itm21	0.07	0.26 *	0.25 *	0.18 *	0.19 *	0.23 *	0.22 *
itm23	0.06	0.17	0.11	0.05	0.14	0.33 *	0.37 *
itm24	0.08	0.15	0.24 *	0.11	0.04	0.27 *	0.29 *
itm25	0.18 *	0.34 *	0.37 *	0.25 *	0.30 *	0.32 *	0.31 *
itm27	0.03	0.03	0.12	-0.05	0.08	0.04	0.12
OPN_MM	-0.06	0.00	-0.10	-0.06	-0.05	0.12	0.03
CLS_MM	-0.01	0.06	-0.04	-0.03	-0.11	0.10	0.05
OPN_YR	-0.03	0.06	-0.04	-0.08	-0.08	0.08	0.10
CLS_YR	0.00	0.02	-0.05	-0.07	-0.08	0.05	0.06
INV_ENF_HRS	0.10	0.04	0.05	0.04	0.12	-0.02	-0.04
CS_CZP1	0.09	0.09	0.14	0.13	0.06	0.03	0.07
CS_CZP2	0.07	0.07	0.15	0.14	0.04	0.04	0.02
CS_CZP4	0.12	0.13	0.17 *	0.19 *	0.15	0.00	0.01
SAC_OS	0.03	0.02	0.07	0.08	0.07	0.05	0.12
SAC_ICE	0.06	0.07	0.05	0.17 *	0.09	-0.04	-0.07
SAC_IGA	-0.01	0.02	0.10	0.12	0.03	-0.02	0.05
SAC_SDA	0.07	0.09	0.10	0.11	0.11	0.02	0.01
SAC_CPT	0.09	0.02	0.09	0.10	0.05	0.01	0.03
SAC_SI	0.09	0.05	0.12	0.15	0.11	0.03	0.05
SAC_II	0.06	0.03	0.12	0.14	0.09	-0.02	0.06
SAC_AA	0.05	-0.02	0.07	0.13	0.02	-0.10	-0.05
SAC_KKA	0.06	0.06	0.05	0.10	0.03	-0.01	0.08

	itm10	itm11	itm13	itm14
MEAN	4.07	4.33	3.48	3.80
STD	1.00	0.91	0.82	0.83
N	158	158	158	158
itm10	1.00			
itm11	0.82 *	1.00		
itm13	0.17 *	0.15	1.00	

itm14	0.36 *	0.27 *	0.48 *	1.00
itm15	0.34 *	0.29 *	0.29 *	0.38 *
itm17	0.25 *	0.23 *	0.35 *	0.41 *
itm18	0.19 *	0.12	0.40 *	0.51 *
itm20	0.32 *	0.29 *	0.05	0.26 *
itm21	0.24 *	0.21 *	0.13	0.28 *
itm23	0.40 *	0.28 *	0.04	0.20 *
itm24	0.26 *	0.28 *	-0.01	0.04
itm25	0.33 *	0.32 *	0.11	0.23 *
itm27	0.08	0.04	-0.01	0.08
OPN_MM	0.11	0.13	0.09	-0.04
CLS_MM	0.02	0.00	0.08	0.07
OPN_YR	0.09	0.15	0.06	-0.01
CLS_YR	0.06	0.10	0.09	-0.01
INV_ENF_HRS	-0.13	-0.01	-0.05	-0.09
CS_CZP1	0.02	0.10	0.12	0.06
CS_CZP2	0.02	0.10	-0.02	-0.04
CS_CZP4	0.02	0.07	0.02	-0.08
SAC_OS	0.09	0.10	-0.05	-0.03
SAC_ICE	-0.03	0.03	-0.05	-0.14
SAC_IGA	0.03	0.00	-0.01	-0.12
SAC_SDA	-0.02	0.02	-0.04	-0.13
SAC_CPT	0.02	0.06	-0.04	-0.07
SAC_SI	0.03	0.04	-0.05	-0.12
SAC_II	0.02	0.06	-0.05	-0.10
SAC_AA	-0.07	0.04	0.05	-0.10
SAC_KKA	0.03	0.11	-0.06	-0.14

	itm15	**itm17**	**itm18**	**itm20**	**itm21**	**itm23**
MEAN	3.79	3.49	3.77	4.28	4.25	4.20
STD	0.75	0.86	0.73	0.59	0.60	0.59
N	158	158	158	158	158	158
itm15	1.00					
itm17	0.31 *	1.00				
itm18	0.39 *	0.57 *	1.00			
itm20	0.24 *	0.21 *	0.15	1.00		
itm21	0.18 *	0.19 *	0.18 *	0.53 *	1.00	
itm23	0.18 *	0.20 *	0.14	0.56 *	0.51 *	1.00
itm24	0.06	0.05	0.02	0.49 *	0.46 *	0.47 *
itm25	0.27 *	0.22 *	0.15	0.55 *	0.66 *	0.53 *
itm27	0.06	0.08	0.05	0.42 *	0.36 *	0.48 *
OPN_MM	0.17 *	0.14	0.11	0.01	0.04	-0.07
CLS_MM	0.06	-0.02	0.01	0.11	0.10	0.08
OPN_YR	0.11	0.06	0.02	-0.05	-0.03	-0.15
CLS_YR	0.10	0.06	-0.01	-0.09	-0.08	-0.19
INV_ENF_HRS	0.03	0.00	-0.13	-0.13	-0.05	-0.12
CS_CZP1	0.11	-0.02	-0.08	-0.13	-0.04	-0.12
CS_CZP2	0.09	-0.03	-0.08	-0.08	-0.15	-0.08
CS_CZP4	0.10	0.00	-0.04	-0.06	-0.09	-0.12
SAC_OS	0.07	0.00	0.04	0.06	0.05	0.04
SAC_ICE	0.05	-0.01	0.00	0.04	0.05	-0.06

SAC_IGA	-0.02	-0.09	-0.07	0.07	0.08	0.04
SAC_SDA	0.00	-0.10	0.01	0.00	0.04	-0.01
SAC_CPT	0.04	-0.11	-0.04	0.00	0.05	-0.12
SAC_SI	0.05	-0.12	-0.03	-0.07	0.05	-0.09
SAC_II	0.07	-0.04	-0.05	0.02	0.02	-0.07
SAC_AA	0.06	0.01	0.01	-0.03	-0.04	-0.16
SAC_KKA	0.02	-0.07	-0.04	-0.02	0.01	-0.07

	itm24	itm25	itm27	OPN_MM
MEAN	3.93	4.26	4.18	1.59
STD	0.67	0.61	0.62	2.17
N	158	158	158	158
itm24	1.00			
itm25	0.51 *	1.00		
itm27	0.39 *	0.36 *	1.00	
OPN_MM	-0.05	0.08	-0.09	1.00
CLS_MM	-0.01	0.11	0.06	0.39
OPN_YR	-0.12	-0.02	-0.16 *	0.70
CLS_YR	-0.17 *	-0.06	-0.21 *	0.65
INV_ENF_HRS	-0.03	0.06	-0.03	0.14
CS_CZP1	-0.08	-0.10	-0.18 *	0.19
CS_CZP2	-0.03	-0.06	-0.17 *	0.18
CS_CZP4	-0.07	-0.03	-0.20 *	0.25
SAC_OS	-0.03	0.08	0.01	0.07
SAC_ICE	-0.03	-0.06	-0.11	-0.05
SAC_IGA	-0.04	0.03	-0.06	-0.06
SAC_SDA	-0.02	-0.02	-0.09	0.15
SAC_CPT	-0.04	-0.02	-0.11	0.03
SAC_SI	-0.04	0.00	-0.12	0.10
SAC_II	-0.03	0.04	-0.10	0.13
SAC_AA	-0.11	-0.02	-0.19 *	0.15
SAC_KKA	-0.12	-0.09	-0.16	0.18

	CLS_MM	OPN_YR	CLS_YR	INV_ENF_HRS	CS_CZP1	CS_CZP2
MEAN	2.10	20.23	19.63	164.03	5.81	5.58
STD	4.46	20.48	21.23	201.07	1.09	1.26
N	158	158	158	158	158	158
CLS_MM	1.00					
OPN_YR	0.38 *	1.00				
CLS_YR	0.40 *	0.92 *	1.00			
INV_ENF_HRS	0.22 *	0.30 *	0.32 *	1.00		
CS_CZP1	0.08	0.23 *	0.26 *	0.08	1.00	
CS_CZP2	0.09	0.20 *	0.22 *	0.11	0.82 *	1.00
CS_CZP4	0.17 *	0.25 *	0.28 *	0.07	0.75 *	0.78 *
SAC_OS	-0.01	0.15	0.23 *	0.05	0.27 *	0.22 *
SAC_ICE	-0.10	0.02	0.11	-0.02	0.31 *	0.29 *
SAC_IGA	0.05	0.07	0.13	0.04	0.23 *	0.22 *
SAC_SDA	0.14	0.22 *	0.28 *	0.02	0.34 *	0.29 *
SAC_CPT	0.08	0.16 *	0.23 *	0.03	0.35 *	0.32 *
SAC_SI	0.07	0.17 *	0.25 *	0.10	0.40 *	0.34 *
SAC_II	-0.15	0.23 *	0.29 *	-0.05	0.31 *	0.27 *

SAC_AA	-0.08	0.19 *	0.25 *	0.03	0.45 *	0.41 *
SAC_KKA	-0.01	0.25 *	0.32 *	0.06	0.40 *	0.35 *

	CS_CZP4	**SAC_OS**	**SAC_ICE**	**SAC_IGA**
MEAN	5.35	5.62	5.54	5.43
STD	1.19	0.83	0.92	0.91
N	158	158	158	158
CS_CZP4	1.00			
SAC_OS	0.16 *	1.00		
SAC_ICE	0.22 *	0.67 *	1.00	
SAC_IGA	0.18 *	0.69 *	0.61 *	1.00
SAC_SDA	0.30 *	0.69 *	0.58 *	0.65 *
SAC_CPT	0.30 *	0.69 *	0.68 *	0.70 *
SAC_SI	0.31 *	0.72 *	0.65 *	0.67 *
SAC_II	0.27 *	0.64 *	0.55 *	0.62 *
SAC_AA	0.35 *	0.67 *	0.63 *	0.60 *
SAC_KKA	0.33 *	0.77 *	0.67 *	0.68 *

	SAC_SDA	**SAC_CPT**	**SAC_SI**	**SAC_II**	**SAC_AA**	**SAC_KKA**
MEAN	5.55	5.52	5.47	5.58	5.42	5.56
STD	0.96	0.98	0.97	0.98	0.99	0.95
N	158	158	158	158	158	158
SAC_SDA	1.00					
SAC_CPT	0.71 *	1.00				
SAC_SI	0.68 *	0.75 *	1.00			
SAC_II	0.66 *	0.62 *	0.54 *	1.00		
SAC_AA	0.62 *	0.65 *	0.61 *	0.61 *	1.00	
SAC_KKA	0.74 *	0.77 *	0.68 *	0.74 *	0.74 *	1.00

Note. See Appendix B for manifest variable key.
* $p < .05$

The SAS System
The CALIS Procedure
Covariance Structure Analysis: Pattern and Initial Values

Measurement Model with 2 Factor Criterion Space

LINEQS Model Statement

		Matrix	Rows	Columns	Matrix Type	
Term 1	**1**	_SEL_	30	66	SELECTION	
	2	_BETA_	66	66	EQSBETA	IMINUSINV
	3	_GAMMA_	66	36	EQSGAMMA	
	4	_PHI_	36	36	SYMMETRIC	

The 30 Endogenous Variables

Manifest	C1 C2 C3 C4 C5 C6 itm2 itm8 itm10 itm11 itm13 itm14 itm15 itm17 itm18 itm20 itm21 itm23 itm24 itm25 itm27 OPN_MM CLS_MM OPN_YR CLS_YR INV_ENF_HRS SAC_CZP4 CS_CZP1 CS_CZP2 CS_CZP4
Latent	

The 36 Exogenous Variables

Manifest	
Latent	F1 F2 F3 F4 F5 F6
Error	E1 E2 E3 E4 E5 E6 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 E24 E25 E26 E27 E28 E29 E30 E31

Observations	158	**Model Terms**	1
Variables	30	**Model Matrices**	4
Informations	465	**Parameters**	75

Variable	Mean	Std Dev
C1	23.98101	3.26235
C2	19.30380	3.45804
C3	24.28481	4.01128
C4	20.87975	3.73545
C5	23.12025	3.38290
C6	19.41772	3.50107
itm2	4.17089	0.88291
itm8	3.96203	0.97671
itm10	4.06962	1.00392
itm11	4.32911	0.90605
itm13	3.48101	0.81952
itm14	3.80380	0.83291
itm15	3.79114	0.74913
itm17	3.48734	0.85762
itm18	3.76582	0.73292
itm20	4.27848	0.58510
itm21	4.25316	0.59656
itm23	4.19620	0.59143
itm24	3.93038	0.66884
itm25	4.25949	0.60969
itm27	4.18354	0.61653
OPN_MM	1.59494	2.16821
CLS_MM	2.10127	4.45528
OPN_YR	20.23418	20.48369
CLS_YR	19.62658	21.22536
INV_ENF_HRS	164.03215	201.07282

Variable	Mean	Std Dev
SAC_CZP4	5.65823	1.02063
CS_CZP1	5.81013	1.08933
CS_CZP2	5.57595	1.26337
CS_CZP4	5.35443	1.19487

Dual Quasi-Newton Optimization
Dual Broyden - Fletcher - Goldfarb - Shanno Update (DBFGS)

Parameter Estimates	75
Functions (Observations)	465

Optimization Start

Active Constraints	0	**Objective Function**	60.430349998
Max Abs Gradient Element	77.514749002		

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
1	0	2	0	6.29064	54.1397	2.5734
2	0	4	0	4.27992	2.0107	0.8839
3	0	5	0	3.77279	0.5071	6.1876
4	0	6	0	3.45629	0.3165	1.4923
5	0	7	0	3.37674	0.0795	1.0244
6	0	9	0	3.31851	0.0582	0.2784
7	0	11	0	3.30827	0.0102	0.1130
8	0	12	0	3.30084	0.00743	0.5970
9	0	13	0	3.29660	0.00424	0.2726
10	0	14	0	3.29420	0.00240	0.3492
11	0	15	0	3.29308	0.00111	0.2124
12	0	16	0	3.29223	0.000855	0.1101

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
13	0	18	0	3.29188	0.000348	0.0395
14	0	19	0	3.29167	0.000208	0.0306
15	0	21	0	3.29155	0.000121	0.00697
16	0	23	0	3.29150	0.000051	0.00926
17	0	25	0	3.29148	0.000021	0.00701
18	0	27	0	3.29147	8.071E-6	0.00460
19	0	29	0	3.29147	5.212E-6	0.00157
20	0	31	0	3.29146	1.678E-6	0.00141
21	0	33	0	3.29146	7.444E-7	0.000865
22	0	35	0	3.29146	4.857E-7	0.00136
23	0	37	0	3.29146	1.946E-7	0.000849
24	0	39	0	3.29146	1.317E-7	0.000301
25	0	41	0	3.29146	2.951E-8	0.000235

Optimization Results

Iterations	25	**Function Calls**	42
Gradient Calls	28	**Active Constraints**	0
Objective Function	3.2914628271	**Max Abs Gradient Element**	0.0002351963
Slope of Search Direction	-3.01477E-8		

GCONV convergence criterion satisfied.

Fit Function	3.2915
Goodness of Fit Index (GFI)	0.8293

GFI Adjusted for Degrees of Freedom (AGFI)	0.7965
Root Mean Square Residual (RMR)	0.0666
Parsimonious GFI (Mulaik, 1989)	0.7435
Chi-Square	516.7597
Chi-Square DF	390
Pr > Chi-Square	<.0001
Independence Model Chi-Square	2839.0
Independence Model Chi-Square DF	435
RMSEA Estimate	0.0455
RMSEA 90% Lower Confidence Limit	0.0342
RMSEA 90% Upper Confidence Limit	0.0557
ECVI Estimate	4.4819
ECVI 90% Lower Confidence Limit	.
ECVI 90% Upper Confidence Limit	4.9026
Probability of Close Fit	0.7563
Bentler's Comparative Fit Index	0.9473
Normal Theory Reweighted LS Chi-Square	484.7189
Akaike's Information Criterion	-263.2403
Bozdogan's (1987) CAIC	-1847.6524
Schwarz's Bayesian Criterion	-1457.6524
McDonald's (1989) Centrality	0.6696
Bentler & Bonett's (1980) Non-normed Index	0.9412
Bentler & Bonett's (1980) NFI	0.8180
James, Mulaik, & Brett (1982) Parsimonious NFI	0.7334
Z-Test of Wilson & Hilferty (1931)	4.1441
Bollen (1986) Normed Index Rho1	0.7970
Bollen (1988) Non-normed Index Delta2	0.9482

Hoelter's (1983) Critical N	134

Rank Order of the 10 Largest Raw Residuals

Row	**Column**	**Residual**
itm13	**C2**	0.28797
itm20	**C2**	-0.23098
itm27	**C5**	-0.18975
itm25	**C4**	0.17260
itm27	**itm11**	-0.16901
itm15	**itm10**	0.16496
INV_ENF_HRS	**itm10**	-0.16066
itm27	**C2**	-0.15655
itm25	**C6**	0.15362
itm8	**C5**	-0.15306

Rank Order of the 10 Largest Asymptotically Standardized Residuals

Row	**Column**	**Residual**
itm13	**C2**	3.80242
itm25	**C4**	3.30930
itm18	**itm17**	3.25399
itm25	**itm21**	3.24148
itm8	**C5**	-3.23876
itm20	**C2**	-3.20883
itm11	**C3**	3.11827
itm27	**C5**	-2.88995
itm25	**C3**	2.84839
itm27	**itm11**	-2.76613

Manifest Variable Equations with Estimates

C1	=	0.7678	*	F1	+	1.0000	E1
Std Err		0.0698		gamma1			
t Value		10.9950					
C2	=	0.4423	*	F1	+	1.0000	E2
Std Err		0.0796		gamma2			
t Value		5.5587					
C3	=	0.8118	*	F1	+	1.0000	E3
Std Err		0.0680		gamma3			
t Value		11.9296					
C4	=	0.8174	*	F1	+	1.0000	E4
Std Err		0.0678		gamma4			
t Value		12.0534					
C5	=	0.8557	*	F1	+	1.0000	E5
Std Err		0.0662		gamma5			
t Value		12.9283					
C6	=	0.6097	*	F1	+	1.0000	E6
Std Err		0.0753		gamma6			
t Value		8.0935					
itm2	=	0.7747	*	F2	+	1.0000	E8
Std Err		0.0685		gamma8			
t Value		11.3107					
itm8	=	0.8382	*	F2	+	1.0000	E9
Std Err		0.0658		gamma9			
t Value		12.7344					
itm10	=	0.9146	*	F2	+	1.0000	E10
Std Err		0.0624		gamma10			
t Value		14.6580					
itm11	=	0.8988	*	F2	+	1.0000	E11
Std Err		0.0631		gamma11			
t Value		14.2389					
itm13	=	0.5767	*	F3	+	1.0000	E12
Std Err		0.0813		gamma12			

t Value		7.0896						
itm14	=	0.7139	*	F3	+	1.0000	E13
Std Err		0.0777		gamma13			
t Value		9.1924					
itm15	=	0.5299	*	F3	+	1.0000	E14
Std Err		0.0825		gamma14			
t Value		6.4200					
itm17	=	0.6600	*	F3	+	1.0000	E15
Std Err		0.0791		gamma15			
t Value		8.3442					
itm18	=	0.7354	*	F3	+	1.0000	E16
Std Err		0.0771		gamma16			
t Value		9.5383					
itm20	=	0.7336	*	F4	+	1.0000	E17
Std Err		0.0726		gamma17			
t Value		10.1095					
itm21	=	0.7443	*	F4	+	1.0000	E18
Std Err		0.0722		gamma18			
t Value		10.3114					
itm23	=	0.7243	*	F4	+	1.0000	E19
Std Err		0.0729		gamma19			
t Value		9.9335					
itm24	=	0.6479	*	F4	+	1.0000	E20
Std Err		0.0755		gamma20			
t Value		8.5768					
itm25	=	0.7874	*	F4	+	1.0000	E21
Std Err		0.0706		gamma21			
t Value		11.1610					
itm27	=	0.5297	*	F4	+	1.0000	E22
Std Err		0.0790		gamma22			
t Value		6.7075					
OPN_MM	=	0.7149	*	F5	+	1.0000	E23
Std Err		0.0699		gamma23			
t Value		10.2342					
CLS_MM	=	0.4057	*	F5	+	1.0000	E24

Std Err		0.0778		gamma24				
t Value		5.2156						
OPN_YR	=	0.9718	*	F5	+	1.0000		E25
Std Err		0.0596		gamma25				
t Value		16.2984						
CLS_YR	=	0.9442	*	F5	+	1.0000		E26
Std Err		0.0609		gamma26				
t Value		15.4936						
INV_ENF_HRS	=	0.3136	*	F5	+	1.0000		E27
Std Err		0.0792		gamma27				
t Value		3.9585						
SAC_CZP4	=	0.4069	*	F6	+	1.0000		E28
Std Err		0.0794		gamma28				
t Value		5.1265						
CS_CZP1	=	0.8859	*	F6	+	1.0000		E29
Std Err		0.0642		gamma29				
t Value		13.7972						
CS_CZP2	=	0.9158	*	F6	+	1.0000		E30
Std Err		0.0630		gamma30				
t Value		14.5449						
CS_CZP4	=	0.8568	*	F6	+	1.0000		E31
Std Err		0.0654		gamma31				
t Value		13.1041						

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
F1		1.00000		
F2		1.00000		
F3		1.00000		
F4		1.00000		
F5		1.00000		

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
F6		1.00000		
E1	error1	0.41060	0.05525	7.43
E2	error2	0.80435	0.09328	8.62
E3	error3	0.34113	0.04928	6.92
E4	error4	0.33198	0.04854	6.84
E5	error5	0.26781	0.04381	6.11
E6	error6	0.62830	0.07587	8.28
E8	error7	0.39992	0.05095	7.85
E9	error8	0.29753	0.04110	7.24
E10	error9	0.16366	0.03108	5.27
E11	error10	0.19227	0.03279	5.86
E12	error11	0.66743	0.08610	7.75
E13	error12	0.49042	0.07538	6.51
E14	error13	0.71923	0.08995	8.00
E15	error14	0.56450	0.07923	7.12
E16	error15	0.45915	0.07412	6.19
E17	error16	0.46181	0.06350	7.27
E18	error17	0.44611	0.06224	7.17
E19	error18	0.47548	0.06461	7.36
E20	error19	0.58033	0.07362	7.88
E21	error20	0.38006	0.05730	6.63
E22	error21	0.71940	0.08630	8.34
E23	error22	0.48888	0.05768	8.48
E24	error23	0.83537	0.09500	8.79

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
E25	error24	0.05549	0.02780	2.00
E26	error25	0.10842	0.02840	3.82
E27	error26	0.90159	0.10218	8.82
E28	error27	0.83441	0.09578	8.71
E29	error28	0.21513	0.03721	5.78
E30	error29	0.16137	0.03496	4.62
E31	error30	0.26592	0.04019	6.62

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F1	**F2**	COVF1F2	0.30672	0.07982	3.84
F1	**F3**	COVF1F3	0.13909	0.09287	1.50
F2	**F3**	COVF2F3	0.36386	0.08249	4.41
F1	**F4**	COVF1F4	0.30076	0.08349	3.60
F2	**F4**	COVF2F4	0.43774	0.07402	5.91
F3	**F4**	COVF3F4	0.32191	0.08835	3.64
F1	**F5**	COVF1F5	-0.04390	0.08556	-0.51
F2	**F5**	COVF2F5	0.11258	0.08332	1.35
F3	**F5**	COVF3F5	0.06132	0.09088	0.67
F4	**F5**	COVF4F5	-0.12038	0.08641	-1.39
F1	**F6**	COVF1F6	0.18006	0.08507	2.12
F2	**F6**	COVF2F6	0.05901	0.08594	0.69
F3	**F6**	COVF3F6	-0.01773	0.09320	-0.19
F4	**F6**	COVF4F6	-0.14006	0.08797	-1.59

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F5	**F6**	COVF5F6	0.26563	0.07907	3.36

Manifest Variable Equations with Standardized Estimates

C1	=	0.7677	*	F1	+	0.6408	E1
				gamma1			
C2	=	0.4423	*	F1	+	0.8968	E2
				gamma2			
C3	=	0.8117	*	F1	+	0.5840	E3
				gamma3			
C4	=	0.8173	*	F1	+	0.5762	E4
				gamma4			
C5	=	0.8557	*	F1	+	0.5175	E5
				gamma5			
C6	=	0.6097	*	F1	+	0.7926	E6
				gamma6			
itm2	=	0.7747	*	F2	+	0.6324	E8
				gamma8			
itm8	=	0.8381	*	F2	+	0.5454	E9
				gamma9			
itm10	=	0.9145	*	F2	+	0.4045	E10
				gamma10			
itm11	=	0.8987	*	F2	+	0.4385	E11
				gamma11			
itm13	=	0.5767	*	F3	+	0.8169	E12
				gamma12			
itm14	=	0.7139	*	F3	+	0.7003	E13
				gamma13			
itm15	=	0.5299	*	F3	+	0.8481	E14
				gamma14			
itm17	=	0.6600	*	F3	+	0.7513	E15

				gamma15			
itm18	=	0.7354	*	F3	+	0.6776	E16
				gamma16			
itm20	=	0.7336	*	F4	+	0.6796	E17
				gamma17			
itm21	=	0.7442	*	F4	+	0.6679	E18
				gamma18			
itm23	=	0.7242	*	F4	+	0.6895	E19
				gamma19			
itm24	=	0.6479	*	F4	+	0.7618	E20
				gamma20			
itm25	=	0.7874	*	F4	+	0.6165	E21
				gamma21			
itm27	=	0.5297	*	F4	+	0.8482	E22
				gamma22			
OPN_MM	=	0.7149	*	F5	+	0.6992	E23
				gamma23			
CLS_MM	=	0.4057	*	F5	+	0.9140	E24
				gamma24			
OPN_YR	=	0.9719	*	F5	+	0.2356	E25
				gamma25			
CLS_YR	=	0.9442	*	F5	+	0.3293	E26
				gamma26			
INV_ENF_HRS	=	0.3136	*	F5	+	0.9496	E27
				gamma27			
SAC_CZP4	=	0.4069	*	F6	+	0.9135	E28
				gamma28			
CS_CZP1	=	0.8859	*	F6	+	0.4638	E29
				gamma29			
CS_CZP2	=	0.9158	*	F6	+	0.4017	E30
				gamma30			
CS_CZP4	=	0.8568	*	F6	+	0.5157	E31
				gamma31			

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
1	C1	0.41060	1.00008	0.5894
2	C2	0.80435	1.00002	0.1957
3	C3	0.34113	1.00007	0.6589
4	C4	0.33198	1.00007	0.6680
5	C5	0.26781	1.00008	0.7322
6	C6	0.62830	1.00007	0.3717
7	itm2	0.39992	1.00006	0.6001
8	itm8	0.29753	1.00006	0.7025
9	itm10	0.16366	1.00007	0.8363
10	itm11	0.19227	1.00005	0.8077
11	itm13	0.66743	1.00003	0.3326
12	itm14	0.49042	1.00004	0.5096
13	itm15	0.71923	1.00001	0.2808
14	itm17	0.56450	1.00007	0.4355
15	itm18	0.45915	1.00003	0.5409
16	itm20	0.46181	1.00004	0.5382
17	itm21	0.44611	1.00002	0.5539
18	itm23	0.47548	1.00002	0.5245
19	itm24	0.58033	1.00009	0.4197
20	itm25	0.38006	1.00007	0.6200
21	itm27	0.71940	1.00003	0.2806
22	OPN_MM	0.48888	0.99997	0.5111
23	CLS_MM	0.83537	0.99996	0.1646
24	OPN_YR	0.05549	0.99998	0.9445

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
25	**CLS_YR**	0.10842	0.99998	0.8916
26	**INV_ENF_HRS**	0.90159	0.99990	0.0983
27	**SAC_CZP4**	0.83441	1.00000	0.1656
28	**CS_CZP1**	0.21513	0.99998	0.7849
29	**CS_CZP2**	0.16137	0.99998	0.8386
30	**CS_CZP4**	0.26592	0.99997	0.7341

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	**F2**	COVF1F2	0.30672
F1	**F3**	COVF1F3	0.13909
F2	**F3**	COVF2F3	0.36386
F1	**F4**	COVF1F4	0.30076
F2	**F4**	COVF2F4	0.43774
F3	**F4**	COVF3F4	0.32191
F1	**F5**	COVF1F5	-0.04390
F2	**F5**	COVF2F5	0.11258
F3	**F5**	COVF3F5	0.06132
F4	**F5**	COVF4F5	-0.12038
F1	**F6**	COVF1F6	0.18006
F2	**F6**	COVF2F6	0.05901
F3	**F6**	COVF3F6	-0.01773
F4	**F6**	COVF4F6	-0.14006
F5	**F6**	COVF5F6	0.26563

The SAS System
The CALIS Procedure
Covariance Structure Analysis: Pattern and Initial Values

Measurement Model with 2 Factor Criterion Space- Revised

LINEQS Model Statement

		Matrix	Rows	Columns	Matrix Type	
Term 1	**1**	_SEL_	28	62	SELECTION	
	2	_BETA_	62	62	EQSBETA	IMINUSINV
	3	_GAMMA_	62	34	EQSGAMMA	
	4	_PHI_	34	34	SYMMETRIC	

The 28 Endogenous Variables

Manifest	C1 C3 C4 C5 C6 itm2 itm8 itm10 itm11 itm13 itm14 itm15 itm17 itm18 itm20 itm21 itm23 itm24 itm25 itm27 OPN_MM CLS_MM OPN_YR CLS_YR INV_ENF_HRS CS_CZP1 CS_CZP2 CS_CZP4
Latent	

The 34 Exogenous Variables

Manifest	
Latent	F1 F2 F3 F4 F5 F6
Error	E2 E3 E4 E5 E6 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 E24 E25 E26 E27 E28 E29 E30

Observations	158	**Model Terms**	1
Variables	28	**Model Matrices**	4
Informations	406	**Parameters**	71

Variable	Mean	Std Dev
C1	23.98101	3.26235
C3	24.28481	4.01128
C4	20.87975	3.73545
C5	23.12025	3.38290
C6	19.41772	3.50107
itm2	4.17089	0.88291
itm8	3.96203	0.97671
itm10	4.06962	1.00392
itm11	4.32911	0.90605
itm13	3.48101	0.81952
itm14	3.80380	0.83291
itm15	3.79114	0.74913
itm17	3.48734	0.85762
itm18	3.76582	0.73292
itm20	4.27848	0.58510
itm21	4.25316	0.59656
itm23	4.19620	0.59143
itm24	3.93038	0.66884
itm25	4.25949	0.60969
itm27	4.18354	0.61653
OPN_MM	1.59494	2.16821
CLS_MM	2.10127	4.45528
OPN_YR	20.23418	20.48369
CLS_YR	19.62658	21.22536
INV_ENF_HRS	164.03215	201.07282
CS_CZP1	5.81013	1.08933

Variable	Mean	Std Dev
CS_CZP2	5.57595	1.26337
CS_CZP4	5.35443	1.19487

Dual Quasi-Newton Optimization
Dual Broyden - Fletcher - Goldfarb - Shanno Update (DBFGS)

Parameter Estimates	71
Functions (Observations)	406

Optimization Start

Active Constraints	0	**Objective Function**	50.026009934
Max Abs Gradient Element	76.362624135		

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
1	0	2	0	5.27213	44.7539	2.4088
2	0	4	0	3.57930	1.6928	0.8552
3	0	5	0	3.11486	0.4644	4.7376
4	0	6	0	2.87596	0.2389	1.4540
5	0	8	0	2.78431	0.0917	0.7470
6	0	11	0	2.74470	0.0396	0.6539
7	0	13	0	2.73443	0.0103	0.1474
8	0	14	0	2.72748	0.00695	0.2061
9	0	16	0	2.72307	0.00440	0.1570
10	0	18	0	2.72206	0.00101	0.0529
11	0	19	0	2.72156	0.000502	0.0512
12	0	20	0	2.72101	0.000547	0.0167
13	0	22	0	2.72076	0.000254	0.0116
14	0	24	0	2.72066	0.000096	0.0134

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
15	0	26	0	2.72061	0.000056	0.0112
16	0	28	0	2.72058	0.000027	0.00750
17	0	30	0	2.72057	9.778E-6	0.00440
18	0	32	0	2.72056	5.349E-6	0.00130
19	0	34	0	2.72056	2.966E-6	0.00113
20	0	36	0	2.72056	1.08E-6	0.00156
21	0	38	0	2.72056	7.454E-7	0.000624
22	0	40	0	2.72056	3.082E-7	0.000960
23	0	42	0	2.72056	1.903E-7	0.000598
24	0	44	0	2.72056	1.19E-7	0.000303
25	0	46	0	2.72056	3.154E-8	0.000156
26	0	47	0	2.72056	2.662E-8	0.000222

Optimization Results

Iterations	26	**Function Calls**	48
Gradient Calls	31	**Active Constraints**	0
Objective Function	2.7205591738	**Max Abs Gradient Element**	0.0002220203
Slope of Search Direction	-1.58049E-8		

GCONV convergence criterion satisfied.

Fit Function	2.7206
Goodness of Fit Index (GFI)	0.8438
GFI Adjusted for Degrees of Freedom (AGFI)	0.8107

Root Mean Square Residual (RMR)	0.0637
Parsimonious GFI (Mulaik, 1989)	0.7478
Chi-Square	427.1278
Chi-Square DF	335
Pr > Chi-Square	0.0005
Independence Model Chi-Square	2693.1
Independence Model Chi-Square DF	378
RMSEA Estimate	0.0419
RMSEA 90% Lower Confidence Limit	0.0286
RMSEA 90% Upper Confidence Limit	0.0533
ECVI Estimate	3.8299
ECVI 90% Lower Confidence Limit	.
ECVI 90% Upper Confidence Limit	4.2087
Probability of Close Fit	0.8742
Bentler's Comparative Fit Index	0.9602
Normal Theory Reweighted LS Chi-Square	406.8238
Akaike's Information Criterion	-242.8722
Bozdogan's (1987) CAIC	-1603.8415
Schwarz's Bayesian Criterion	-1268.8415
McDonald's (1989) Centrality	0.7471
Bentler & Bonett's (1980) Non-normed Index	0.9551
Bentler & Bonett's (1980) NFI	0.8414
James, Mulaik, & Brett (1982) Parsimonious NFI	0.7457
Z-Test of Wilson & Hilferty (1931)	3.3009
Bollen (1986) Normed Index Rho1	0.8210
Bollen (1988) Non-normed Index Delta2	0.9609
Hoelter's (1983) Critical N	141

Manifest Variable Equations with Estimates

C1	=	0.7697	*	F1	+	1.0000	E2
Std Err		0.0699		gamma1			
t Value		11.0175					
C3	=	0.8187	*	F1	+	1.0000	E3
Std Err		0.0679		gamma3			
t Value		12.0611					
C4	=	0.8153	*	F1	+	1.0000	E4
Std Err		0.0680		gamma4			
t Value		11.9851					
C5	=	0.8508	*	F1	+	1.0000	E5
Std Err		0.0665		gamma5			
t Value		12.7859					
C6	=	0.6059	*	F1	+	1.0000	E6
Std Err		0.0756		gamma6			
t Value		8.0185					
itm2	=	0.7747	*	F2	+	1.0000	E8
Std Err		0.0685		gamma8			
t Value		11.3107					
itm8	=	0.8381	*	F2	+	1.0000	E9
Std Err		0.0658		gamma9			
t Value		12.7321					
itm10	=	0.9147	*	F2	+	1.0000	E10
Std Err		0.0624		gamma10			
t Value		14.6624					
itm11	=	0.8986	*	F2	+	1.0000	E11
Std Err		0.0631		gamma11			
t Value		14.2357					
itm13	=	0.5767	*	F3	+	1.0000	E12
Std Err		0.0813		gamma12			
t Value		7.0886					
itm14	=	0.7139	*	F3	+	1.0000	E13
Std Err		0.0777		gamma13			

t Value		9.1922					
itm15	=	0.5298	*	F3	+	1.0000	E14
Std Err		0.0825		gamma14			
t Value		6.4186					
itm17	=	0.6601	*	F3	+	1.0000	E15
Std Err		0.0791		gamma15			
t Value		8.3454					
itm18	=	0.7354	*	F3	+	1.0000	E16
Std Err		0.0771		gamma16			
t Value		9.5380					
itm20	=	0.7340	*	F4	+	1.0000	E17
Std Err		0.0725		gamma17			
t Value		10.1177					
itm21	=	0.7444	*	F4	+	1.0000	E18
Std Err		0.0722		gamma18			
t Value		10.3153					
itm23	=	0.7236	*	F4	+	1.0000	E19
Std Err		0.0729		gamma19			
t Value		9.9222					
itm24	=	0.6474	*	F4	+	1.0000	E20
Std Err		0.0755		gamma20			
t Value		8.5697					
itm25	=	0.7879	*	F4	+	1.0000	E21
Std Err		0.0705		gamma21			
t Value		11.1740					
itm27	=	0.5294	*	F4	+	1.0000	E22
Std Err		0.0790		gamma22			
t Value		6.7025					
OPN_MM	=	0.7149	*	F5	+	1.0000	E23
Std Err		0.0699		gamma23			
t Value		10.2344					
CLS_MM	=	0.4057	*	F5	+	1.0000	E24
Std Err		0.0778		gamma24			
t Value		5.2157					
OPN_YR	=	0.9719	*	F5	+	1.0000	E25

Std Err		0.0596		gamma25			
t Value		16.2980					
CLS_YR	=	0.9442	*	F5	+	1.0000	E26
Std Err		0.0609		gamma26			
t Value		15.4939					
INV_ENF_HRS	=	0.3136	*	F5	+	1.0000	E27
Std Err		0.0792		gamma27			
t Value		3.9586					
CS_CZP1	=	0.8871	*	F6	+	1.0000	E28
Std Err		0.0643		gamma29			
t Value		13.8035					
CS_CZP2	=	0.9162	*	F6	+	1.0000	E29
Std Err		0.0631		gamma30			
t Value		14.5232					
CS_CZP4	=	0.8547	*	F6	+	1.0000	E30
Std Err		0.0655		gamma31			
t Value		13.0424					

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
F1		1.00000		
F2		1.00000		
F3		1.00000		
F4		1.00000		
F5		1.00000		
F6		1.00000		
E2	error1	0.40750	0.05532	7.37
E3	error2	0.32970	0.04884	6.75
E4	error3	0.33533	0.04928	6.80
E5	error4	0.27612	0.04500	6.14

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
E6	error5	0.63291	0.07649	8.27
E8	error6	0.39990	0.05094	7.85
E9	error7	0.29769	0.04111	7.24
E10	error8	0.16337	0.03106	5.26
E11	error9	0.19249	0.03280	5.87
E12	error10	0.66750	0.08611	7.75
E13	error11	0.49041	0.07538	6.51
E14	error12	0.71932	0.08996	8.00
E15	error13	0.56437	0.07922	7.12
E16	error14	0.45915	0.07412	6.19
E17	error15	0.46129	0.06343	7.27
E18	error16	0.44594	0.06220	7.17
E19	error17	0.47647	0.06467	7.37
E20	error18	0.58091	0.07366	7.89
E21	error19	0.37916	0.05720	6.63
E22	error20	0.71982	0.08633	8.34
E23	error21	0.48887	0.05768	8.48
E24	error22	0.83544	0.09501	8.79
E25	error23	0.05551	0.02780	2.00
E26	error24	0.10840	0.02840	3.82
E27	error25	0.90165	0.10219	8.82
E28	error26	0.21297	0.03768	5.65
E29	error27	0.16064	0.03577	4.49
E30	error28	0.26948	0.04075	6.61

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F1	**F2**	COVF1F2	0.31179	0.07972	3.91
F1	**F3**	COVF1F3	0.12702	0.09327	1.36
F2	**F3**	COVF2F3	0.36388	0.08249	4.41
F1	**F4**	COVF1F4	0.31274	0.08306	3.77
F2	**F4**	COVF2F4	0.43768	0.07402	5.91
F3	**F4**	COVF3F4	0.32202	0.08834	3.65
F1	**F5**	COVF1F5	-0.04066	0.08572	-0.47
F2	**F5**	COVF2F5	0.11252	0.08332	1.35
F3	**F5**	COVF3F5	0.06126	0.09088	0.67
F4	**F5**	COVF4F5	-0.12021	0.08641	-1.39
F1	**F6**	COVF1F6	0.16942	0.08556	1.98
F2	**F6**	COVF2F6	0.05941	0.08599	0.69
F3	**F6**	COVF3F6	-0.01521	0.09326	-0.16
F4	**F6**	COVF4F6	-0.14322	0.08795	-1.63
F5	**F6**	COVF5F6	0.26868	0.07899	3.40

Manifest Variable Equations with Standardized Estimates

C1	=	0.7697	*	F1	+	0.6384	E2
				gamma1			
C3	=	0.8187	*	F1	+	0.5742	E3
				gamma3			
C4	=	0.8153	*	F1	+	0.5791	E4
				gamma4			
C5	=	0.8508	*	F1	+	0.5255	E5
				gamma5			
C6	=	0.6059	*	F1	+	0.7955	E6
				gamma6			

itm2	=	0.7747	*	F2	+	0.6324	E8
				gamma8			
itm8	=	0.8380	*	F2	+	0.5456	E9
				gamma9			
itm10	=	0.9147	*	F2	+	0.4042	E10
				gamma10			
itm11	=	0.8986	*	F2	+	0.4387	E11
				gamma11			
itm13	=	0.5766	*	F3	+	0.8170	E12
				gamma12			
itm14	=	0.7139	*	F3	+	0.7003	E13
				gamma13			
itm15	=	0.5298	*	F3	+	0.8481	E14
				gamma14			
itm17	=	0.6600	*	F3	+	0.7512	E15
				gamma15			
itm18	=	0.7354	*	F3	+	0.6776	E16
				gamma16			
itm20	=	0.7340	*	F4	+	0.6792	E17
				gamma17			
itm21	=	0.7444	*	F4	+	0.6678	E18
				gamma18			
itm23	=	0.7236	*	F4	+	0.6903	E19
				gamma19			
itm24	=	0.6474	*	F4	+	0.7622	E20
				gamma20			
itm25	=	0.7879	*	F4	+	0.6158	E21
				gamma21			
itm27	=	0.5293	*	F4	+	0.8484	E22
				gamma22			
OPN_MM	=	0.7149	*	F5	+	0.6992	E23
				gamma23			
CLS_MM	=	0.4057	*	F5	+	0.9140	E24
				gamma24			
OPN_YR	=	0.9718	*	F5	+	0.2356	E25

				gamma25		
CLS_YR	=	0.9442	*	F5	+ 0.3292	E26
				gamma26		
INV_ENF_HRS	=	0.3136	*	F5	+ 0.9496	E27
				gamma27		
CS_CZP1	=	0.8871	*	F6	+ 0.4615	E28
				gamma29		
CS_CZP2	=	0.9162	*	F6	+ 0.4008	E29
				gamma30		
CS_CZP4	=	0.8547	*	F6	+ 0.5191	E30
				gamma31		

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
1	**C1**	0.40750	1.00001	0.5925
2	**C3**	0.32970	1.00004	0.6703
3	**C4**	0.33533	1.00002	0.6647
4	**C5**	0.27612	1.00002	0.7239
5	**C6**	0.63291	1.00003	0.3671
6	**itm2**	0.39990	1.00001	0.6001
7	**itm8**	0.29769	1.00002	0.7023
8	**itm10**	0.16337	1.00003	0.8366
9	**itm11**	0.19249	1.00001	0.8075
10	**itm13**	0.66750	1.00003	0.3325
11	**itm14**	0.49041	1.00001	0.5096
12	**itm15**	0.71932	1.00000	0.2807
13	**itm17**	0.56437	1.00004	0.4357
14	**itm18**	0.45915	1.00001	0.5409
15	**itm20**	0.46129	1.00005	0.5387
16	**itm21**	0.44594	1.00007	0.5541

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
17	**itm23**	0.47647	1.00003	0.5235
18	**itm24**	0.58091	1.00002	0.4191
19	**itm25**	0.37916	1.00001	0.6208
20	**itm27**	0.71982	1.00003	0.2802
21	**OPN_MM**	0.48887	0.99999	0.5111
22	**CLS_MM**	0.83544	1.00005	0.1646
23	**OPN_YR**	0.05551	1.00001	0.9445
24	**CLS_YR**	0.10840	1.00000	0.8916
25	**INV_ENF_HRS**	0.90165	0.99998	0.0983
26	**CS_CZP1**	0.21297	0.99998	0.7870
27	**CS_CZP2**	0.16064	1.00001	0.8394
28	**CS_CZP4**	0.26948	1.00003	0.7305

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	**F2**	COVF1F2	0.31179
F1	**F3**	COVF1F3	0.12702
F2	**F3**	COVF2F3	0.36388
F1	**F4**	COVF1F4	0.31274
F2	**F4**	COVF2F4	0.43768
F3	**F4**	COVF3F4	0.32202
F1	**F5**	COVF1F5	-0.04066
F2	**F5**	COVF2F5	0.11252
F3	**F5**	COVF3F5	0.06126

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F4	**F5**	COVF4F5	-0.12021
F1	**F6**	COVF1F6	0.16942
F2	**F6**	COVF2F6	0.05941
F3	**F6**	COVF3F6	-0.01521
F4	**F6**	COVF4F6	-0.14322
F5	**F6**	COVF5F6	0.26868

Note. F1 = Conscientiousness; F2 = Growth Need Strength; F3 = Performance Orientation; F4 = Learning Orientation; F5 = Task Performance; F6 = Citizenship Performance; see Appendix B for manifest variable key.

The SAS System

The CALIS Procedure

Covariance Structure Analysis: Pattern and Initial Values

Measurement Model with 3 Factor Criterion Space

LINEQS Model Statement

		Matrix	Rows	Columns	Matrix Type	
Term 1	**1**	_SEL_	39	85	SELECTION	
	2	_BETA_	85	85	EQSBETA	IMINUSINV
	3	_GAMMA_	85	46	EQSGAMMA	
	4	_PHI_	46	46	SYMMETRIC	

The 39 Endogenous Variables

Manifest	C1 C2 C3 C4 C5 C6 itm2 itm8 itm10 itm11 itm13 itm14 itm15 itm17 itm18 itm20 itm21 itm23 itm24 itm25 itm27 OPN_MM CLS_MM OPN_YR CLS_YR INV_ENF_HRS SAC_CZP4 CS_CZP1 CS_CZP2 CS_CZP4 SAC_OS SAC_ICE SAC_IGA SAC_SDA SAC_CPT SAC_SI SAC_II SAC_AA SAC_KKA
Latent	

The 46 Exogenous Variables

Manifest	
Latent	F1 F2 F3 F4 F5 F6 F7
Error	E1 E2 E3 E4 E5 E6 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 E24 E25 E26 E27 E28 E29 E30 E31 E32 E33 E34 E35 E36 E37 E38 E39 E40

Observations	158	**Model Terms**	1
Variables	39	**Model Matrices**	4
Informations	780	**Parameters**	99

Variable	Mean	Std Dev
C1	23.98101	3.26235
C2	19.30380	3.45804
C3	24.28481	4.01128
C4	20.87975	3.73545
C5	23.12025	3.38290
C6	19.41772	3.50107
itm2	4.17089	0.88291
itm8	3.96203	0.97671
itm10	4.06962	1.00392
itm11	4.32911	0.90605
itm13	3.48101	0.81952
itm14	3.80380	0.83291
itm15	3.79114	0.74913
itm17	3.48734	0.85762
itm18	3.76582	0.73292
itm20	4.27848	0.58510
itm21	4.25316	0.59656
itm23	4.19620	0.59143
itm24	3.93038	0.66884
itm25	4.25949	0.60969
itm27	4.18354	0.61653
OPN_MM	1.59494	2.16821
CLS_MM	2.10127	4.45528
OPN_YR	20.23418	20.48369
CLS_YR	19.62658	21.22536

Variable	Mean	Std Dev
INV_ENF_HRS	164.03215	201.07282
SAC_CZP4	5.65823	1.02063
CS_CZP1	5.81013	1.08933
CS_CZP2	5.57595	1.26337
CS_CZP4	5.35443	1.19487
SAC_OS	5.62025	0.82638
SAC_ICE	5.54430	0.92106
SAC_IGA	5.43038	0.90552
SAC_SDA	5.55063	0.96134
SAC_CPT	5.51899	0.97564
SAC_SI	5.46835	0.96875
SAC_II	5.58228	0.97885
SAC_AA	5.41772	0.98534
SAC_KKA	5.56329	0.95393

Dual Quasi-Newton Optimization

Dual Broyden - Fletcher - Goldfarb - Shanno Update (DBFGS)

Parameter Estimates	99
Functions (Observations)	780

Optimization Start

Active Constraints	0	**Objective Function**	79.377992849
Max Abs Gradient Element	78.330721845		

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
1	0	2	0	12.61714	66.7609	2.7317
2	0	4	0	9.32387	3.2933	1.6023

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
3	0	5	0	8.64591	0.6780	24.5529
4	0	6	0	7.70695	0.9390	5.6719
5	0	7	0	7.47156	0.2354	7.7613
6	0	8	0	7.19421	0.2774	1.6175
7	0	11	0	7.03057	0.1636	0.6715
8	0	14	0	6.99374	0.0368	0.4606
9	0	15	0	6.97194	0.0218	0.3603
10	0	16	0	6.95386	0.0181	0.2320
11	0	18	0	6.94697	0.00688	0.0692
12	0	20	0	6.94392	0.00305	0.0954
13	0	22	0	6.94239	0.00153	0.0775
14	0	24	0	6.94143	0.000962	0.0517
15	0	25	0	6.94110	0.000328	0.0451
16	0	26	0	6.94058	0.000526	0.0177
17	0	28	0	6.94042	0.000155	0.0226
18	0	29	0	6.94029	0.000130	0.0180
19	0	31	0	6.94025	0.000043	0.00322
20	0	32	0	6.94023	0.000015	0.0124
21	0	33	0	6.94021	0.000022	0.00747
22	0	35	0	6.94020	6.563E-6	0.00319
23	0	37	0	6.94020	4.272E-6	0.00261
24	0	39	0	6.94020	1.033E-6	0.00122
25	0	41	0	6.94020	2.125E-7	0.000758
26	0	43	R0	6.94020	1.374E-7	0.000242

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
27	0	45	0	6.94020	5.961E-8	0.000190

Optimization Results

Iterations	27	**Function Calls**	46
Gradient Calls	32	**Active Constraints**	0
Objective Function	6.9401980331	**Max Abs Gradient Element**	0.0001896539
Slope of Search Direction	-3.408033E-8		

GCONV convergence criterion satisfied.

Fit Function	6.9402
Goodness of Fit Index (GFI)	0.7689
GFI Adjusted for Degrees of Freedom (AGFI)	0.7353
Root Mean Square Residual (RMR)	0.0803
Parsimonious GFI (Mulaik, 1989)	0.7067
Chi-Square	1089.6111
Chi-Square DF	681
Pr > Chi-Square	<.0001
Independence Model Chi-Square	4566.1
Independence Model Chi-Square DF	741
RMSEA Estimate	0.0618
RMSEA 90% Lower Confidence Limit	0.0549
RMSEA 90% Upper Confidence Limit	0.0686
ECVI Estimate	8.6325
ECVI 90% Lower Confidence Limit	8.0570

ECVI 90% Upper Confidence Limit	9.2784
Probability of Close Fit	0.0029
Bentler's Comparative Fit Index	0.8932
Normal Theory Reweighted LS Chi-Square	920.0241
Akaike's Information Criterion	-272.3889
Bozdogan's (1987) CAIC	-3039.0161
Schwarz's Bayesian Criterion	-2358.0161
McDonald's (1989) Centrality	0.2744
Bentler & Bonett's (1980) Non-normed Index	0.8838
Bentler & Bonett's (1980) NFI	0.7614
James, Mulaik, & Brett (1982) Parsimonious NFI	0.6997
Z-Test of Wilson & Hilferty (1931)	9.4074
Bollen (1986) Normed Index Rho1	0.7403
Bollen (1988) Non-normed Index Delta2	0.8948
Hoelter's (1983) Critical N	109

Rank Order of the 10 Largest Raw Residuals

Row	**Column**	**Residual**
SAC_CPT	**SAC_CZP4**	0.50572
SAC_KKA	**SAC_CZP4**	0.49577
SAC_AA	**SAC_CZP4**	0.49047
SAC_OS	**SAC_CZP4**	0.48230
SAC_SDA	**SAC_CZP4**	0.44343
SAC_IGA	**SAC_CZP4**	0.44139
SAC_II	**SAC_CZP4**	0.42835
SAC_SI	**SAC_CZP4**	0.41811

Rank Order of the 10 Largest Raw Residuals

Row	**Column**	**Residual**
SAC_ICE	**SAC_CZP4**	0.41049
itm13	**C2**	0.28768

Rank Order of the 10 Largest Asymptotically Standardized Residuals

Row	**Column**	**Residual**
SAC_CPT	**SAC_CZP4**	7.54427
SAC_KKA	**SAC_CZP4**	7.53450
SAC_OS	**SAC_CZP4**	7.15247
SAC_AA	**SAC_CZP4**	7.12097
SAC_SDA	**SAC_CZP4**	6.51166
SAC_IGA	**SAC_CZP4**	6.41108
SAC_II	**SAC_CZP4**	6.16762
SAC_SI	**SAC_CZP4**	6.12188
SAC_ICE	**SAC_CZP4**	5.90505
itm13	**C2**	3.80047

Manifest Variable Equations with Estimates

C1	=	0.7676	*	F1	+	1.0000	E1
Std Err		0.0698		gamma1			
t Value		10.9912					
C2	=	0.4423	*	F1	+	1.0000	E2
Std Err		0.0796		gamma2			
t Value		5.5587					
C3	=	0.8112	*	F1	+	1.0000	E3
Std Err		0.0681		gamma3			
t Value		11.9183					
C4	=	0.8173	*	F1	+	1.0000	E4
Std Err		0.0678		gamma4			

t Value		12.0519					
C5	=	0.8563	*	F1	+	1.0000	E5
Std Err		0.0662		gamma5			
t Value		12.9427					
C6	=	0.6099	*	F1	+	1.0000	E6
Std Err		0.0753		gamma6			
t Value		8.0968					
itm2	=	0.7747	*	F2	+	1.0000	E8
Std Err		0.0685		gamma8			
t Value		11.3103					
itm8	=	0.8382	*	F2	+	1.0000	E9
Std Err		0.0658		gamma9			
t Value		12.7342					
itm10	=	0.9146	*	F2	+	1.0000	E10
Std Err		0.0624		gamma10			
t Value		14.6591					
itm11	=	0.8987	*	F2	+	1.0000	E11
Std Err		0.0631		gamma11			
t Value		14.2376					
itm13	=	0.5789	*	F3	+	1.0000	E12
Std Err		0.0813		gamma12			
t Value		7.1225					
itm14	=	0.7188	*	F3	+	1.0000	E13
Std Err		0.0775		gamma13			
t Value		9.2755					
itm15	=	0.5295	*	F3	+	1.0000	E14
Std Err		0.0825		gamma14			
t Value		6.4158					
itm17	=	0.6591	*	F3	+	1.0000	E15
Std Err		0.0791		gamma15			
t Value		8.3328					
itm18	=	0.7295	*	F3	+	1.0000	E16
Std Err		0.0772		gamma16			
t Value		9.4478					
itm20	=	0.7340	*	F4	+	1.0000	E17

Std Err		0.0726		gamma17			
t Value		10.1167					
itm21	=	0.7450	*	F4	+	1.0000	E18
Std Err		0.0721		gamma18			
t Value		10.3262					
itm23	=	0.7240	*	F4	+	1.0000	E19
Std Err		0.0729		gamma19			
t Value		9.9291					
itm24	=	0.6473	*	F4	+	1.0000	E20
Std Err		0.0756		gamma20			
t Value		8.5668					
itm25	=	0.7872	*	F4	+	1.0000	E21
Std Err		0.0706		gamma21			
t Value		11.1576					
itm27	=	0.5294	*	F4	+	1.0000	E22
Std Err		0.0790		gamma22			
t Value		6.7022					
OPN_MM	=	0.7134	*	F5	+	1.0000	E23
Std Err		0.0699		gamma23			
t Value		10.2030					
CLS_MM	=	0.4079	*	F5	+	1.0000	E24
Std Err		0.0778		gamma24			
t Value		5.2410					
OPN_YR	=	0.9673	*	F5	+	1.0000	E25
Std Err		0.0598		gamma25			
t Value		16.1689					
CLS_YR	=	0.9489	*	F5	+	1.0000	E26
Std Err		0.0607		gamma26			
t Value		15.6323					
INV_ENF_HRS	=	0.3147	*	F5	+	1.0000	E27
Std Err		0.0793		gamma27			
t Value		3.9691					
SAC_CZP4	=	0.4316	*	F6	+	1.0000	E28
Std Err		0.0789		gamma28			
t Value		5.4689					

CS_CZP1	=	0.8899	*	F6	+	1.0000	E29
Std Err		0.0640		gamma29			
t Value		13.9061					
CS_CZP2	=	0.9105	*	F6	+	1.0000	E30
Std Err		0.0631		gamma30			
t Value		14.4275					
CS_CZP4	=	0.8532	*	F6	+	1.0000	E31
Std Err		0.0655		gamma31			
t Value		13.0248					
SAC_OS	=	0.8441	*	F7	+	1.0000	E32
Std Err		0.0649		gamma32			
t Value		13.0054					
SAC_ICE	=	0.7636	*	F7	+	1.0000	E33
Std Err		0.0683		gamma33			
t Value		11.1857					
SAC_IGA	=	0.7905	*	F7	+	1.0000	E34
Std Err		0.0672		gamma34			
t Value		11.7639					
SAC_SDA	=	0.8195	*	F7	+	1.0000	E35
Std Err		0.0660		gamma35			
t Value		12.4185					
SAC_CPT	=	0.8583	*	F7	+	1.0000	E36
Std Err		0.0643		gamma36			
t Value		13.3568					
SAC_SI	=	0.8119	*	F7	+	1.0000	E37
Std Err		0.0663		gamma37			
t Value		12.2432					
SAC_II	=	0.7662	*	F7	+	1.0000	E38
Std Err		0.0682		gamma38			
t Value		11.2401					
SAC_AA	=	0.7894	*	F7	+	1.0000	E39
Std Err		0.0672		gamma39			
t Value		11.7387					
SAC_KKA	=	0.9006	*	F7	+	1.0000	E40
Std Err		0.0622		gamma40			

t Value 14.4682

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
F1		1.00000		
F2		1.00000		
F3		1.00000		
F4		1.00000		
F5		1.00000		
F6		1.00000		
F7		1.00000		
E1	error1	0.41089	0.05526	7.44
E2	error2	0.80433	0.09327	8.62
E3	error3	0.34198	0.04933	6.93
E4	error4	0.33211	0.04854	6.84
E5	error5	0.26678	0.04373	6.10
E6	error6	0.62805	0.07585	8.28
E8	error7	0.39994	0.05095	7.85
E9	error8	0.29755	0.04110	7.24
E10	error9	0.16358	0.03107	5.26
E11	error10	0.19236	0.03280	5.87
E12	error11	0.66497	0.08590	7.74
E13	error12	0.48335	0.07500	6.45
E14	error13	0.71966	0.08997	8.00
E15	error14	0.56571	0.07926	7.14
E16	error15	0.46781	0.07436	6.29
E17	error16	0.46128	0.06344	7.27

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
E18	error17	0.44501	0.06214	7.16
E19	error18	0.47586	0.06463	7.36
E20	error19	0.58109	0.07368	7.89
E21	error20	0.38036	0.05731	6.64
E22	error21	0.71980	0.08633	8.34
E23	error22	0.49102	0.05795	8.47
E24	error23	0.83365	0.09485	8.79
E25	error24	0.06431	0.02761	2.33
E26	error25	0.09956	0.02803	3.55
E27	error26	0.90095	0.10214	8.82
E28	error27	0.81376	0.09366	8.69
E29	error28	0.20803	0.03657	5.69
E30	error29	0.17086	0.03486	4.90
E31	error30	0.27199	0.04052	6.71
E32	error31	0.28732	0.03708	7.75
E33	error32	0.41673	0.05060	8.24
E34	error33	0.37492	0.04620	8.12
E35	error34	0.32832	0.04132	7.95
E36	error35	0.26315	0.03460	7.60
E37	error36	0.34072	0.04262	8.00
E38	error37	0.41277	0.05018	8.23
E39	error38	0.37673	0.04639	8.12
E40	error39	0.18882	0.02724	6.93

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F1	**F2**	COVF1F2	0.30639	0.07984	3.84
F1	**F3**	COVF1F3	0.13968	0.09288	1.50
F2	**F3**	COVF2F3	0.36585	0.08240	4.44
F1	**F4**	COVF1F4	0.30065	0.08349	3.60
F2	**F4**	COVF2F4	0.43767	0.07402	5.91
F3	**F4**	COVF3F4	0.32297	0.08832	3.66
F1	**F5**	COVF1F5	-0.04426	0.08566	-0.52
F2	**F5**	COVF2F5	0.11064	0.08345	1.33
F3	**F5**	COVF3F5	0.06108	0.09102	0.67
F4	**F5**	COVF4F5	-0.12344	0.08645	-1.43
F1	**F6**	COVF1F6	0.18091	0.08512	2.13
F2	**F6**	COVF2F6	0.05931	0.08601	0.69
F3	**F6**	COVF3F6	-0.01582	0.09330	-0.17
F4	**F6**	COVF4F6	-0.14024	0.08804	-1.59
F5	**F6**	COVF5F6	0.26869	0.07910	3.40
F1	**F7**	COVF1F7	0.11566	0.08519	1.36
F2	**F7**	COVF2F7	0.04319	0.08471	0.51
F3	**F7**	COVF3F7	-0.08134	0.09126	-0.89
F4	**F7**	COVF4F7	-0.03779	0.08799	-0.43
F5	**F7**	COVF5F7	0.24496	0.07866	3.11
F6	**F7**	COVF6F7	0.44838	0.06929	6.47

Manifest Variable Equations with Standardized Estimates

C1	= 0.7675	*	F1	+	0.6410	E1
			gamma1			
C2	= 0.4423	*	F1	+	0.8969	E2

				gamma2				
C3	=	0.8112	*	F1	+	0.5848	E3	
				gamma3				
C4	=	0.8172	*	F1	+	0.5763	E4	
				gamma4				
C5	=	0.8563	*	F1	+	0.5165	E5	
				gamma5				
C6	=	0.6099	*	F1	+	0.7925	E6	
				gamma6				
itm2	=	0.7746	*	F2	+	0.6324	E8	
				gamma8				
itm8	=	0.8381	*	F2	+	0.5455	E9	
				gamma9				
itm10	=	0.9146	*	F2	+	0.4044	E10	
				gamma10				
itm11	=	0.8987	*	F2	+	0.4386	E11	
				gamma11				
itm13	=	0.5788	*	F3	+	0.8154	E12	
				gamma12				
itm14	=	0.7188	*	F3	+	0.6952	E13	
				gamma13				
itm15	=	0.5295	*	F3	+	0.8483	E14	
				gamma14				
itm17	=	0.6590	*	F3	+	0.7521	E15	
				gamma15				
itm18	=	0.7295	*	F3	+	0.6840	E16	
				gamma16				
itm20	=	0.7340	*	F4	+	0.6792	E17	
				gamma17				
itm21	=	0.7450	*	F4	+	0.6671	E18	
				gamma18				
itm23	=	0.7240	*	F4	+	0.6898	E19	
				gamma19				
itm24	=	0.6472	*	F4	+	0.7623	E20	
				gamma20				

itm25	=	0.7872	*	F4	+	0.6167	E21
				gamma21			
itm27	=	0.5294	*	F4	+	0.8484	E22
				gamma22			
OPN_MM	=	0.7134	*	F5	+	0.7007	E23
				gamma23			
CLS_MM	=	0.4079	*	F5	+	0.9130	E24
				gamma24			
OPN_YR	=	0.9673	*	F5	+	0.2536	E25
				gamma25			
CLS_YR	=	0.9489	*	F5	+	0.3155	E26
				gamma26			
INV_ENF_HRS	=	0.3147	*	F5	+	0.9492	E27
				gamma27			
SAC_CZP4	=	0.4316	*	F6	+	0.9021	E28
				gamma28			
CS_CZP1	=	0.8899	*	F6	+	0.4561	E29
				gamma29			
CS_CZP2	=	0.9106	*	F6	+	0.4134	E30
				gamma30			
CS_CZP4	=	0.8532	*	F6	+	0.5215	E31
				gamma31			
SAC_OS	=	0.8442	*	F7	+	0.5361	E32
				gamma32			
SAC_ICE	=	0.7637	*	F7	+	0.6456	E33
				gamma33			
SAC_IGA	=	0.7906	*	F7	+	0.6124	E34
				gamma34			
SAC_SDA	=	0.8195	*	F7	+	0.5730	E35
				gamma35			
SAC_CPT	=	0.8584	*	F7	+	0.5130	E36
				gamma36			
SAC_SI	=	0.8119	*	F7	+	0.5838	E37
				gamma37			
SAC_II	=	0.7663	*	F7	+	0.6425	E38

			gamma38			
SAC_AA	= 0.7894	*	F7	+ 0.6138	E39
			gamma39			
SAC_KKA	= 0.9006	*	F7	+ 0.4346	E40
			gamma40			

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
1	**C1**	0.41089	1.00003	0.5891
2	**C2**	0.80433	0.99998	0.1957
3	**C3**	0.34198	1.00001	0.6580
4	**C4**	0.33211	1.00001	0.6679
5	**C5**	0.26678	1.00003	0.7332
6	**C6**	0.62805	1.00002	0.3720
7	**itm2**	0.39994	1.00006	0.6001
8	**itm8**	0.29755	1.00009	0.7025
9	**itm10**	0.16358	1.00004	0.8364
10	**itm11**	0.19236	1.00004	0.8077
11	**itm13**	0.66497	1.00004	0.3351
12	**itm14**	0.48335	1.00003	0.5167
13	**itm15**	0.71966	1.00001	0.2804
14	**itm17**	0.56571	1.00007	0.4343
15	**itm18**	0.46781	1.00003	0.5322
16	**itm20**	0.46128	1.00001	0.5387
17	**itm21**	0.44501	1.00004	0.5550
18	**itm23**	0.47586	1.00001	0.5241
19	**itm24**	0.58109	1.00004	0.4189
20	**itm25**	0.38036	1.00003	0.6197

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
21	itm27	0.71980	1.00003	0.2802
22	OPN_MM	0.49102	1.00000	0.5090
23	CLS_MM	0.83365	1.00000	0.1663
24	OPN_YR	0.06431	1.00002	0.9357
25	CLS_YR	0.09956	1.00001	0.9004
26	INV_ENF_HRS	0.90095	0.99997	0.0990
27	SAC_CZP4	0.81376	1.00000	0.1862
28	CS_CZP1	0.20803	0.99996	0.7920
29	CS_CZP2	0.17086	0.99996	0.8291
30	CS_CZP4	0.27199	0.99996	0.7280
31	SAC_OS	0.28732	0.99986	0.7126
32	SAC_ICE	0.41673	0.99988	0.5832
33	SAC_IGA	0.37492	0.99985	0.6250
34	SAC_SDA	0.32832	0.99986	0.6716
35	SAC_CPT	0.26315	0.99982	0.7368
36	SAC_SI	0.34072	0.99985	0.6592
37	SAC_II	0.41277	0.99987	0.5872
38	SAC_AA	0.37673	0.99985	0.6232
39	SAC_KKA	0.18882	0.99982	0.8111

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	F2	COVF1F2	0.30639
F1	F3	COVF1F3	0.13968
F2	F3	COVF2F3	0.36585

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	**F4**	COVF1F4	0.30065
F2	**F4**	COVF2F4	0.43767
F3	**F4**	COVF3F4	0.32297
F1	**F5**	COVF1F5	-0.04426
F2	**F5**	COVF2F5	0.11064
F3	**F5**	COVF3F5	0.06108
F4	**F5**	COVF4F5	-0.12344
F1	**F6**	COVF1F6	0.18091
F2	**F6**	COVF2F6	0.05931
F3	**F6**	COVF3F6	-0.01582
F4	**F6**	COVF4F6	-0.14024
F5	**F6**	COVF5F6	0.26869
F1	**F7**	COVF1F7	0.11566
F2	**F7**	COVF2F7	0.04319
F3	**F7**	COVF3F7	-0.08134
F4	**F7**	COVF4F7	-0.03779
F5	**F7**	COVF5F7	0.24496
F6	**F7**	COVF6F7	0.44838

The SAS System
The CALIS Procedure
Covariance Structure Analysis: Pattern and Initial Values

Measurement Model with 3 Factor Criterion Space - Revised

LINEQS Model Statement

		Matrix	Rows	Columns	Matrix Type	
Term 1	**1**	_SEL_	37	81	SELECTION	
	2	_BETA_	81	81	EQSBETA	IMINUSINV
	3	_GAMMA_	81	44	EQSGAMMA	
	4	_PHI_	44	44	SYMMETRIC	

The 37 Endogenous Variables

Manifest	C1 C3 C4 C5 C6 itm2 itm8 itm10 itm11 itm13 itm14 itm15 itm17 itm18 itm20 itm21 itm23 itm24 itm25 itm27 OPN_MM CLS_MM OPN_YR CLS_YR INV_ENF_HRS CS_CZP1 CS_CZP2 CS_CZP4 SAC_OS SAC_ICE SAC_IGA SAC_SDA SAC_CPT SAC_SI SAC_II SAC_AA SAC_KKA
Latent	

The 44 Exogenous Variables

Manifest	
Latent	F1 F2 F3 F4 F5 F6 F7
Error	E2 E3 E4 E5 E6 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 E24 E25 E26 E27 E29 E30 E31 E32 E33 E34 E35 E36 E37 E38 E39 E40

Observations	158	**Model Terms**	1
Variables	37	**Model Matrices**	4
Informations	703	**Parameters**	95

Variable	Mean	Std Dev

Variable	Mean	Std Dev
C1	23.98101	3.26235
C3	24.28481	4.01128
C4	20.87975	3.73545
C5	23.12025	3.38290
C6	19.41772	3.50107
itm2	4.17089	0.88291
itm8	3.96203	0.97671
itm10	4.06962	1.00392
itm11	4.32911	0.90605
itm13	3.48101	0.81952
itm14	3.80380	0.83291
itm15	3.79114	0.74913
itm17	3.48734	0.85762
itm18	3.76582	0.73292
itm20	4.27848	0.58510
itm21	4.25316	0.59656
itm23	4.19620	0.59143
itm24	3.93038	0.66884
itm25	4.25949	0.60969
itm27	4.18354	0.61653
OPN_MM	1.59494	2.16821
CLS_MM	2.10127	4.45528
OPN_YR	20.23418	20.48369
CLS_YR	19.62658	21.22536
INV_ENF_HRS	164.03215	201.07282
CS_CZP1	5.81013	1.08933

Variable	Mean	Std Dev
CS_CZP2	5.57595	1.26337
CS_CZP4	5.35443	1.19487
SAC_OS	5.62025	0.82638
SAC_ICE	5.54430	0.92106
SAC_IGA	5.43038	0.90552
SAC_SDA	5.55063	0.96134
SAC_CPT	5.51899	0.97564
SAC_SI	5.46835	0.96875
SAC_II	5.58228	0.97885
SAC_AA	5.41772	0.98534
SAC_KKA	5.56329	0.95393

Dual Quasi-Newton Optimization
Dual Broyden - Fletcher - Goldfarb - Shanno Update (DBFGS)

Parameter Estimates	95
Functions (Observations)	703

Optimization Start

Active Constraints	0	**Objective Function**	62.605061999
Max Abs Gradient Element	76.884086883		

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
1	0	2	0	9.08769	53.5174	2.5478
2	0	4	0	6.76926	2.3184	0.8533
3	0	5	0	6.14907	0.6202	6.7521
4	0	6	0	5.70120	0.4479	1.3002

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
5	0	8	0	5.55279	0.1484	0.9388
6	0	10	0	5.43671	0.1161	0.5896
7	0	12	0	5.39814	0.0386	0.9208
8	0	14	0	5.37810	0.0200	0.2747
9	0	16	0	5.36653	0.0116	0.1734
10	0	18	0	5.36252	0.00402	0.1797
11	0	20	0	5.35973	0.00279	0.0660
12	0	22	0	5.35864	0.00109	0.1016
13	0	23	0	5.35817	0.000469	0.0581
14	0	24	0	5.35749	0.000685	0.0132
15	0	26	0	5.35721	0.000270	0.0277
16	0	27	0	5.35704	0.000170	0.0205
17	0	29	0	5.35694	0.000105	0.00434
18	0	31	0	5.35688	0.000060	0.0109
19	0	33	0	5.35685	0.000026	0.00681
20	0	35	0	5.35684	0.000016	0.00213
21	0	37	0	5.35683	3.717E-6	0.00179
22	0	39	0	5.35683	1.556E-6	0.00105
23	0	41	0	5.35683	4.095E-7	0.00109
24	0	43	0	5.35683	2.158E-7	0.000293
25	0	45	0	5.35683	1.004E-7	0.000386

Optimization Results

Optimization Results

Iterations	25	**Function Calls**	46
Gradient Calls	29	**Active Constraints**	0
Objective Function	5.3568319905	**Max Abs Gradient Element**	0.0003861654
Slope of Search Direction	-4.961129E-8		

GCONV convergence criterion satisfied.

Fit Function	5.3568
Goodness of Fit Index (GFI)	0.7934
GFI Adjusted for Degrees of Freedom (AGFI)	0.7611
Root Mean Square Residual (RMR)	0.0620
Parsimonious GFI (Mulaik, 1989)	0.7243
Chi-Square	841.0226
Chi-Square DF	608
Pr > Chi-Square	<.0001
Independence Model Chi-Square	4258.0
Independence Model Chi-Square DF	666
RMSEA Estimate	0.0494
RMSEA 90% Lower Confidence Limit	0.0410
RMSEA 90% Upper Confidence Limit	0.0573
ECVI Estimate	6.9535
ECVI 90% Lower Confidence Limit	.
ECVI 90% Upper Confidence Limit	7.4939
Probability of Close Fit	0.5412
Bentler's Comparative Fit Index	0.9351
Normal Theory Reweighted LS Chi-Square	756.5395

Akaike's Information Criterion	-374.9774
Bozdogan's (1987) CAIC	-2845.0352
Schwarz's Bayesian Criterion	-2237.0352
McDonald's (1989) Centrality	0.4783
Bentler & Bonett's (1980) Non-normed Index	0.9289
Bentler & Bonett's (1980) NFI	0.8025
James, Mulaik, & Brett (1982) Parsimonious NFI	0.7326
Z-Test of Wilson & Hilferty (1931)	5.9932
Bollen (1986) Normed Index Rho1	0.7836
Bollen (1988) Non-normed Index Delta2	0.9362
Hoelter's (1983) Critical N	126

Manifest Variable Equations with Estimates

C1	=	0.7695	*	F1	+	1.0000	E2
Std Err		0.0699		gamma1			
t Value		11.0133					
C3	=	0.8181	*	F1	+	1.0000	E3
Std Err		0.0679		gamma3			
t Value		12.0469					
C4	=	0.8153	*	F1	+	1.0000	E4
Std Err		0.0680		gamma4			
t Value		11.9853					
C5	=	0.8515	*	F1	+	1.0000	E5
Std Err		0.0665		gamma5			
t Value		12.8033					
C6	=	0.6061	*	F1	+	1.0000	E6
Std Err		0.0756		gamma6			
t Value		8.0228					
itm2	=	0.7747	*	F2	+	1.0000	E8
Std Err		0.0685		gamma8			
t Value		11.3107					

itm8	=	0.8381	*	F2	+	1.0000	E9
Std Err		0.0658		gamma9			
t Value		12.7323					
itm10	=	0.9147	*	F2	+	1.0000	E10
Std Err		0.0624		gamma10			
t Value		14.6636					
itm11	=	0.8986	*	F2	+	1.0000	E11
Std Err		0.0631		gamma11			
t Value		14.2348					
itm13	=	0.5787	*	F3	+	1.0000	E12
Std Err		0.0813		gamma12			
t Value		7.1203					
itm14	=	0.7189	*	F3	+	1.0000	E13
Std Err		0.0775		gamma13			
t Value		9.2765					
itm15	=	0.5293	*	F3	+	1.0000	E14
Std Err		0.0825		gamma14			
t Value		6.4138					
itm17	=	0.6592	*	F3	+	1.0000	E15
Std Err		0.0791		gamma15			
t Value		8.3342					
itm18	=	0.7296	*	F3	+	1.0000	E16
Std Err		0.0772		gamma16			
t Value		9.4495					
itm20	=	0.7343	*	F4	+	1.0000	E17
Std Err		0.0725		gamma17			
t Value		10.1245					
itm21	=	0.7451	*	F4	+	1.0000	E18
Std Err		0.0721		gamma18			
t Value		10.3287					
itm23	=	0.7234	*	F4	+	1.0000	E19
Std Err		0.0729		gamma19			
t Value		9.9186					
itm24	=	0.6469	*	F4	+	1.0000	E20
Std Err		0.0756		gamma20			

t Value		8.5617					
itm25	=	0.7878	*	F4	+	1.0000	E21
Std Err		0.0705		gamma21			
t Value		11.1718					
itm27	=	0.5290	*	F4	+	1.0000	E22
Std Err		0.0790		gamma22			
t Value		6.6977					
OPN_MM	=	0.7134	*	F5	+	1.0000	E23
Std Err		0.0699		gamma23			
t Value		10.2022					
CLS_MM	=	0.4079	*	F5	+	1.0000	E24
Std Err		0.0778		gamma24			
t Value		5.2419					
OPN_YR	=	0.9671	*	F5	+	1.0000	E25
Std Err		0.0598		gamma25			
t Value		16.1641					
CLS_YR	=	0.9491	*	F5	+	1.0000	E26
Std Err		0.0607		gamma26			
t Value		15.6373					
INV_ENF_HRS	=	0.3147	*	F5	+	1.0000	E27
Std Err		0.0793		gamma27			
t Value		3.9696					
CS_CZP1	=	0.8923	*	F6	+	1.0000	E29
Std Err		0.0640		gamma29			
t Value		13.9503					
CS_CZP2	=	0.9133	*	F6	+	1.0000	E30
Std Err		0.0631		gamma30			
t Value		14.4762					
CS_CZP4	=	0.8519	*	F6	+	1.0000	E31
Std Err		0.0656		gamma31			
t Value		12.9905					
SAC_OS	=	0.8443	*	F7	+	1.0000	E32
Std Err		0.0649		gamma32			
t Value		13.0100					
SAC_ICE	=	0.7636	*	F7	+	1.0000	E33

Std Err		0.0683		gamma33				
t Value		11.1858						
SAC_IGA	=	0.7906	*	F7	+	1.0000		E34
Std Err		0.0672		gamma34				
t Value		11.7668						
SAC_SDA	=	0.8195	*	F7	+	1.0000		E35
Std Err		0.0660		gamma35				
t Value		12.4188						
SAC_CPT	=	0.8582	*	F7	+	1.0000		E36
Std Err		0.0643		gamma36				
t Value		13.3543						
SAC_SI	=	0.8118	*	F7	+	1.0000		E37
Std Err		0.0663		gamma37				
t Value		12.2419						
SAC_II	=	0.7662	*	F7	+	1.0000		E38
Std Err		0.0682		gamma38				
t Value		11.2395						
SAC_AA	=	0.7890	*	F7	+	1.0000		E39
Std Err		0.0673		gamma39				
t Value		11.7309						
SAC_KKA	=	0.9005	*	F7	+	1.0000		E40
Std Err		0.0622		gamma40				
t Value		14.4664						

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
F1		1.00000		
F2		1.00000		
F3		1.00000		
F4		1.00000		
F5		1.00000		

Variances of Exogenous Variables

Variable	**Parameter**	**Estimate**	**Standard Error**	**t Value**
F6		1.00000		
F7		1.00000		
E2	error1	0.40786	0.05534	7.37
E3	error2	0.33079	0.04891	6.76
E4	error3	0.33536	0.04927	6.81
E5	error4	0.27490	0.04490	6.12
E6	error5	0.63261	0.07646	8.27
E8	error6	0.39991	0.05095	7.85
E9	error7	0.29768	0.04111	7.24
E10	error8	0.16330	0.03105	5.26
E11	error9	0.19255	0.03280	5.87
E12	error10	0.66513	0.08591	7.74
E13	error11	0.48327	0.07499	6.44
E14	error12	0.71978	0.08997	8.00
E15	error13	0.56559	0.07925	7.14
E16	error14	0.46767	0.07435	6.29
E17	error15	0.46080	0.06338	7.27
E18	error16	0.44493	0.06211	7.16
E19	error17	0.47678	0.06468	7.37
E20	error18	0.58159	0.07371	7.89
E21	error19	0.37940	0.05721	6.63
E22	error20	0.72016	0.08636	8.34
E23	error21	0.49108	0.05795	8.47
E24	error22	0.83354	0.09484	8.79

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
E25	error23	0.06464	0.02760	2.34
E26	error24	0.09924	0.02801	3.54
E27	error25	0.90086	0.10213	8.82
E29	error26	0.20368	0.03676	5.54
E30	error27	0.16584	0.03526	4.70
E31	error28	0.27410	0.04080	6.72
E32	error29	0.28696	0.03705	7.75
E33	error30	0.41667	0.05060	8.23
E34	error31	0.37465	0.04618	8.11
E35	error32	0.32827	0.04133	7.94
E36	error33	0.26328	0.03463	7.60
E37	error34	0.34076	0.04263	7.99
E38	error35	0.41277	0.05019	8.22
E39	error36	0.37724	0.04645	8.12
E40	error37	0.18889	0.02726	6.93

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F1	**F2**	COVF1F2	0.31142	0.07973	3.91
F1	**F3**	COVF1F3	0.12758	0.09328	1.37
F2	**F3**	COVF2F3	0.36585	0.08240	4.44
F1	**F4**	COVF1F4	0.31258	0.08306	3.76
F2	**F4**	COVF2F4	0.43767	0.07402	5.91

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F3	**F4**	COVF3F4	0.32309	0.08831	3.66
F1	**F5**	COVF1F5	-0.04125	0.08582	-0.48
F2	**F5**	COVF2F5	0.11048	0.08346	1.32
F3	**F5**	COVF3F5	0.06098	0.09102	0.67
F4	**F5**	COVF4F5	-0.12346	0.08645	-1.43
F1	**F6**	COVF1F6	0.16941	0.08557	1.98
F2	**F6**	COVF2F6	0.05970	0.08600	0.69
F3	**F6**	COVF3F6	-0.01317	0.09330	-0.14
F4	**F6**	COVF4F6	-0.14368	0.08795	-1.63
F5	**F6**	COVF5F6	0.27161	0.07897	3.44
F1	**F7**	COVF1F7	0.11503	0.08534	1.35
F2	**F7**	COVF2F7	0.04311	0.08471	0.51
F3	**F7**	COVF3F7	-0.08142	0.09126	-0.89
F4	**F7**	COVF4F7	-0.03773	0.08799	-0.43
F5	**F7**	COVF5F7	0.24509	0.07865	3.12
F6	**F7**	COVF6F7	0.42146	0.07115	5.92

Manifest Variable Equations with Standardized Estimates

C1	=	0.7695	*	F1	+	0.6386	E2
				gamma1			
C3	=	0.8181	*	F1	+	0.5751	E3
				gamma3			
C4	=	0.8153	*	F1	+	0.5791	E4
				gamma4			
C5	=	0.8515	*	F1	+	0.5243	E5
				gamma5			

C6	=	0.6061	*	F1	+	0.7954	E6
				gamma6			
itm2	=	0.7747	*	F2	+	0.6324	E8
				gamma8			
itm8	=	0.8380	*	F2	+	0.5456	E9
				gamma9			
itm10	=	0.9147	*	F2	+	0.4041	E10
				gamma10			
itm11	=	0.8986	*	F2	+	0.4388	E11
				gamma11			
itm13	=	0.5787	*	F3	+	0.8156	E12
				gamma12			
itm14	=	0.7189	*	F3	+	0.6952	E13
				gamma13			
itm15	=	0.5293	*	F3	+	0.8484	E14
				gamma14			
itm17	=	0.6591	*	F3	+	0.7520	E15
				gamma15			
itm18	=	0.7296	*	F3	+	0.6839	E16
				gamma16			
itm20	=	0.7343	*	F4	+	0.6788	E17
				gamma17			
itm21	=	0.7450	*	F4	+	0.6670	E18
				gamma18			
itm23	=	0.7233	*	F4	+	0.6905	E19
				gamma19			
itm24	=	0.6469	*	F4	+	0.7626	E20
				gamma20			
itm25	=	0.7878	*	F4	+	0.6159	E21
				gamma21			
itm27	=	0.5290	*	F4	+	0.8486	E22
				gamma22			
OPN_MM	=	0.7134	*	F5	+	0.7008	E23
				gamma23			
CLS_MM	=	0.4079	*	F5	+	0.9130	E24

			gamma24			
OPN_YR	=	0.9671	* F5	+	0.2542	E25
			gamma25			
CLS_YR	=	0.9491	* F5	+	0.3150	E26
			gamma26			
INV_ENF_HRS	=	0.3147	* F5	+	0.9492	E27
			gamma27			
CS_CZP1	=	0.8924	* F6	+	0.4513	E29
			gamma29			
CS_CZP2	=	0.9133	* F6	+	0.4073	E30
			gamma30			
CS_CZP4	=	0.8520	* F6	+	0.5236	E31
			gamma31			
SAC_OS	=	0.8444	* F7	+	0.5357	E32
			gamma32			
SAC_ICE	=	0.7637	* F7	+	0.6456	E33
			gamma33			
SAC_IGA	=	0.7907	* F7	+	0.6122	E34
			gamma34			
SAC_SDA	=	0.8196	* F7	+	0.5730	E35
			gamma35			
SAC_CPT	=	0.8583	* F7	+	0.5132	E36
			gamma36			
SAC_SI	=	0.8119	* F7	+	0.5838	E37
			gamma37			
SAC_II	=	0.7663	* F7	+	0.6425	E38
			gamma38			
SAC_AA	=	0.7891	* F7	+	0.6143	E39
			gamma39			
SAC_KKA	=	0.9006	* F7	+	0.4347	E40
			gamma40			

Squared Multiple Correlations

Variable	Error Variance	Total Variance	R-Square

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
1	C1	0.40786	1.00002	0.5921
2	C3	0.33079	1.00002	0.6692
3	C4	0.33536	1.00001	0.6646
4	C5	0.27490	1.00003	0.7251
5	C6	0.63261	1.00002	0.3674
6	itm2	0.39991	1.00004	0.6001
7	itm8	0.29768	1.00003	0.7023
8	itm10	0.16330	1.00006	0.8367
9	itm11	0.19255	0.99998	0.8074
10	itm13	0.66513	1.00001	0.3349
11	itm14	0.48327	1.00004	0.5167
12	itm15	0.71978	0.99997	0.2802
13	itm17	0.56559	1.00007	0.4345
14	itm18	0.46767	1.00002	0.5323
15	itm20	0.46080	1.00003	0.5392
16	itm21	0.44493	1.00004	0.5551
17	itm23	0.47678	1.00001	0.5232
18	itm24	0.58159	1.00006	0.4184
19	itm25	0.37940	1.00005	0.6206
20	itm27	0.72016	1.00000	0.2798
21	OPN_MM	0.49108	0.99999	0.5089
22	CLS_MM	0.83354	0.99994	0.1664
23	OPN_YR	0.06464	1.00002	0.9354
24	CLS_YR	0.09924	0.99999	0.9008
25	INV_ENF_HRS	0.90086	0.99991	0.0991

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
26	**CS_CZP1**	0.20368	0.99993	0.7963
27	**CS_CZP2**	0.16584	0.99992	0.8341
28	**CS_CZP4**	0.27410	0.99992	0.7259
29	**SAC_OS**	0.28696	0.99980	0.7130
30	**SAC_ICE**	0.41667	0.99982	0.5833
31	**SAC_IGA**	0.37465	0.99975	0.6253
32	**SAC_SDA**	0.32827	0.99982	0.6717
33	**SAC_CPT**	0.26328	0.99975	0.7367
34	**SAC_SI**	0.34076	0.99978	0.6592
35	**SAC_II**	0.41277	0.99981	0.5872
36	**SAC_AA**	0.37724	0.99977	0.6227
37	**SAC_KKA**	0.18889	0.99975	0.8111

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	**F2**	COVF1F2	0.31142
F1	**F3**	COVF1F3	0.12758
F2	**F3**	COVF2F3	0.36585
F1	**F4**	COVF1F4	0.31258
F2	**F4**	COVF2F4	0.43767
F3	**F4**	COVF3F4	0.32309
F1	**F5**	COVF1F5	-0.04125
F2	**F5**	COVF2F5	0.11048
F3	**F5**	COVF3F5	0.06098
F4	**F5**	COVF4F5	-0.12346

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	**F6**	COVF1F6	0.16941
F2	**F6**	COVF2F6	0.05970
F3	**F6**	COVF3F6	-0.01317
F4	**F6**	COVF4F6	-0.14368
F5	**F6**	COVF5F6	0.27161
F1	**F7**	COVF1F7	0.11503
F2	**F7**	COVF2F7	0.04311
F3	**F7**	COVF3F7	-0.08142
F4	**F7**	COVF4F7	-0.03773
F5	**F7**	COVF5F7	0.24509
F6	**F7**	COVF6F7	0.42146

Note. F1 = Conscientiousness; F2 = Growth Need Strength; F3 = Performance Orientation; F4 = Learning Orientation; F5 = Task Performance; F6 = Citizenship Performance; F7 = Perception of Task Performance; see Appendix B for manifest variable key.

The SAS System
The CALIS Procedure
Covariance Structure Analysis: Pattern and Initial Values

Structural Model with 2 Factor Criterion Space

LINEQS Model Statement

		Matrix	Rows	Columns	Matrix Type	
Term 1	**1**	_SEL_	28	64	SELECTION	
	2	_BETA_	64	64	EQSBETA	IMINUSINV
	3	_GAMMA_	64	34	EQSGAMMA	
	4	_PHI_	34	34	SYMMETRIC	

The 30 Endogenous Variables

Manifest	C1 C3 C4 C5 C6 itm2 itm8 itm10 itm11 itm13 itm14 itm15 itm17 itm18 itm20 itm21 itm23 itm24 itm25 itm27 OPN_MM CLS_MM OPN_YR CLS_YR INV_ENF_HRS CS_CZP1 CS_CZP2 CS_CZP4
Latent	F5 F6

The 34 Exogenous Variables

Manifest	
Latent	F1 F2 F3 F4
Error	E2 E3 E4 E5 E6 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 E24 E25 E26 E27 E29 E30 E31 D1 D2

Observations	158	**Model Terms**	1
Variables	28	**Model Matrices**	4
Informations	406	**Parameters**	70

Variable	Mean	Std Dev
C1	23.98101	3.26235
C3	24.28481	4.01128
C4	20.87975	3.73545
C5	23.12025	3.38290
C6	19.41772	3.50107
itm2	4.17089	0.88291
itm8	3.96203	0.97671
itm10	4.06962	1.00392
itm11	4.32911	0.90605
itm13	3.48101	0.81952
itm14	3.80380	0.83291
itm15	3.79114	0.74913
itm17	3.48734	0.85762
itm18	3.76582	0.73292
itm20	4.27848	0.58510
itm21	4.25316	0.59656
itm23	4.19620	0.59143
itm24	3.93038	0.66884
itm25	4.25949	0.60969
itm27	4.18354	0.61653
OPN_MM	1.59494	2.16821
CLS_MM	2.10127	4.45528
OPN_YR	20.23418	20.48369
CLS_YR	19.62658	21.22536
INV_ENF_HRS	164.03215	201.07282
CS_CZP1	5.81013	1.08933

Variable	Mean	Std Dev
CS_CZP2	5.57595	1.26337
CS_CZP4	5.35443	1.19487

The CALIS Procedure
Dual Quasi-Newton Optimization
Dual Broyden - Fletcher - Goldfarb - Shanno Update (DBFGS)

Parameter Estimates	70
Functions (Observations)	406

Optimization Start

Active Constraints	0	**Objective Function**	3.041681812
Max Abs Gradient Element	1.7218072298		

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
1	0	4	0	2.89566	0.1460	0.5991
2	0	6	0	2.85055	0.0451	0.9026
3	0	9	0	2.83376	0.0168	0.4173
4	0	10	0	2.81700	0.0168	0.2547
5	0	12	0	2.80048	0.0165	0.4158
6	0	14	0	2.79195	0.00853	0.1179
7	0	16	0	2.78691	0.00503	0.1286
8	0	17	0	2.78491	0.00201	0.3110
9	0	19	0	2.78045	0.00445	0.1257
10	0	21	0	2.77872	0.00173	0.1068
11	0	22	0	2.77745	0.00127	0.1137
12	0	23	0	2.77689	0.000559	0.0981

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
13	0	24	0	2.77620	0.000682	0.0178
14	0	26	0	2.77601	0.000194	0.0140
15	0	28	0	2.77591	0.000095	0.00553
16	0	30	0	2.77586	0.000050	0.00845
17	0	32	0	2.77584	0.000023	0.00891
18	0	33	0	2.77583	9.199E-6	0.0138
19	0	34	0	2.77582	0.000013	0.00168
20	0	36	0	2.77581	4.785E-6	0.00305
21	0	38	0	2.77581	3.023E-6	0.00106
22	0	39	0	2.77581	3.202E-6	0.00113
23	0	41	0	2.77581	1.229E-6	0.00112
24	0	43	0	2.77581	6.936E-7	0.000807
25	0	45	0	2.77581	4.797E-7	0.000994
26	0	47	0	2.77581	2.201E-7	0.000639
27	0	49	0	2.77581	1.113E-7	0.000205
28	0	51	0	2.77581	7.292E-8	0.000126
29	0	53	0	2.77581	1.967E-8	0.000092

Optimization Results

Iterations	29	**Function Calls**	54
Gradient Calls	35	**Active Constraints**	0
Objective Function	2.7758054686	**Max Abs Gradient Element**	0.0000917525
Slope of Search Direction	-1.342709E-8		

GCONV convergence criterion satisfied.

Fit Function	2.7758
Goodness of Fit Index (GFI)	0.8411
GFI Adjusted for Degrees of Freedom (AGFI)	0.8081
Root Mean Square Residual (RMR)	0.0709
Parsimonious GFI (Mulaik, 1989)	0.7477
Chi-Square	435.8015
Chi-Square DF	336
Pr > Chi-Square	0.0002
Independence Model Chi-Square	2693.1
Independence Model Chi-Square DF	378
RMSEA Estimate	0.0435
RMSEA 90% Lower Confidence Limit	0.0308
RMSEA 90% Upper Confidence Limit	0.0547
ECVI Estimate	3.8696
ECVI 90% Lower Confidence Limit	.
ECVI 90% Upper Confidence Limit	4.2544
Probability of Close Fit	0.8221
Bentler's Comparative Fit Index	0.9569
Normal Theory Reweighted LS Chi-Square	415.0914
Akaike's Information Criterion	-236.1985
Bozdogan's (1987) CAIC	-1601.2305
Schwarz's Bayesian Criterion	-1265.2305
McDonald's (1989) Centrality	0.7292
Bentler & Bonett's (1980) Non-normed Index	0.9515
Bentler & Bonett's (1980) NFI	0.8382

James, Mulaik, & Brett (1982) Parsimonious NFI	0.7450
Z-Test of Wilson & Hilferty (1931)	3.5471
Bollen (1986) Normed Index Rho1	0.8180
Bollen (1988) Non-normed Index Delta2	0.9577
Hoelter's (1983) Critical N	138

Manifest Variable Equations with Estimates

C1	=	0.9057	*	F1	+	1.0000	E2
Std Err		0.0820		gamma1			
t Value		11.0439					
C3	=	0.9644	*	F1	+	1.0000	E3
Std Err		0.0799		gamma3			
t Value		12.0714					
C4	=	0.9584	*	F1	+	1.0000	E4
Std Err		0.0801		gamma4			
t Value		11.9661					
C5	=	1.0000		F1	+	1.0000	E5
C6	=	0.7123	*	F1	+	1.0000	E6
Std Err		0.0887		gamma6			
t Value		8.0332					
itm2	=	0.8475	*	F2	+	1.0000	E8
Std Err		0.0667		gamma8			
t Value		12.6995					
itm8	=	0.9167	*	F2	+	1.0000	E9
Std Err		0.0620		gamma9			
t Value		14.7863					
itm10	=	1.0000		F2	+	1.0000	E10
itm11	=	0.9835	*	F2	+	1.0000	E11
Std Err		0.0575		gamma11			
t Value		17.1158					
itm13	=	0.7850	*	F3	+	1.0000	E12
Std Err		0.1251		gamma12			
t Value		6.2766					

itm14	=	0.9716	*	F3	+	1.0000	E13
Std Err		0.1296		gamma13			
t Value		7.4965					
itm15	=	0.7218	*	F3	+	1.0000	E14
Std Err		0.1243		gamma14			
t Value		5.8073					
itm17	=	0.8979	*	F3	+	1.0000	E15
Std Err		0.1272		gamma15			
t Value		7.0618					
itm18	=	1.0000		F3	+	1.0000	E16
itm20	=	0.9339	*	F4	+	1.0000	E17
Std Err		0.1015		gamma17			
t Value		9.2034					
itm21	=	0.9453	*	F4	+	1.0000	E18
Std Err		0.1014		gamma18			
t Value		9.3271					
itm23	=	0.9227	*	F4	+	1.0000	E19
Std Err		0.1016		gamma19			
t Value		9.0818					
itm24	=	0.8242	*	F4	+	1.0000	E20
Std Err		0.1029		gamma20			
t Value		8.0121					
itm25	=	1.0000		F4	+	1.0000	E21
itm27	=	0.6761	*	F4	+	1.0000	E22
Std Err		0.1048		gamma22			
t Value		6.4526					
OPN_MM	=	0.7329	*	F5	+	1.0000	E23
Std Err		0.0618		gamma23			
t Value		11.8568					
CLS_MM	=	0.4135	*	F5	+	1.0000	E24
Std Err		0.0771		gamma24			
t Value		5.3638					
OPN_YR	=	1.0000		F5	+	1.0000	E25
CLS_YR	=	0.9659	*	F5	+	1.0000	E26
Std Err		0.0428		gamma26			

t Value		22.5585					
INV_ENF_HRS	=	0.3206	*	F5	+	1.0000	E27
Std Err		0.0796		gamma27			
t Value		4.0268					
CS_CZP1	=	0.9636	*	F6	+	1.0000	E29
Std Err		0.0608		gamma29			
t Value		15.8605					
CS_CZP2	=	1.0000		F6	+	1.0000	E30
CS_CZP4	=	0.9262	*	F6	+	1.0000	E31
Std Err		0.0623		gamma31			
t Value		14.8562					

Latent Variable Equations with Estimates

F5	=	-0.0400	*	F1	+	0.2159	*	F2	+	0.0874	*	F3	+	-0.2826	*	F4	+	1.0000	D1
Std Err		0.1049		beta1		0.1073		beta2		0.1330		beta3		0.1286		beta4			
t Value		-0.3810				2.0111				0.6575				-2.1983					
F6	=	0.2340	*	F1	+	0.1122	*	F2	+	0.0088 9	*	F3	+	-0.3166	*	F4	+	1.0000	D2
Std Err		0.1013		beta5		0.1025		beta6		0.1270		beta7		0.1238		beta8			
t Value		2.3089				1.0945				0.0700				-2.5562					

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
F1	VARF1	0.72276	0.11320	6.38
F2	VARF2	0.83565	0.11410	7.32
F3	VARF3	0.54001	0.11335	4.76
F4	VARF4	0.61740	0.11092	5.57

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
E2	VARE2	0.40716	0.05530	7.36
E3	VARE3	0.32773	0.04871	6.73
E4	VARE4	0.33608	0.04936	6.81
E5	VARE5	0.27721	0.04509	6.15
E6	VARE6	0.63330	0.07653	8.27
E8	VARE8	0.39978	0.05093	7.85
E9	VARE9	0.29772	0.04111	7.24
E10	VARE10	0.16436	0.03110	5.29
E11	VARE11	0.19171	0.03274	5.86
E12	VARE12	0.66722	0.08609	7.75
E13	VARE13	0.49021	0.07538	6.50
E14	VARE14	0.71866	0.08991	7.99
E15	VARE15	0.56460	0.07925	7.12
E16	VARE16	0.46001	0.07417	6.20
E17	VARE17	0.46150	0.06342	7.28
E18	VARE18	0.44824	0.06235	7.19
E19	VARE19	0.47431	0.06446	7.36
E20	VARE20	0.58057	0.07361	7.89
E21	VARE21	0.38259	0.05740	6.67
E22	VARE22	0.71780	0.08613	8.33
E23	VARE23	0.48961	0.05773	8.48
E24	VARE24	0.83750	0.09520	8.80
E25	VARE25	0.04972	0.02838	1.75
E26	VARE26	0.11349	0.02899	3.91

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
E27	VARE27	0.90231	0.10224	8.83
E29	VARE29	0.21485	0.03800	5.65
E30	VARE30	0.15442	0.03594	4.30
E31	VARE31	0.27468	0.04120	6.67
D1	VARD1	0.89514	0.11103	8.06
D2	VARD2	0.77434	0.10835	7.15

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F1	**F2**	COVF1F2	0.24263	0.07192	3.37
F1	**F3**	COVF1F3	0.07955	0.05982	1.33
F2	**F3**	COVF2F3	0.24444	0.06835	3.58
F1	**F4**	COVF1F4	0.20873	0.06489	3.22
F2	**F4**	COVF2F4	0.31473	0.07208	4.37
F3	**F4**	COVF3F4	0.18601	0.06040	3.08

Manifest Variable Equations with Standardized Estimates

C1	=	0.7700	*	F1	+	0.6381	E2
				gamma1			
C3	=	0.8199	*	F1	+	0.5725	E3
				gamma3			
C4	=	0.8148	*	F1	+	0.5797	E4
				gamma4			
C5	=	0.8502		F1	+	0.5265	E5
C6	=	0.6056	*	F1	+	0.7958	E6
				gamma6			
itm2	=	0.7747	*	F2	+	0.6323	E8

				gamma8			
itm8	=	0.8380	*	F2	+	0.5456	E9
				gamma9			
itm10	=	0.9141		F2	+	0.4054	E10
itm11	=	0.8991	*	F2	+	0.4378	E11
				gamma11			
itm13	=	0.5769	*	F3	+	0.8168	E12
				gamma12			
itm14	=	0.7140	*	F3	+	0.7002	E13
				gamma13			
itm15	=	0.5304	*	F3	+	0.8477	E14
				gamma14			
itm17	=	0.6599	*	F3	+	0.7514	E15
				gamma15			
itm18	=	0.7348		F3	+	0.6782	E16
itm20	=	0.7338	*	F4	+	0.6793	E17
				gamma17			
itm21	=	0.7428	*	F4	+	0.6695	E18
				gamma18			
itm23	=	0.7250	*	F4	+	0.6887	E19
				gamma19			
itm24	=	0.6476	*	F4	+	0.7620	E20
				gamma20			
itm25	=	0.7858		F4	+	0.6185	E21
itm27	=	0.5312	*	F4	+	0.8472	E22
				gamma22			
OPN_MM	=	0.7144	*	F5	+	0.6997	E23
				gamma23			
CLS_MM	=	0.4031	*	F5	+	0.9152	E24
				gamma24			
OPN_YR	=	0.9748		F5	+	0.2230	E25
CLS_YR	=	0.9415	*	F5	+	0.3369	E26
				gamma26			
INV_ENF_HRS	=	0.3126	*	F5	+	0.9499	E27
				gamma27			

CS_CZP1	=	0.8861	*	F6	+	0.4635	E29
				gamma29			
CS_CZP2	=	0.9196		F6	+	0.3930	E30
CS_CZP4	=	0.8517	*	F6	+	0.5241	E31
				gamma31			

Latent Variable Equations with Standardized Estimates

F5	=	-0.0349	*	F1	+	0.2024	*	F2	+	0.0659	*	F3	+	-0.2278	*	F4	+	0.9706	D1
				beta1				beta2				beta3				beta4			
F6	=	0.2163	*	F1	+	0.1116	*	F2	+	0.00711	*	F3	+	-0.2705	*	F4	+	0.9570	D2
				beta5				beta6				beta7				beta8			

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
1	**C1**	0.40716	1.00001	0.5928
2	**C3**	0.32773	0.99999	0.6723
3	**C4**	0.33608	1.00000	0.6639
4	**C5**	0.27721	0.99997	0.7228
5	**C6**	0.63330	1.00000	0.3667
6	**itm2**	0.39978	1.00001	0.6002
7	**itm8**	0.29772	1.00001	0.7023
8	**itm10**	0.16436	1.00001	0.8356
9	**itm11**	0.19171	1.00003	0.8083
10	**itm13**	0.66722	0.99999	0.3328
11	**itm14**	0.49021	1.00001	0.5098
12	**itm15**	0.71866	1.00000	0.2813
13	**itm17**	0.56460	1.00001	0.4354
14	**itm18**	0.46001	1.00001	0.5400

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
15	**itm20**	0.46150	1.00001	0.5385
16	**itm21**	0.44824	0.99999	0.5518
17	**itm23**	0.47431	1.00001	0.5257
18	**itm24**	0.58057	0.99998	0.4194
19	**itm25**	0.38259	1.00000	0.6174
20	**itm27**	0.71780	1.00000	0.2822
21	**OPN_MM**	0.48961	1.00000	0.5104
22	**CLS_MM**	0.83750	1.00000	0.1625
23	**OPN_YR**	0.04972	1.00000	0.9503
24	**CLS_YR**	0.11349	1.00000	0.8865
25	**INV_ENF_HRS**	0.90231	1.00001	0.0977
26	**CS_CZP1**	0.21485	1.00001	0.7852
27	**CS_CZP2**	0.15442	0.99999	0.8456
28	**CS_CZP4**	0.27468	0.99998	0.7253
29	**F5**	0.89514	0.95028	0.0580
30	**F6**	0.77434	0.84557	0.0842

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	**F2**	COVF1F2	0.31220
F1	**F3**	COVF1F3	0.12734
F2	**F3**	COVF2F3	0.36388
F1	**F4**	COVF1F4	0.31247
F2	**F4**	COVF2F4	0.43817
F3	**F4**	COVF3F4	0.32214

Note. F1 = Conscientiousness; F2 = Growth Need Strength; F3 = Performance Orientation; F4 = Learning Orientation; F5 = Task Performance; F6 = Citizenship Performance; see Appendix B for manifest variable key.

The SAS System
The CALIS Procedure
Covariance Structure Analysis: Pattern and Initial Values

Structural Model with 3 Factor Criterion Space

LINEQS Model Statement

		Matrix	Rows	Columns	Matrix Type	
Term 1	**1**	_SEL_	37	84	SELECTION	
	2	_BETA_	84	84	EQSBETA	IMINUSINV
	3	_GAMMA_	84	44	EQSGAMMA	
	4	_PHI_	44	44	SYMMETRIC	

The 40 Endogenous Variables

Manifest	C1 C3 C4 C5 C6 itm2 itm8 itm10 itm11 itm13 itm14 itm15 itm17 itm18 itm20 itm21 itm23 itm24 itm25 itm27 OPN_MM CLS_MM OPN_YR CLS_YR INV_ENF_HRS CS_CZP1 CS_CZP2 CS_CZP4 SAC_OS SAC_ICE SAC_IGA SAC_SDA SAC_CPT SAC_SI SAC_II SAC_AA SAC_KKA
Latent	F5 F6 F7

The 44 Exogenous Variables

Manifest	
Latent	F1 F2 F3 F4
Error	E2 E3 E4 E5 E6 E7 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 E24 E25 E26 E27 E29 E30 E31 E32 E33 E34 E35 E36 E37 E38 E39 E40 D1 D2 D3

Observations	158	**Model Terms**	1
Variables	37	**Model Matrices**	4
Informations	703	**Parameters**	92

Variable	Mean	Std Dev
C1	23.98101	3.26235
C3	24.28481	4.01128
C4	20.87975	3.73545
C5	23.12025	3.38290
C6	19.41772	3.50107
itm2	4.17089	0.88291
itm8	3.96203	0.97671
itm10	4.06962	1.00392
itm11	4.32911	0.90605
itm13	3.48101	0.81952
itm14	3.80380	0.83291
itm15	3.79114	0.74913
itm17	3.48734	0.85762
itm18	3.76582	0.73292
itm20	4.27848	0.58510
itm21	4.25316	0.59656
itm23	4.19620	0.59143
itm24	3.93038	0.66884
itm25	4.25949	0.60969
itm27	4.18354	0.61653
OPN_MM	1.59494	2.16821
CLS_MM	2.10127	4.45528
OPN_YR	20.23418	20.48369
CLS_YR	19.62658	21.22536
INV_ENF_HRS	164.03215	201.07282
CS_CZP1	5.81013	1.08933

Variable	Mean	Std Dev
CS_CZP2	5.57595	1.26337
CS_CZP4	5.35443	1.19487
SAC_OS	5.62025	0.82638
SAC_ICE	5.54430	0.92106
SAC_IGA	5.43038	0.90552
SAC_SDA	5.55063	0.96134
SAC_CPT	5.51899	0.97564
SAC_SI	5.46835	0.96875
SAC_II	5.58228	0.97885
SAC_AA	5.41772	0.98534
SAC_KKA	5.56329	0.95393

Covariance Structure Analysis: Maximum Likelihood Estimation
Dual Quasi-Newton Optimization
Dual Broyden - Fletcher - Goldfarb - Shanno Update (DBFGS)

Parameter Estimates	92
Functions (Observations)	703

Optimization Start

Active Constraints	0	**Objective Function**	6.667717377
Max Abs Gradient Element	8.8788751337		

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
1	0	4	0	6.20671	0.4610	1.6886
2	0	8	0	5.83439	0.3723	0.7785
3	0	11	0	5.78476	0.0496	0.9708
4	0	12	0	5.69964	0.0851	0.1880

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
5	0	13	0	5.66046	0.0392	0.2225
6	0	15	0	5.63832	0.0221	0.2474
7	0	16	0	5.61753	0.0208	0.2602
8	0	18	0	5.60874	0.00879	0.1381
9	0	19	0	5.60597	0.00277	0.2322
10	0	21	0	5.59699	0.00898	0.0561
11	0	23	0	5.59176	0.00523	0.0471
12	0	25	0	5.58900	0.00275	0.0349
13	0	27	0	5.58790	0.00110	0.0343
14	0	29	0	5.58722	0.000684	0.0329
15	0	31	0	5.58686	0.000363	0.0165
16	0	32	0	5.58672	0.000133	0.0331
17	0	33	0	5.58651	0.000218	0.0114
18	0	35	0	5.58639	0.000111	0.0129
19	0	36	0	5.58631	0.000085	0.0175
20	0	38	0	5.58626	0.000046	0.00488
21	0	40	0	5.58624	0.000020	0.00295
22	0	42	0	5.58624	6.261E-6	0.00163
23	0	43	0	5.58623	4.068E-6	0.00222
24	0	44	0	5.58623	2.568E-6	0.00151
25	0	45	0	5.58623	3.13E-6	0.00123
26	0	46	0	5.58622	3.698E-6	0.00101
27	0	48	0	5.58622	1.667E-6	0.000750
28	0	50	0	5.58622	6.145E-7	0.000379

Iteration	Restarts	Function Calls	Active Constraints	Objective Function	Objective Function Change	Max Abs Gradient Element
29	0	51	0	5.58622	3.165E-7	0.000761
30	0	52	0	5.58622	2.052E-7	0.000232
31	0	54	0	5.58622	1.176E-7	0.000211
32	0	55	0	5.58622	3.831E-8	0.000298

Optimization Results

Iterations	32	**Function Calls**	56
Gradient Calls	38	**Active Constraints**	0
Objective Function	5.586220372	**Max Abs Gradient Element**	0.0002983758
Slope of Search Direction	-3.879166E-8		

GCONV convergence criterion satisfied.

Fit Function	5.5862
Goodness of Fit Index (GFI)	0.7866
GFI Adjusted for Degrees of Freedom (AGFI)	0.7544
Root Mean Square Residual (RMR)	0.0891
Parsimonious GFI (Mulaik, 1989)	0.7216
Chi-Square	877.0366
Chi-Square DF	611
Pr > Chi-Square	<.0001
Independence Model Chi-Square	4258.0
Independence Model Chi-Square DF	666
RMSEA Estimate	0.0527
RMSEA 90% Lower Confidence Limit	0.0447
RMSEA 90% Upper Confidence Limit	0.0603

ECVI Estimate	7.1324
ECVI 90% Lower Confidence Limit	.
ECVI 90% Upper Confidence Limit	7.6918
Probability of Close Fit	0.2832
Bentler's Comparative Fit Index	0.9259
Normal Theory Reweighted LS Chi-Square	788.1827
Akaike's Information Criterion	-344.9634
Bozdogan's (1987) CAIC	-2827.2090
Schwarz's Bayesian Criterion	-2216.2090
McDonald's (1989) Centrality	0.4309
Bentler & Bonett's (1980) Non-normed Index	0.9193
Bentler & Bonett's (1980) NFI	0.7940
James, Mulaik, & Brett (1982) Parsimonious NFI	0.7285
Z-Test of Wilson & Hilferty (1931)	6.7331
Bollen (1986) Normed Index Rho1	0.7755
Bollen (1988) Non-normed Index Delta2	0.9271
Hoelter's (1983) Critical N	121

Manifest Variable Equations with Estimates

C1	=	0.9029	*	F1	+	1.0000	E2
Std Err		0.0818		gamma1			
t Value		11.0418					
C3	=	0.9611	*	F1	+	1.0000	E3
Std Err		0.0796		gamma3			
t Value		12.0677					
C4	=	0.9574	*	F1	+	1.0000	E4
Std Err		0.0798		gamma4			
t Value		12.0013					
C5	=	1.0000		F1	+	1.0000	E5

C6	=	0.7115	*	F1	+	1.0000	E6
Std Err		0.0884		gamma6			
t Value		8.0459					
itm2	=	0.8477	*	F2	+	1.0000	E7
Std Err		0.0668		gamma7			
t Value		12.6874					
itm8	=	0.9172	*	F2	+	1.0000	E9
Std Err		0.0621		gamma9			
t Value		14.7816					
itm10	=	1.0000		F2	+	1.0000	E10
itm11	=	0.9842	*	F2	+	1.0000	E11
Std Err		0.0575		gamma11			
t Value		17.1143					
itm13	=	0.7889	*	F3	+	1.0000	E12
Std Err		0.1256		gamma12			
t Value		6.2788					
itm14	=	0.9805	*	F3	+	1.0000	E13
Std Err		0.1304		gamma13			
t Value		7.5163					
itm15	=	0.7210	*	F3	+	1.0000	E14
Std Err		0.1248		gamma14			
t Value		5.7775					
itm17	=	0.9003	*	F3	+	1.0000	E15
Std Err		0.1277		gamma15			
t Value		7.0484					
itm18	=	1.0000		F3	+	1.0000	E16
itm20	=	0.9340	*	F4	+	1.0000	E17
Std Err		0.1018		gamma17			
t Value		9.1775					
itm21	=	0.9430	*	F4	+	1.0000	E18
Std Err		0.1017		gamma18			
t Value		9.2743					
itm23	=	0.9253	*	F4	+	1.0000	E19
Std Err		0.1019		gamma19			
t Value		9.0834					

itm24	=	0.8269	*	F4	+	1.0000	E20
Std Err		0.1031		gamma20			
t Value		8.0198					
itm25	=	1.0000		F4	+	1.0000	E21
itm27	=	0.6795	*	F4	+	1.0000	E22
Std Err		0.1050		gamma22			
t Value		6.4730					
OPN_MM	=	0.7329	*	F5	+	1.0000	E23
Std Err		0.0618		gamma23			
t Value		11.8547					
CLS_MM	=	0.4137	*	F5	+	1.0000	E24
Std Err		0.0771		gamma24			
t Value		5.3645					
OPN_YR	=	1.0000		F5	+	1.0000	E25
CLS_YR	=	0.9662	*	F5	+	1.0000	E26
Std Err		0.0428		gamma26			
t Value		22.5668					
INV_ENF_HRS	=	0.3208	*	F5	+	1.0000	E27
Std Err		0.0796		gamma27			
t Value		4.0273					
CS_CZP1	=	0.9638	*	F6	+	1.0000	E29
Std Err		0.0607		gamma29			
t Value		15.8668					
CS_CZP2	=	1.0000		F6	+	1.0000	E30
CS_CZP4	=	0.9263	*	F6	+	1.0000	E31
Std Err		0.0623		gamma31			
t Value		14.8594					
SAC_OS	=	0.9425	*	F7	+	1.0000	E32
Std Err		0.0619		gamma32			
t Value		15.2216					
SAC_ICE	=	0.8516	*	F7	+	1.0000	E33
Std Err		0.0682		gamma33			
t Value		12.4944					
SAC_IGA	=	0.8830	*	F7	+	1.0000	E34
Std Err		0.0661		gamma34			

t Value		13.3534					
SAC_SDA	=	0.9106	*	F7	+	1.0000	E35
Std Err		0.0642		gamma35			
t Value		14.1750					
SAC_CPT	=	0.9549	*	F7	+	1.0000	E36
Std Err		0.0610		gamma36			
t Value		15.6600					
SAC_SI	=	0.9024	*	F7	+	1.0000	E37
Std Err		0.0648		gamma37			
t Value		13.9253					
SAC_II	=	0.8513	*	F7	+	1.0000	E38
Std Err		0.0682		gamma38			
t Value		12.4866					
SAC_AA	=	0.8741	*	F7	+	1.0000	E39
Std Err		0.0667		gamma39			
t Value		13.1009					
SAC_KKA	=	1.0000		F7	+	1.0000	E40

Latent Variable Equations with Estimates

F5	=	-0.0344	*	F1	+	0.2222	*	F2	+	0.0788	*	F3	+	-0.2920	*	F4	+	1.0000	D1
Std Err		0.1046		beta1		0.1074		beta2		0.1332		beta3		0.1288		beta4			
t Value		-0.3287				2.0695				0.5912				-2.2675					
F6	=	0.2427	*	F1	+	0.1211	*	F2	+	-0.00345	*	F3	+	-0.3296	*	F4	+	1.0000	D2
Std Err		0.1009		beta5		0.1023		beta6		0.1271		beta7		0.1239		beta8			
t Value		2.4059				1.1830				-0.0272				-2.6609					
F7	=	0.1523	*	F1	+	0.0895	*	F2	+	-0.1119	*	F3	+	-0.1361	*	F4	+	1.0000	D3
Std Err		0.0985		beta9		0.1004		beta10		0.1252		beta11		0.1196		beta12			

tValue	1.5465	0.8908	-0.8935	-1.1381

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
F1	VARF1	0.72504	0.11327	6.40
F2	VARF2	0.83497	0.11408	7.32
F3	VARF3	0.53627	0.11300	4.75
F4	VARF4	0.61565	0.11084	5.55
E2	VARE2	0.40901	0.05544	7.38
E3	VARE3	0.33030	0.04887	6.76
E4	VARE4	0.33550	0.04927	6.81
E5	VARE5	0.27501	0.04490	6.12
E6	VARE6	0.63302	0.07649	8.28
E7	VARE7	0.40014	0.05097	7.85
E9	VARE9	0.29754	0.04109	7.24
E10	VARE10	0.16509	0.03113	5.30
E11	VARE11	0.19122	0.03270	5.85
E12	VARE12	0.66624	0.08599	7.75
E13	VARE13	0.48447	0.07506	6.45
E14	VARE14	0.72123	0.09009	8.01
E15	VARE15	0.56540	0.07924	7.13
E16	VARE16	0.46372	0.07422	6.25
E17	VARE17	0.46295	0.06353	7.29
E18	VARE18	0.45257	0.06270	7.22
E19	VARE19	0.47291	0.06435	7.35
E20	VARE20	0.57903	0.07347	7.88

Variances of Exogenous Variables

Variable	Parameter	Estimate	Standard Error	t Value
E21	VARE21	0.38440	0.05753	6.68
E22	VARE22	0.71578	0.08595	8.33
E23	VARE23	0.48966	0.05774	8.48
E24	VARE24	0.83745	0.09519	8.80
E25	VARE25	0.05004	0.02836	1.76
E26	VARE26	0.11317	0.02897	3.91
E27	VARE27	0.90230	0.10224	8.83
E29	VARE29	0.21469	0.03797	5.65
E30	VARE30	0.15463	0.03591	4.31
E31	VARE31	0.27461	0.04118	6.67
E32	VARE32	0.28198	0.03660	7.70
E33	VARE33	0.41387	0.05035	8.22
E34	VARE34	0.36971	0.04571	8.09
E35	VARE35	0.32975	0.04154	7.94
E36	VARE36	0.26301	0.03467	7.59
E37	VARE37	0.34166	0.04278	7.99
E38	VARE38	0.41426	0.05039	8.22
E39	VARE39	0.38245	0.04705	8.13
E40	VARE40	0.19167	0.02762	6.94
D1	VARD1	0.89275	0.11082	8.06
D2	VARD2	0.76774	0.10765	7.13
D3	VARD3	0.77836	0.10867	7.16

Covariances Among Exogenous Variables

Var1	Var2	Parameter	Estimate	Standard Error	t Value
F1	**F2**	COVF1F2	0.24233	0.07198	3.37
F1	**F3**	COVF1F3	0.07943	0.05971	1.33
F2	**F3**	COVF2F3	0.24411	0.06816	3.58
F1	**F4**	COVF1F4	0.20886	0.06492	3.22
F2	**F4**	COVF2F4	0.31472	0.07202	4.37
F3	**F4**	COVF3F4	0.18483	0.06014	3.07

Manifest Variable Equations with Standardized Estimates

C1	=	0.7688	*	F1	+	0.6395	E2
				gamma1			
C3	=	0.8184	*	F1	+	0.5747	E3
				gamma3			
C4	=	0.8152	*	F1	+	0.5792	E4
				gamma4			
C5	=	0.8515		F1	+	0.5244	E5
C6	=	0.6058	*	F1	+	0.7956	E6
				gamma6			
itm2	=	0.7745	*	F2	+	0.6325	E7
				gamma7			
itm8	=	0.8381	*	F2	+	0.5455	E9
				gamma9			
itm10	=	0.9137		F2	+	0.4063	E10
itm11	=	0.8993	*	F2	+	0.4373	E11
				gamma11			
itm13	=	0.5777	*	F3	+	0.8162	E12
				gamma12			
itm14	=	0.7180	*	F3	+	0.6960	E13
				gamma13			

itm15	=	0.5280	*	F3	+	0.8493	E14
				gamma14			
itm17	=	0.6593	*	F3	+	0.7519	E15
				gamma15			
itm18	=	0.7323		F3	+	0.6810	E16
itm20	=	0.7329	*	F4	+	0.6804	E17
				gamma17			
itm21	=	0.7399	*	F4	+	0.6727	E18
				gamma18			
itm23	=	0.7260	*	F4	+	0.6877	E19
				gamma19			
itm24	=	0.6488	*	F4	+	0.7610	E20
				gamma20			
itm25	=	0.7846		F4	+	0.6200	E21
itm27	=	0.5331	*	F4	+	0.8460	E22
				gamma22			
OPN_MM	=	0.7144	*	F5	+	0.6998	E23
				gamma23			
CLS_MM	=	0.4032	*	F5	+	0.9151	E24
				gamma24			
OPN_YR	=	0.9747		F5	+	0.2237	E25
CLS_YR	=	0.9417	*	F5	+	0.3364	E26
				gamma26			
INV_ENF_HRS	=	0.3126	*	F5	+	0.9499	E27
				gamma27			
CS_CZP1	=	0.8862	*	F6	+	0.4633	E29
				gamma29			
CS_CZP2	=	0.9194		F6	+	0.3932	E30
CS_CZP4	=	0.8517	*	F6	+	0.5240	E31
				gamma31			
SAC_OS	=	0.8474	*	F7	+	0.5310	E32
				gamma32			
SAC_ICE	=	0.7656	*	F7	+	0.6433	E33
				gamma33			
SAC_IGA	=	0.7939	*	F7	+	0.6081	E34

				gamma34			
SAC_SDA	=	0.8187	*	F7	+	0.5742	E35
				gamma35			
SAC_CPT	=	0.8585	*	F7	+	0.5128	E36
				gamma36			
SAC_SI	=	0.8114	*	F7	+	0.5845	E37
				gamma37			
SAC_II	=	0.7653	*	F7	+	0.6436	E38
				gamma38			
SAC_AA	=	0.7858	*	F7	+	0.6184	E39
				gamma39			
SAC_KKA	=	0.8991		F7	+	0.4378	E40

Latent Variable Equations with Standardized Estimates

F5	=	-0.0300	*	F1	+	0.2083	*	F2	+	0.0592	*	F3	+	-0.2351	*	F4	+	0.9694 D1
				beta1				beta2				beta3				beta4		
F6	=	0.2248	*	F1	+	0.1203	*	F2	+	-0.00275	*	F3	+	-0.2813	*	F4	+	0.9530 D2
				beta5				beta6				beta7				beta8		
F7	=	0.1443	*	F1	+	0.0909	*	F2	+	-0.0911	*	F3	+	-0.1188	*	F4	+	0.9813 D3
				beta9				beta10				beta11				beta12		

Squared Multiple Correlations

	Variable	**Error Variance**	**Total Variance**	**R-Square**
1	**C1**	0.40901	1.00008	0.5910
2	**C3**	0.33030	1.00009	0.6697
3	**C4**	0.33550	1.00002	0.6645
4	**C5**	0.27501	1.00005	0.7250

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
5	C6	0.63302	1.00001	0.3670
6	itm2	0.40014	1.00010	0.5999
7	itm8	0.29754	1.00002	0.7025
8	itm10	0.16509	1.00007	0.8349
9	itm11	0.19122	1.00006	0.8088
10	itm13	0.66624	0.99999	0.3338
11	itm14	0.48447	1.00000	0.5155
12	itm15	0.72123	1.00000	0.2788
13	itm17	0.56540	1.00003	0.4346
14	itm18	0.46372	0.99999	0.5363
15	itm20	0.46295	1.00005	0.5371
16	itm21	0.45257	1.00003	0.5474
17	itm23	0.47291	1.00006	0.5271
18	itm24	0.57903	0.99995	0.4209
19	itm25	0.38440	1.00005	0.6156
20	itm27	0.71578	1.00000	0.2842
21	OPN_MM	0.48966	0.99992	0.5103
22	CLS_MM	0.83745	1.00000	0.1625
23	OPN_YR	0.05004	0.99994	0.9500
24	CLS_YR	0.11317	0.99997	0.8868
25	INV_ENF_HRS	0.90230	1.00003	0.0977
26	CS_CZP1	0.21469	1.00001	0.7853
27	CS_CZP2	0.15463	1.00000	0.8454
28	CS_CZP4	0.27461	1.00000	0.7254
29	SAC_OS	0.28198	0.99995	0.7180

Squared Multiple Correlations

	Variable	Error Variance	Total Variance	R-Square
30	**SAC_ICE**	0.41387	1.00004	0.5861
31	**SAC_IGA**	0.36971	0.99994	0.6303
32	**SAC_SDA**	0.32975	0.99997	0.6702
33	**SAC_CPT**	0.26301	1.00001	0.7370
34	**SAC_SI**	0.34166	0.99994	0.6583
35	**SAC_II**	0.41426	0.99998	0.5857
36	**SAC_AA**	0.38245	0.99998	0.6175
37	**SAC_KKA**	0.19167	0.99998	0.8083
38	**F5**	0.89275	0.94991	0.0602
39	**F6**	0.76774	0.84538	0.0918
40	**F7**	0.77836	0.80830	0.0370

Correlations Among Exogenous Variables

Var1	Var2	Parameter	Estimate
F1	**F2**	COVF1F2	0.31145
F1	**F3**	COVF1F3	0.12738
F2	**F3**	COVF2F3	0.36481
F1	**F4**	COVF1F4	0.31261
F2	**F4**	COVF2F4	0.43896
F3	**F4**	COVF3F4	0.32168

Note. F1 = Conscientiousness; F2 = Growth Need Strength; F3 = Performance Orientation; F4 = Learning Orientation; F5 = Task Performance; F6 = Citizenship Performance; F7 = Perception of Task Performance; see Appendix B for manifest variable key.