Implicit Theories and Beta Change in Longitudinal Evaluations of Training Effectiveness: An Investigation Using Item Response Theory

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(Abstract)

Golembiewski, Billingsly, and Yeager (1976) conceptualized three distinct types of change that might result from development interventions, called alpha, beta, and gamma change. Recent research has found that beta and gamma change do occur as hypothesized, but the phenomena are somewhat infrequent and the precise conditions under which they occur have not been established. This study used confirmatory factor analysis and item response theory to identify gamma and beta change on a multidimensional, multisource managerial performance appraisal instrument and to examine relations among the change types, training program content, and raters' implicit theories of performance. Results suggested that coverage in training was a necessary but not sufficient condition for beta and gamma change to occur. Further, although gamma change was detected only in the trainee group, beta change was detected in self-ratings from trainees and in ratings collected from their superiors. Because trainees' superiors were involved in post-training follow-up, this finding was interpreted as a possible diffusion of treatments effect (Campbell & Stanley, 1963). Contrary to expectations, there were no interpretable relations between raters' implicit theories of performance and either of the change types. Perhaps relatedly, more implicit theory change was detected among individuals providing observer ratings than in the trainees themselves. The implications of these findings for future research on plural change were discussed.

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INTRODUCTION

The Prevalence of Training in U.S. Organizations

Activities related to the training and development of employees constitute a crucial function in organizations. Organizational training and development run the gamut from "hard" technical skills, such as machinery operation, to "soft" interpersonal skills, such as sales and leadership. Development interventions also vary widely in terms of formality, ranging from highly structured classroom-style settings, such as in computer skills training, to one-on-one development, as in the case of executive coaching. Techniques for delivering this training also vary, and can be classified as either information presentation, simulation, or on-the-job training (Campbell, Dunnette, Lawler, & Weick, 1970).

Nearly 59 million U.S. employees received some form of training in 1996, with associated costs exceeding $200 billion (Phillips, 1997). Further, those numbers are growing rapidly. The American Society for Training and Development (ASTD; Van Buren, 2001) estimated that 79% of eligible employees received training in 1999, averaging more than 26 hours of training each. In that same year, the most recent for which data are available, U.S. organizations responding to ASTD's survey spent an average of $1.2 million each on direct training expenditures (i.e., trainers' compensation, cost of training materials, etc.). That figure represents 1.8% of total payroll costs. When the indirect costs of training are taken into account, such as salaries received by trainees while off the job and lost productivity due to their time off the job, total training costs approach 10% of payroll (Van Buren, 2001). Respondents to ASTD's survey also indicated that they expected year 2000 expenditures to increase by an average of 28% over those of 1999—the largest single year increase ever predicted by that survey.

Evaluating Training Effectiveness

With organizations investing hundreds of billions of dollars per year in training and development, it is not surprising that interest in the evaluation of training effectiveness is high and increasing (Phillips, 1997). Without rigorous evaluation of training interventions, the question of whether training investments were money well spent goes largely unanswered, and opportunities to improve training programs pass untapped. Beyond purely financial concerns, researchers wishing to study the various theoretical frameworks underlying training interventions require a means for quantifying the effectiveness of those interventions.

Components of Evaluation

Traditional training evaluation can be conceptually decomposed into two components: (1) assessing how much change has occurred and (2) attributing that change to the intervention under study. Increasingly, a third component is included in the evaluation process: attaching a monetary value to the change attributable to training. Crudely, it can be said that the three components represent, respectively, problems of (1) measurement, (2) design, and (3) accounting.

This article focuses on the measurement component of training evaluation. Therefore, a detailed exploration of the design and accounting components is beyond the scope of the present discussion. Suffice it to say that attributing causality to an intervention with certainty (component 2) requires the use of one or more control groups that did not receive the intervention (Campbell & Stanley, 1963; Pedhazur & Schmelkin, 1991; Goldstein, 1993; Phillips, 1997; Van Velsor, 1998). Comparison of the change observed in the treatment group with the change observed in the control group(s) allows for inferences about the intervention as the cause of the change. But, all too often, evaluation in organizational settings must forego the use of control groups because of their expense. The value of collecting data on multiple occasions from individuals who did not

participate in the training is often not obvious to organizational stakeholders. Additionally, the withholding of valuable training may run counter to important organizational initiatives. For these reasons and because the present research focuses on the measurement issues inherent in evaluation, the present study focuses on the treatment group. The analytic approach proposed here is equally applicable to control group designs, however.

The accounting component of training evaluation is often referred to as the calculation of return on investment (ROI; Phillips, 1997) or as utility analysis (Taylor & Russell, 1939; Brogden, 1946; Cronbach & Gleser, 1965; Naylor & Shine, 1965). This component of training evaluation is essentially the process of describing the distribution of job performance in an organization and relating that distribution to the organization's revenues. The interested reader is referred to Phillips (1997) and Cascio (1991) for excellent discussions of this topic.

Training Criteria

It having been stated that the current discussion will focus on the measurement component of training evaluation—on the process of answering the question of how much change has occurred—one might ask, change in what? This is the question of training criteria. Selection of appropriate criteria by which to evaluate training is crucial to the validity of evaluation results (Goldstein, 1993). Although the training literature is generally fragmented, it is on the issue of training criteria where some structure exists. A number of taxonomies of training criteria has been proposed.

Perhaps the best known of these is a taxonomy of training outcomes articulated by Kirkpatrick (1959, 1960). Kirkpatrick's four level taxonomy distinguishes among participants' reactions to training (level one), their acquisition of new knowledge (level two), changes in their on-job behavior (level three), and organizational results (level four). Kirkpatrick's four levels

represent progressive increases in the logical distance between the intervention's point of contact and the outcome being measured, with each increase in distance having an associated increase in difficulty of causal attribution. Despite widespread appreciation for the importance of evaluation, fewer than one third of organizations measure training outcomes at level two or above (Saari, Johnson, McLaughlin, & Zimmerle, 1988). This fact is almost certainly due to the greater ease with which outcomes can be measured at level one; basic measurement of trainee reactions needs little more than a simple survey administered at the end of training. In contrast, the most distal training outcomes, at level four, present a considerable measurement challenge due to what often amount to nebulous definitions of outcomes and to opportunities for those outcomes to have been affected by factors other than the training intervention.

In a recent meta-analysis of the correlations among training criteria, Alliger, Tannenbaum, Bennett, Traver, and Shotland (1997) extended Kirkpatrick's (1959) taxonomy by distinguishing among subcategories within levels one and two. Within level one, they distinguished between training participants' affective reactions to training and their subjective appraisals of the training's utility. Affective reactions included ratings of enjoyment and trainers' performance; utility reactions included estimates of how valuable the training would be to them on their jobs. Within level two, they distinguished among knowledge measured immediately, knowledge measured after some time interval (but still within the training setting), and behavior or skills demonstrated in the training setting. Level three was thus narrowed in scope to include only behavior or skills actually transferred to the job, though Alliger et al. noted that modification to be more a clarification of Kirkpatrick's original intent than an extension of his taxonomy.

An important finding of Alliger et al.'s (1997) meta-analysis concerned the very low correlations among criteria at different levels. For example, trainees' subjective appraisals of

utility correlated with transfer to the job setting at only r = .18 (one of the higher interlevel correlations among their results). That finding implies that criteria of convenience, such as trainee reactions, are very poor predictors of the less convenient but arguably more important criteria of on-the-job behavior change and the organizational results thereof. This fact has significant implications for organizations conducting training because research has found trainee reactions to be the most commonly measured criterion by a wide margin (Alliger et al., 1997; Bassi, Benson, & Cheney, 1996; Saari et al., 1988). It seems reasonable to conclude that, although measured criteria may provide information about the effect of training on what has actually been measured, generalization of those results to unmeasured criteria—especially across taxonomic levels—is ill advised.

Difference Scores and Metric Equivalence

Regardless of the training criteria chosen to be of interest in a particular evaluation, the measurement component of training evaluation reduces to the process of measuring the chosen criteria at two or more points in time and estimating the change that occurred in the time between measurements. A variety of methods has been proposed for assessing change magnitude but nearly all of them have in common the arithmetic comparison of measurements taken at different times—the calculation of "difference" or "gain" scores. In the context of training evaluation, this method would typically imply the comparison of pretraining scores on some criterion of interest to posttraining scores on the same measure. The difference between the pre- and posttraining scores would be interpreted as an indicator of training effectiveness. In a research design that employs control groups, difference scores are often similarly calculated for individuals who did not receive training. If control group members change significantly less than do treatment group

members, causality can be more confidently attributed to the training. In sum, the calculation of gain or difference scores is integral to the process of training evaluation.

The use of such difference scores has been the subject of considerable controversy in the research literature, due to their problematic statistical properties. Thorndike (1942) warned of the spurious correlation of difference scores with the components from which they are calculated. In a now classic article, Cronbach and Furby (1970) articulated several important concerns about difference scores. One of these concerned the relation of the reliability of difference scores to the reliability of their components, pointing out that acceptably reliable difference scores require extremely high reliability of their components. Cronbach and Furby also warned of the systematic influence of measurement error on difference scores and of spurious correlation problems similar to those raised by Thorndike. A variety of authors has raised similar concerns in recent years (e.g., Bedeian & Day, 1994; Edwards, 1994; Tisak, & Smith, 1994; Edwards, 1995; Feldt, 1995).

It is noteworthy, however, that each of the caveats that has been identified as plaguing difference scores is linked to a specific use of difference scores. For example, Edwards (1995) addressed the problems with using difference scores as dependent variables. Cronbach and Furby (1970) wrote of the inappropriateness of using difference scores as indicators of latent constructs. But no author has suggested that difference scores are without any use whatsoever, only that their use is associated with certain limitations that must be acknowledged. Mellenbergh (1999), for example, noted that unreliability in difference scores does not render them useless as indicators of intraindividual change. Indeed, despite the attendant controversy, difference scores pervade the social sciences: five of the six quasi-experimental research designs described by Campbell and Stanley (1963) entail comparisons of measures taken at different times. Additionally, every

application of repeated measures analysis of variance (ANOVA)—arguably a commonly used analysis—makes implicit use of difference scores.

Many of the critiques of difference scores have been accompanied by suggested alternatives. Cronbach and Furby (1970) discuss several of these, including residualized gain scores and an extension to Lord's (1956) D_{∞} estimator of change. However, all of the proposed alternatives to simple difference scores still involve comparisons of measurements taken at different points in time. Importantly, any such comparison of measurements necessarily assumes that the measurements being compared are on the same scale or metric. Indeed, Cronbach and Furby concluded by delineating some conditions they deemed minimally necessary for the drawing of valid inferences regarding change. Primary among necessary conditions was that pretest and posttest measure the same variable on the same metric. Proposed alternatives to difference scores may involve computations of considerably greater sophistication than the simple arithmetic of difference scores, but the alternatives still involve mathematical comparisons of time displaced measurements. Thus, the assumption of metric equivalence for temporally separated measurements is inherent in virtually any attempt to assess change and is not limited to situations involving difference scores.

The idea that longitudinal measurements must use the same metric in order to be mathematically comparable is not new. Campbell (1957) warned of "instrument decay" as a possible threat to internal validity (see also Campbell & Stanley, 1963). This early conception of metric inequivalence was broad and seems intended to encompass any phenomenon that might cause a measurement tool to function differently on different occasions. Campbell specifically noted that a change in respondents' "frame of reference" from one measurement occasion to the next might be one source of instrument decay. The issue of measurement inequivalence across

time has received its fullest treatment, however, in two parallel lines of research: as "beta change" in the management literature and as "response shift bias" in the program evaluation literature.

The Alpha, Beta, Gamma Change Typology

Golembiewski, Billingsley, and Yeager (1976) suggested that organizational research should allow for multiple types of change due to interventions. Their proposed taxonomy of change types has received considerable attention and use in subsequent research. Their typology identifies three distinct types of change that might be detected in a comparison of measurements over time, labeled alpha change, beta change, and gamma change. The classification of any case of observed change depends on the constancy of (1) the content domain at each time of measurement and (2) the calibration of the measurement instrument at each time of measurement. Golembiewski et al. suggested that observed differences in temporally separated measurements are often a combination of two or even all three types of change. In order to classify observed change as any one type, the other types must be quantified or ruled out as plausible explanations. Because analyses of the change types involve a process of successively ruling out each type, the types are presented here in the order in which they would be assessed.

Gamma Change.

When the underlying content domain being measured is not the same at different times, gamma change is said to have occurred. Gamma change is hypothesized to occur because the intervention under study (or some other influence) caused the individuals being assessed to reconceptualize the domain being measured. When gamma change occurs, the construct in question has a qualitatively different definition at, say, Time 2 than it did at Time 1. As an example, Golembiewski et al. (1976) point out that, in 1960, the concept of "freedom" for African-Americans was partially defined by not having to ride in the backs of buses. But in 1970 that aspect of "freedom" was more likely to be defined as having input into the design of entire

transit systems. Thus intervening events redefined a concept for participants in those events just as might a management development intervention in an organization.

Although Golembiewski et al. (1976) acknowledged that "today, we simply do not know how to distinguish the three types of change in any reasonably rigorous and consistent way" (p. 143), they did suggest that gamma change might be identified via factor analysis. Specifically, they proposed that a difference in an instrument's factor structure at different points in time should be an indicator of gamma change. Their reasoning, which was based on the notion that factor analysis discovers the definitions of constructs by identifying the items which load on them, did not explicitly address whether factor analysis should be considered both necessary and sufficient for a conclusion of gamma change. Lindell and Drexler (1979; 1980) later pointed out that change in an instrument's factor structure is at best only necessary and thus an imperfect indicator of gamma change. Using longitudinal data, they demonstrated that both alpha and beta change also could affect interitem correlations and thus factor structure. After concluding that an adequate indicator of gamma change had yet to be identified, they went on to suggest that factor structure incongruence is as likely to indicate "sloppy" instrument development as a psychological reconceptualization of the construct domain. Specifically, they hypothesized that instruments using multiple, behaviorally specific indicators of each construct rather than vague trait-level statements would be less likely to show factor structure changes due to interventions. In sum it seems reasonable to conclude that, although factor structure incongruence alone is not sufficient for a diagnosis of gamma change, the absence of such incongruence is highly suggestive that gamma change did not occur.

In any case, excellent methods are available for assessing factor structure congruence. Golembiewski et al. (1976) originally suggested that the comparison could be accomplished by

the calculation of congruence coefficients as described by Ahmavaara (1954). In the intervening time since 1976, however, latent variable modeling techniques such as structural equations modeling and confirmatory factor analysis have become more readily available to researchers. These methods allow for much more precise descriptions of latent factor structures than the methods available in 1976 and, indeed, have been used to good effect in the assessment of gamma change (Schmitt, 1982; Schmitt, Pulakos, & Lieblein, 1984; Millsap & Hartog, 1988).

Beta Change. When the intervals associated with an instrument's scaling units change between administrations—and gamma change can be ruled out—beta change is said to have occurred. Golembiewski et al.'s (1976) conception of beta change speaks of a "recalibration of the intervals used to measure some stable dimension of psychological space" (p. 135). Their use of the term "stable dimension" points to the hierarchical manner in which the change types must be identified; only when gamma change has been ruled out can beta (or alpha) change be assessed. This procedural requirement is due to the fact that gamma change can produce scale interval recalibration, if only because the different constructs involved at the different time points imply different scale intervals.

It is noteworthy that both beta and gamma change have the potential to render simple gain scores quite misleading, due to their representing a violation of Cronbach and Furby's (1970) dictum that difference scores must be derived from measures taken on the same metric in order to be even minimally useful. In the extreme, either beta or gamma change could cause gain scores to indicate a result in the direction opposite to that of the actual result. In an example given by Golembiewski et al. (1976), a preintervention assessment of participative decision making rated an organization as 16 on a 20 point scale. Subsequently, a training intervention taught participants about a (higher) level of participative decision making to which they had not previously been

exposed, thus recalibrating their metric with regard to what constituted highly participative decision making. The postintervention assessment was 13, appearing to suggest that decision making had become less participative following the intervention. The gain score of -3 was, however, an artifact of beta change.

In contrast to the situation with gamma change, Golembiewsk et al. (1976) were unable to propose a specific methodology for assessing beta change. They noted later, “we were not then nor are we now prepared to specify what constitutes a beta change...” (Golembiewski & Billingsley, 1980, p. 101). As will be discussed later, no adequate method for assessing beta change has been available until very recently (Craig, Palus, & Rogolsky, 1999).

Alpha Change. Golembiewski et al. (1976) called the true change with which researchers most often have been concerned alpha change. Alpha change occurs “along relatively stable dimensions of reality that are defined in terms of discrete and constant intervals” (p. 135). Thus, for pre-post differences (gain scores) to reflect alpha change, both scale interval calibration and conceptual domain must be constant at the time points being compared—neither beta nor gamma change can have occurred. With gamma and beta change ruled out as possible explanations for differences between measurement occasions, assessing alpha change is relatively straightforward. Indeed, the process of ruling out gamma and beta change is the process of the establishing that an equivalent metric exists across time so that traditional difference score methods (or their alternatives) can be employed.

An important theme in the original propositions of Golembiewski et al. (1976) was that, depending upon the intent of the organizational intervention under study, any or all of the change types might be considered to be legitimate outcomes. For example, a training intervention in a financial services organization might have as its explicit goal to redefine “customer service” from

meaning “being polite and responsive to customer requests” to “providing customers with industry-leading investment returns,” a type of gamma change. This conception of change types stands in contrast to other writings on the topic, which have tended to regard beta and gamma change as measurement “noise” to be filtered out (e.g. Martineau, 1998). Indeed, Meade, Hecht, Lautenschlager, Barroso, and Stokes (2001) have framed the issue as one of “measurement equivalence across time,” suggesting that such inequivalence is a problem to be solved. Regardless of whether one views beta and gamma change as a measurement problem or as real organizational change, however, the methodological issues surrounding the identification of the phenomena are the same.

Response Shift Bias and Retrospective Pretests

In a parallel to the beta change concept, Howard & Dailey (1979) used the term “response shift bias” to refer to a change in a respondent’s standard of measurement or frame of reference from one measurement occasion to another. Specifically, response shift bias was posited to occur when an intervention, such as training, increases participants' knowledge of the domain with regard to which they are rating performance. This new knowledge, which is gained after pretraining ratings have been collected, causes participants to use a different psychological metric when making posttraining ratings. Thus, difference scores calculated from such contaminated data are misleading, nearly always underestimating true change.

Howard and Dailey did not propose an analog to gamma change. Presumably, though, the absence of response shift bias would be analogous to Golembiewski et al.’s concept of alpha change. In contrast to the view presented by Golembiewski et al. (1976), Howard and Dailey treat response shift bias almost exclusively as a source of measurement error rather than as a desirable outcome of interventions.

Later, Howard and his colleagues (Howard, Dailey, & Gulanick, 1979; Howard, Ralph, Gulanick, Maxwell, Nance, & Gerber, 1979; Terborg, Howard, & Maxwell, 1980) proposed a method for assessing response shift bias (beta change). Their method involved the inclusion of a posttraining retrospective pretest, or "then-test," in addition to conventional pre- and posttests. The retrospective pretest, administered after training, asks participants to rate themselves as they now (i.e., after training) believe they were before training. Significant differences between scores on the retrospective pretest and scores on the conventional pretest are interpreted as evidence that response shift bias is operating. They recommended that, in the presence of response shift bias, the difference between the retrospective pretest and the posttest be used as the indicator of training effectiveness.

A number of studies has examined the response shift phenomenon and the properties of retrospective ratings (Howard, Dailey, & Gulanick, 1979; Howard, Ralph, Gulanick, Maxwell, Nance, & Gerber, 1979; Terborg et al., 1980; Sprangers & Hoogstraten, 1987, 1989; Sprangers, 1989; Mann, 1997; Schwartz & Sprangers, 1999; Sprangers & Schwartz, 1999; Wilson, 1999). These researchers have generally concluded that retrospective pretests are an effective means of detecting response shift bias. Further, they have concluded that differences between retrospective pretests and conventional posttests are adequate indicators of change.

There appears to be at least one serious flaw in the notion of using retrospective pretests to detect response shift bias, however. If data collected pre-intervention are not on a comparable metric with data collected post-intervention, then arithmetic differences between pre and post data are meaningless. Yet, Howard and his colleagues operationalize response shift bias as a significant difference between the conventional pretest (collected pre-intervention) and the retrospective pretest (collected post-intervention). A logical paradox is thus created such that, at the instant

that response shift is concluded to have occurred, the basis for that conclusion is rendered invalid. There is also empirical evidence, which will be discussed later, that retrospective pretests do not perform as supposed by Terborg et al. (1980).

Using Item Response Theory to Assess Beta Change

Because the original conception of beta change (Golembiewski et al., 1976) defined it as a shift in scaling intervals, item response theory (IRT) is uniquely suited to its assessment. A variety of IRT models have been developed to address many of the item response formats and supposed item-construct relations underlying modern tests. The IRT model for analysis of polytomous items like those in most performance appraisal instruments was proposed by Samejima (1969) and is referred to as the graded response model (GRM). Analysis of item functioning under the graded response model yields a b parameter for each response option of the item (except the highest response, the b for which is logically determined by the area not covered by the lower responses) and a single a parameter for each item. The b parameters indicate the relative "difficulty" of the response options by marking the points on the latent construct continuum where the distributions of respondents choosing each option are centered. For example, if the "2" response option for a given item has a b parameter of -1.0, that would indicate that respondents who choose "2" as their response to that item are, on average, one standard deviation below the mean on the latent construct being measured. The a parameter reflects an item's ability to discriminate among respondents. Higher values of a indicate that smaller differences on the latent construct translate to larger differences in item responses. The a parameter is sometimes referred to as an item's slope, though the term "slope" is less directly applicable to polytomous items than to the dichotomous items with which the term originated.

It is the estimation of the b parameters that makes IRT-based analyses suited for the detection of beta change. The linear distance between b parameters reflects the psychological intervals between points on the response scale. When beta change occurs, the psychological intervals are altered as a result of the intervention under study. Thus, items should have different b parameters at Time 2 than they did at Time 1 if beta change has occurred. Those parameter differences should be detectable by conventional methods for assessing differential item functioning (DIF).

Use of techniques based on item response theory (IRT) to detect beta change appears to have been first demonstrated by Craig, Palus, and Rogolsky (1999). Their method involved estimating IRT-based item parameters separately from pretraining data and from posttraining data, then submitting those two sets of item parameters to a conventional DIF analysis using the DFIT framework of Raju, van der Linden, and Fleer (1995). They also showed how items that exhibited beta change could be put on the same metric, thus allowing for the calculation of meaningful effect sizes, by using IRT to score both pre- and posttraining data with a common set of item parameters (e.g., parameters estimated from posttraining item responses).

In that study, Craig et al. found that some items on a multisource managerial performance appraisal instrument did indeed exhibit DIF in comparisons of pretraining performance ratings with posttraining performance ratings. Because factor analysis demonstrated that the instrument's factor structure did not change from one administration to the next, thereby ruling out gamma change as an explanation, they interpreted the DIF as beta change.

Later, Craig et al. (2000) compared the IRT-based DIF method of detecting beta change to the retrospective pretest method (Howard, Ralph, Gulanick, Maxwell, Nance, and Gerber, 1979; Terborg, 1980). Recall that the retrospective pretest method calls for raters to complete

both a conventional pretest and a retrospective pretest, with the latter being administered after training and asking raters to retrospectively rate trainees' performance as it was before training. Significant differences between the conventional pretest and the retrospective pretest would be interpreted as response shift or beta change. Craig et al. found that the retrospective method "detected" beta change in 17 of 54 items, only five of which also showed DIF. Further, another six items showed DIF that was not detected by the retrospective method.

Assuming DIF to be an accurate indicator of beta change, these results suggested that the retrospective pretest method is an unreliable means of detecting beta change, yielding both false positives and false negatives. In support of the validity of the IRT-based DIF method, only two items (of 54) showed DIF in a comparison of posttest data to retrospective data. That finding is consistent with the hypothesis that ratings collected at the same point in time should be on the same metric. Therefore, in addition to the logical problem with retrospective pretesting described earlier, it also seems likely that retrospective performance ratings confound beta change with at least one other factor, such as raters' memory accuracy.

Meade et al. (2001) also used IRT-based DIF methodology to detect beta change. They investigated an eight item job satisfaction scale that had been administered twice, fifteen years apart. In addition to the DFIT method (Raju et al., 1995) used by Craig et al. (1999; 2000), Meade et al. also employed the likelihood ratio test for DIF (Thissen, Steinberg, & Gerrard, 1986). Although the two methods did not agree completely, each method identified a subset of the items as functioning differently across time.

Thus, research conducted to date has found that beta change is a real phenomenon; it does occur as theorized by Golembiewski et al. (1976). But also emerging from this research has been the finding that beta change did not occur on every dimension being measured. In each study

where beta change was assessed rigorously, only a subset of the items was found to exhibit the effect. This fact naturally raises the question of what it is that causes some items to undergo beta change and not others.

THE PRESENT STUDY

As discussed earlier, beta change may be viewed as either a legitimate training outcome (Golembiewski et al., 1976) or as a source of measurement contamination (Howard & Dailey, 1979). Regardless of which view one might take, there is value in understanding the mechanisms underlying the effect and consequently being able to predict when it is likely to occur. If beta change is an intended outcome of a training intervention, then evaluating that intervention requires instrumentation that is sensitive to the effect. Alternatively, if training evaluators are primarily interested in alpha change, their preference should be for instrumentation that is more robust—or perhaps immune—to an effect that would prevent the estimation of their criteria of interest. In sum, the existence of the beta change phenomenon burdens evaluators of training with a responsibility to understand how beta change interacts with instrumentation and to select (or develop) instruments according to the objectives of their investigations.

Implicit Theories and Beta Change

In an application of Kelly's (1955) "personal construct theory," Borman (1983, 1987) found that performance ratings were influenced by what he called "folk theories" of performance. Folk theories of performance are performance schemata used by perceivers to evaluate performance. These implicit theories contain descriptive information about what effective performance looks like, including which dimensions it encompasses and the relative importance of each dimension. Indeed, it could be argued that implicit theories of performance constitute raters' idiosyncratic definitions of performance. Several studies have found that performance ratings are

affected by raters' implicit theories (e.g., Feldman, 1981; Ilgen & Feldman, 1983; Lord, Foti, & Phillips, 1982; Hauenstein & Alexander, 1991).

Importantly, Borman (1987) suggested that leadership training may influence the development of implicit theories about subordinates' performance. Indeed, a great deal of research has found frame of reference (FOR) training of raters to affect subsequent performance ratings in a manner that bears a striking resemblance to beta change (e.g., Day & Sulsky, 1995; Hauenstein, 1998; Hauenstein & Foti, 1989). Extending this reasoning, if implicit theories of performance affect performance judgments and training can affect implicit theories of performance, then implicit theory change may be one mechanism through which training induces beta change.

It should be noted that previous research has focused on manifest characteristics of performance ratings (e.g., mean level, accuracy, variance) whereas beta change is concerned with latent phenomena. Specifically, beta change inheres in the relation between observed ratings and the latent constructs they are intended to represent. Thus, this investigation extends research on the relation between implicit theories and performance judgments to the level of latent constructs.

However, to suppose that beta change is the result of implicit theory change is only to restate the question of "why these items?" as "why these implicit theories?" That is, we are still left to speculate as to why training affects some implicit theories (or some components of a single implicit theory) and not others. Alliger et al. (1997) found that training outcome criteria that were related to the content of training programs were also more strongly related to each other, supporting the straightforward contention that program content matters in the examination of outcomes. Extending this idea, it would seem equally straightforward to suppose that there might be a relation between training program content and which implicit theories undergo change—and, by extension, which items show beta change. That is, items that assess constructs that were

explicitly addressed in training may be more likely to undergo recalibration (beta change) than items that assess topics that were not specifically covered in training. Indeed, such effects are exactly what Golembiewski et al. (1976) had in mind when they suggested gamma and beta change as legitimate—even intended—outcomes of development interventions. It seems safe to assume, however, that scale recalibration need not be intended by trainers in order for the effect to occur; beta change may occur as a side effect of some other, intended, outcome.

An outcome that is essentially universal in the extent to which it is intended by trainers is increased knowledge of subject matter. One type of knowledge that might be so enhanced is an awareness of the range within which phenomena vary. That is, training, like other forms of education, makes use of examples. Further, those examples are usually accompanied by evaluations of where the examples fall on some dimension of interest. For instance, a leadership skills trainer might describe an example of a manager who insists on completing tasks herself rather than delegating them to subordinates. The trainer would likely then evaluate that example (negatively) by pointing out that the manager has limited her own effectiveness to the range of things that she has the personal time and resources to accomplish. By delegating tasks, the trainer might say, the manager can expand the scope of her own effectiveness to include not only what she herself can accomplish, but also what her subordinates can accomplish using their resources. Thus, the trainer has presented trainees with (1) a specific behavioral description and then (2) anchored that description at a particular place on a dimension (albeit imprecisely), in this case, scope of effectiveness. This process is very much like those employed in FOR training and even in the application of behaviorally anchored rating scales (BARS) to performance appraisal—processes intended to provide raters with a specific metric (Hauenstein, 1998; Smith & Kendall, 1963).

Extending the work of Craig et al. (1999, 2000), the present study investigated the question of why some items and scales exhibit beta change following a developmental intervention and others do not. More specifically, this study tested the hypothesis that implicit theory change acts as a mediator between training interventions and beta change. During this process, a new procedure for identifying beta change at both the item and test level, originally presented in Craig et al. (1999), was further validated. The use of multisource performance ratings also allowed for hypotheses to be tested separately for raters who did and did not experience the training intervention.

Hypotheses

H1: Implicit theories, measured before and after the development intervention, will show evidence of change.

H1a: Implicit theory change will be detected in data collected from participants in the development intervention (self-ratings).

H1b: Implicit theory change will not be detected in data collected from individuals who did not participate in the development intervention (superior, peer, and subordinate ratings).

H1c: Implicit theory change will occur in domains of leadership behavior that are addressed by the development intervention.

H1d: Implicit theory change will not occur in domains of leadership behavior that are not addressed by the development intervention.

H2: At least some items and scales will show beta change in comparisons of responses collected before the development intervention to responses collected after the intervention.

H2a: Beta change will be detected in responses from individuals who participated in the development intervention (self-ratings).

H2b: Beta change will not be detected in responses from individuals who did not participate in the development intervention (superior, peer, and subordinate ratings).

H2c: Beta change will be detected in items and scales for behavioral domains in which implicit theory change occurred.

H2d: Beta change will not be detected in items and scales for behavioral domains in which implicit theory change did not occur.

H3: Direction of implicit theory change will be related to direction of beta change. (Directionality of implicit theory change is explained in the Assessment of Implicit Theories section below.)

H3a: Implicit theory change in the positive direction will be associated with beta change in the direction of increasing severity at Time 2 relative to Time 1.

H3b: Implicit theory change in the negative direction will be associated with beta change in the direction of decreasing severity at Time 2 relative to Time 1.

H4: Magnitude of implicit theory change will be positively related to magnitude of beta change.

Method

Overview

A multisource (360°) performance appraisal instrument was administered to focal managers and their raters before and after focal managers' participation in a leadership development intervention. The training professional who delivered the leadership development intervention was surveyed as to the extent to which the behavioral domains measured by the multisource assessment instrument were also addressed in the intervention. Implicit theory change was operationalized as changes in the frequencies with which specific performance

domains were endorsed as important to effective leadership. Gamma change was assessed by comparing results of exploratory factor analyses conducted on pre-intervention data to results of confirmatory factor analyses conducted on post-intervention data. IRT-based analyses were used to identify items and scales that exhibit beta change in comparisons of pre-intervention and post-intervention multisource performance ratings. Specific hypotheses regarding the relation between intervention-induced implicit theory change and beta change were tested via comparisons of observed beta change with a priori predictions regarding the specific items, scales, and rating sources in which the effect was expected to occur.

Sample and Data Collection Procedure

The data analyzed here were originally collected between 1996 and 1998 by the Center for Creative Leadership (CCL) as part of a longitudinal program evaluation study. Eighty-four managers from a Canadian utility company participated in CCL's "Looking Glass Experience" leadership development program (LGE). Multisource (360°) performance appraisals were conducted twice for each program participant: once immediately before participation (Time 1) and again 12-18 months after participation (Time 2). Both performance appraisals were conducted for nonadministrative purposes (i.e., results were not used for administrative decisions such as pay increases or promotions and, in fact, were disclosed to the client organization only at an aggregate level). The primary purpose of both appraisals was described to raters as the provision of developmental feedback to the focal managers, with the postprogram appraisal having a secondary purpose of program evaluation. Due to the multisource nature of the performance ratings, the 84 program participants yielded approximately 800 responses to the appraisal instrument. Because the number of nonimmediate

superiors in the sample was small (N = 14 at Time 1 and N = 4 at Time 2), that group was combined with immediate superiors in all analyses. Table 1 summarizes the sample sizes for each rating source and administration time.

Multisource Performance Measure

Performance ratings were collected using the Benchmarks® 360 degree leadership assessment instrument (McCauley, Lombardo, & Usher, 1989). Benchmarks®, a commercially available instrument published by the Center for Creative Leadership, contains 22 managerial performance assessment scales divided into two sections. Section 1 contains 16 scales designed to measure desirable performance dimensions. Section 2 contains six scales designed to measure undesirable managerial behaviors associated with career derailment. Section 3 contains 16 items which ask raters to speculate as to how well the ratee would handle various business or career challenges.

Section 4 presents respondents with a list of the 16 performance domains assessed in Section 1, along with brief definitions, and asks them to mark the eight that are most important to success in their organizations. As will be discussed in more detail later, these domain importance ratings were to be used as indicators of raters' implicit theories about performance. Because scales Sections 2 and 3 are not included in the importance ratings in Section 4, only scales one through 16 (Section 1) were used in the current investigation. All items in Section 1 are rated on a five point Likert-type scale with anchors ranging from "not at all" to "to a very great extent." Table 2 provides descriptive information about the 16 scales used in this study, including sample items.

Leadership Development Program

The Looking Glass Experience (LGE) is a five day long leadership development program designed by the Center for Creative Leadership. The version of the program used here was modified slightly from the standard version; it included the following components:

(1) Personality assessment and feedback via the Myers-Briggs Type Indicator (MBTI; Myers, McCauley, Quenk, & Hammer, 1998).

(2) Individually delivered performance feedback using ratings from the Benchmarks® multisource (360°) performance appraisal instrument.

(3) Participation in an elaborate business simulation, in which participants play roles as executives in a glass company ("Looking Glass, Inc.") and face a variety of simulated business challenges. Participants are observed by program staff and receive detailed feedback about their performances afterward. Participants also provide performance feedback to each other in debrief sessions which follow the simulations.

(4) Education in research findings related to causes of managerial career derailment.

(5) Setting of goals related to participant characteristics which were identified during the program as "development needs." Participants leave with a detailed written "development plan" which includes the goals, specific actions for achieving them, and descriptions of potential obstacles to goal achievement. Participants were required to share their development plans with their immediate superiors upon returning to work and to seek their superiors' commitments to support the plans.

For the purpose of this investigation, the individual who delivered the training program provided ratings of the extent to which each of the 16 performance domains was addressed in

the intervention. Specifically, each performance domain was rated as either “not addressed at all,” “addressed briefly," "a moderately important part of the program," or "covered extensively—a primary focus of the program." Although it would seem desirable to collect such ratings from more than one trainer, it was not possible to locate other trainers who would have been familiar with this particular program, which had been customized for that organization and thus was not identical to other instantiations of the LGE program. However, the trainer who provided ratings was extremely familiar with the subject matter, having personally conducted nearly all the training sessions under study here, as well as hundreds of other programs similar to this one.

Analyses

Assessment of Implicit Theories

Section 4 of the Benchmarks® instrument presents respondents with a list of the 16 domains of leader behavior assessed in Section 1, along with brief definitions of each. Raters are asked to (dichotomously) mark the eight that are most important to success. Appendix A contains the items to which raters responded in Section 3 of Benchmarks®.

Although this response format does not allow for within-rater distinctions to be made among the eight selected domains, such distinctions can be made across raters. Responses were coded as 1 for “endorsed” or 0 for “not endorsed.” Frequency of endorsement across raters was calculated for each domain and expressed as a proportion of sample size, yielding a continuous importance rating for each performance domain. A significant change in the proportion of the sample endorsing the domain as important was interpreted as an aggregate indicator of implicit theory change. It should be emphasized that these data do not constitute a

comprehensive assessment of raters' implicit theories about performance. One element that such a comprehensive assessment would include, but that is lacking here, is an opportunity for raters to list, in an unstructured fashion, domains they consider to be important. Because in the present scenario raters could only choose from among a predefined set of domains, these data are best considered to reflect a subset of a larger network of schemata. However, because the domains rated here map directly onto the performance domains measured in Section 1, Section 4 was considered an adequate "convenience" indicator of implicit theories of performance.

Assessment of Gamma Change

Before beta change can be assessed, gamma change must be ruled out (Golembiewski et al., 1976). Following Golembiewski et al., gamma change was operationalized as the congruence of factor structures at Time 1 and Time 2. Congruence was determined by, first, conducting an exploratory factor analysis (EFA) on the Time 1 data to empirically identify its structure. This was done separately for each of the 16 scales, nested with the four rating sources, for a total of 64 exploratory factor analyses. All EFAs used principal factors extraction and, where applicable, oblique rotation methods.

Next, confirmatory factor analysis (CFA) was used to test whether the model derived from the Time 1 data provided an adequate fit to the Time 2 data. Adequate fit was interpreted as indicating that gamma change had not occurred. Factor analyses conducted during this stage were also used to establish that these data meet IRT's assumption of unidimensionality.

Assessment of Beta Change

Item Parameter Estimation. In the first step of the IRT-based analyses, the implementation of Samejima's (1969) graded response model in the MULTILOG computer

program (Thissen, 1995) was used to estimate item parameters for the 106 items (16 scales). Item parameters were estimated separately from Time 1 administration data and Time 2 administration data and for each rating source within administration, yielding a total of 128 separate MULTILOG parameter estimation analyses (2 administrations X 4 rating sources X 16 scales).

Person parameter estimation. Under IRT, person parameter estimation (test scoring) is a conditional probability problem that is solved with a maximum likelihood estimation procedure. That is, the procedure assigns each person to the standing on $\underline{\theta}$ that is most likely to have resulted in the observed pattern of item responses, given the "known" probabilistic relations between items and $\underline{\theta}$ that are defined by the item parameters. The peakedness of the likelihood function is reflected in the standard error estimates that accompany the $\underline{\theta}$ estimates, and thus indicate the certainty with which persons' standings on the construct have been estimated. By convention, $\underline{\theta}$ estimates are expressed as $\underline{z}$ scores.

Using the item parameters estimated in the previous step, subsequent MULTILOG (Thissen, 1995) analyses were used to compute person parameters, or $\underline{\theta}$ estimates, for each person in the Time 1 data, requiring another 64 separate MULTILOG analyses (4 rating sources X 16 scales). The DFIT procedure (Raju et al., 1995) requires person parameters for one of the two groups being compared (i.e., the “focal” group). Although it is an arbitrary choice as to which group is declared "focal" and which is declared "reference," this study used Time 1 as the focal group in order to benefit from the slightly larger samples available from that administration.

Equating of parameter metrics. One characteristic of parameter estimation software such as MULTILOG (Thissen, 1995) is that parameters estimated from separate executions of the software are not on identical scaling metrics. Before IRT-based estimates of person and item parameters can be compared by the DFIT procedure, the parameter estimates must be placed on the same metric. This task was accomplished with the EQUATE computer program (Baker, 1995), which implements the procedure developed by Stocking and Lord (1983) for equating parameter metrics. The outcome of this stage of the analysis is a set of transformation coefficients (i.e., slope and intercept) that allows parameter estimates from one administration to be linearly transformed to the metric of the parameter estimates from the other administration. Following Candell and Drasgow (1988), the transformation coefficients were re-estimated when any items demonstrated significant DIF after the first estimation. The second estimation procedure excluded from analysis any items that showed differential functioning using the initial transformation coefficients, thus producing more stable coefficients for use in the final comparison. This equating procedure was completed for each pairwise comparison of time points (always within scale and rating source), thus yielding 64 sets of transformation coefficients (4 rating sources X 16 scales)—not including analyses that were repeated when DIF was discovered, as described above.

DFIT Framework. Raju, van der Linden, and Fleer (1995) proposed a framework for examining differential functioning, at both the item and scale levels, called "differential functioning of items and tests (DFIT)." The DFIT framework, which is based on IRT, defines differential functioning as a difference in the expected item or scale scores for individuals with the same standing on the latent construct (θ), attributable to their membership in different

groups. In the language of the DFIT framework, the expected score on an item or test, given $\underline{\theta}$, is called the "true score," and is expressed on the raw metric of the item or test (e.g., on a one to four scale for a four point Likert-type response format). In the present study, the “groups” compared were the data from before the intervention and the data from after the intervention. Because the true score functions compared in the DFIT procedure are directly computed from the item parameters previously estimated with MULTILOG (Thissen, 1995), DFIT essentially tests the hypothesis that items have the same parameters in both groups.

The DFIT framework has several characteristics that make it desirable for use here. First, it is oriented toward detection of practical, real-world consequences that result from differential functioning (i.e., differences in item and scale scores). Second, DFIT has received significant attention in recent literature. This has been especially true with regard to investigations of measurement equivalence in organizational settings. Thus, DFIT is supported by a growing body of research as an effective method for detecting differential functioning. Finally, computer software has been developed to perform the computations required for DFIT. The availability of software not only facilitated the conduct of this study but also acts to standardize the DFIT procedure across studies, making cross-study inferences about measurement equivalence increasingly possible as this body of literature grows.

Analyses based on DFIT yield several types of differential functioning indices. Noncompensatory differential item functioning (NCDIF) is a purely item level statistic that reflects true score (i.e., expected item response given $\underline{\theta}$) differences for the two groups under examination. As the "noncompensatory" moniker suggests, the NCDIF index considers each item separately, without regard for the functioning of other items in the scale. Mathematically,

NCDIF is the square of the difference in true scores for the two groups, averaged across $\underline{\theta}$. Thus, the square root of NCDIF gives the expected difference in item responses for individuals with the same standing on $\underline{\theta}$, but belonging to different groups.

Differential test functioning (DTF) is analogous to NCDIF, but is a test level index. The square root of DTF is the average expected test score difference between individuals from different groups, but with the same standing on $\underline{\theta}$.

Compensatory differential item functioning (CDIF) is an item level index that represents an item's net contribution to DTF. Computationally, CDIF is the change in DTF associated with the deletion of the focal item from the test. An important concept in DFIT is the directionality of differential functioning. Two items may exhibit similar levels of differential functioning, but in opposite directions (e.g., in a peer-subordinate comparison, one item might "favor" peers and the other might "favor" subordinates). In such a scenario, the two items would cancel each other and produce no net differential functioning at the test level. Conversely, a number of items that have nonsignificant, but nonzero, levels of NCDIF in the same direction can produce a test with significant DTF due to the cumulation of item level DIF at the test level. Because the CDIF index represents an item's net contribution to DTF, it takes into account the functioning of other items on the test, in contrast to NCDIF.

The relative importance placed on NCDIF, CDIF, and DTF depends on the question under investigation. The CDIF index can be very useful in a test development endeavor where test level differential functioning (DTF) is a concern. In the present study, however, emphasis was placed on NCDIF as an indicator of beta change at the item level and DTF as an indicator of beta change at the scale level.

In the DFIT framework, the difference in true scores for members of different groups is considered significant in the context of (1) a significant chi square statistic and (2) an associated index that exceeds an a priori specified critical value. The critical value for significant NCDIF depends on the number of response categories for that item and is intended to counter the sensitivity of chi square tests in large samples. Raju (1999) has recommended that the critical NCDIF value for an item with four response categories be set to 0.054, based on Monte Carlo simulations. The critical DTF value for a test composed of such items would be 0.054 multiplied by the number of items on the test. It should be noted that NCDIF=0.054 is equivalent to an expected difference between groups of 0.23 on a four point scale. Thus, DFIT provides a fairly sensitive test of differential functioning; items and scales can be identified as differentially functioning when the practical importance of the difference is dubious.

The results of the DFIT analyses, in the form of NCDIF and DTF indices, were used to test the hypotheses about beta change articulated earlier. Each hypothesis identifies a configuration of conditions (content domain X rating source) in which differential functioning either was or was not predicted to occur. Thus, the pattern of significant DFIT indices determines the outcomes of the tests of the hypotheses regarding beta change.

Results

Although the analyses of interest here did not make use of scale scores or interscale correlations, descriptive statistics for all 16 scales are presented for completeness. Separate tables for each rater group and administration time, containing correlation matrices, alpha coefficients, means, and standard deviations, can be found in Appendix B.

Program Content

As mentioned earlier, the content of the leadership development intervention was evaluated in terms of the extent to which each Benchmarks® performance domain was addressed during training. Seven of the 16 performance domains were rated as "covered extensively—a primary focus of the program." Those were Resourcefulness, Doing Whatever It Takes, Being a Quick Study, Decisiveness, Work Team Orientation, Building and Mending Relationships, and Self-Awareness. Six domains were rated as "a moderately important part of the program." Those were Leading Direct Reports, Confronting Problem Direct Reports, Compassion and Sensitivity, Straightforwardness and Composure, Balancing Personal Life and Work, and Acting with Flexibility. Two domains were rated as having been "addressed briefly:" Setting a Developmental Climate and Putting People at Ease. Only Hiring Talented Staff was identified as receiving no coverage in the training.

Implicit Theory Change

Hypotheses 1, 1a, 1b, 1c, and 1d concerned the expected pattern of change in performance domain importance ratings. Hypothesis 1, which predicted that implicit theories would change in terms of at least some of the domains considered important to success, was strongly supported. There was a total of 64 T1-T2 comparisons of domain importance ratings (16 domains X 4 rating sources); 29 (45%) of those comparisons yielded statistically significant differences in endorsement rate ($p < .05$, comparison-wise). It should be noted that no attempt was made to control Type 1 error at the experiment level, so three null hypothesis rejections would be expected by chance alone. Clearly, the number found far exceeds the chance rate. Further, because the individuals comprising the samples are largely overlapping in the groups being compared (i.e., T1 and T2), sampling error would seem to be less of a concern. That is, any

change detected would be expected to represent primarily within-individual change that is unlikely to be attributable to different sample composition.

Hypotheses 1a and 1b predicted that implicit theory change would occur in the self group (1a) but not in the other groups (1b). Hypothesis 1a was supported; two of the 16 scales, Balancing Personal Life and Work and Acting with Flexibility, were significantly less likely to be endorsed as important after training than before training. However, not only was Hypothesis 1b not supported, but there was actually far more evidence of implicit theory change in the observer groups than in the trainees themselves. Superiors showed significant change on five domains, peers on twelve, and direct reports on ten of the 16 domains. Interestingly, all the change detected—including that in the self group—was in the direction of decreased importance after training. Although the three observer groups do not constitute a rigorous control due to the possibility that some of those individuals may also have received the intervention, it is still noteworthy that the results obtained were in a direction opposite to that predicted.

Hypotheses 1c and 1d predicted that domain importance ratings would change for domains addressed in training (1c) but not for domains not addressed in training (1d). Domains receiving coverage in training at the "moderate" or "extensive" level accounted for 25 instances of change, or 48% of the maximum possible, given the number of domains receiving those levels of coverage (52). Domains that were addressed "briefly" or "not at all" accounted for four instances of change, or 33% of the maximum possible (12). Although this trend was in the predicted direction, support for this pair of hypotheses was considered marginal because no instances of change had been expected in domains not covered by the program. Two domains that were covered extensively in training showed no change in importance ratings in any group: Doing Whatever It Takes and Being a Quick Study. Additionally, Hiring Talented Staff, which was not

addressed at all by training, showed a significant decrease in importance as rated by peers and direct reports. In sum, the relation between training and implicit theory change is far from clear, although there was a general trend in the predicted directions. The results of the implicit theory-related hypothesis tests are summarized in Tables 3, 4, and 5.

Gamma Change

Before hypotheses regarding beta change could be tested, gamma change had to be assessed. As mentioned earlier, apparent evidence of beta change cannot be interpreted with confidence in the presence of gamma change. That is, if differential functioning were to be detected, it would be impossible to know whether the scaling units had changed only because the construct being measured had changed.

As the first step in the assessment of gamma change, each of the 16 Benchmarks® scales was factor analyzed using the principal factors method. The exploratory factor analyses were conducted only on the Time 1 data and completed separately for each rating source, yielding a total of 64 exploratory factor analyses (16 scales X 4 rating sources X 1 administration time). The objective of the exploratory factor analyses was to identify the structure of each scale, in each rating group. "Structure" in this case meant the number of latent factors and the mapping of items onto factors. Golembiewski et al.'s (1976) conception of gamma change did not specify that stability in the magnitudes of factor loadings was necessary to rule out gamma change, so loading magnitude was not at issue here. In all exploratory factor analyses, the number of factors to retain was chosen on the basis of (1) an eigenvalue scree test (Cattell, 1966), (2) a requirement that any final factor solution must explain at least 70% of items' variance, and (3) a requirement that any multifactor solution be interpretable in terms of meaningful latent constructs.

Because each scale was submitted separately to factor analysis, it was expected that only one factor would be found for each scale. That was indeed the case in every instance except one. Self ratings (N=84) on the Resourcefulness scale (17 items) yielded a two factor solution. Eleven of the items loaded on a primary factor the interpretation of which was consistent with the a priori description of the Resourcefulness scale (eigenvalue=5.90; proportion of variance=.70). But six items that measured congruence with the values of higher management and with organizational strategy formed a second factor (eigenvalue=1.19; proportion of variance=.14). Because the pattern of loadings was clear and the two factors readily interpretable, a two factor structure was chosen for testing in the Time 2 data for the self group.

Initially, the analysis of self ratings on the Doing Whatever It Takes scale also seemed to suggest a two-factor solution. The second factor had an eigenvalue of 1.09 and accounted for 16% of the variance—even more than the second factor of the Resourcefulness scale described above. But upon inspection of the rotated factor pattern, it was discovered that only a single item loaded significantly on the second factor, at a magnitude of .86. Also, when a one-factor solution was "forced," that same item loaded on the single factor with a magnitude of .56. It was therefore decided to retain the a priori one-factor structure for subsequent testing in the post-training data. No other exploratory factor analysis was ambiguous in suggesting anything but a single factor solution. Eigenvalues, variance proportions, and conclusions for the exploratory factor analyses are summarized in Tables 6, 7, 8, and 9.

Next, the factor structures that were empirically identified in the pretraining data were tested as models in confirmatory factor analyses of the post-training data. As before, each scale by rating source combination was tested separately, for a total of 64 separate confirmatory factor analyses. For each model, all items were specified to load on a single factor (except for the test of

self ratings on the Resourcefulness scale which used two factors, as described above). All latent factor variances were fixed at 1.0, following Hatcher (1994), but factor loadings were estimated. All error terms were initially constrained to be uncorrelated.

Several indices of model fit were examined. First, a ratio of χ^2 to degrees of freedom of 2.0 or lower was interpreted as an indication of adequate fit (Hatcher, 1994). Second, values of the root mean square error of approximation (RMSEA) below 0.08 were taken as suggestive of reasonable fit (Browne & Cudeck, 1993). Three additional fit indices were examined, values of which greater than 0.90 were deemed to indicate adequate model fit. The normed fit index (NFI; Bentler & Bonnet, 1980) and comparative fit index (CFI; Bentler, 1990) reflect the extent to which the specified model improves fit over a null model in which all indicators are constrained to be independent. The CFI is less sensitive to small sample sizes and will generally be slightly higher than the NFI in smaller samples (like those in the self and superiors groups). The non-normed fit index (NNFI; Bentler & Bonnet, 1980), which is equivalent to the Tucker-Lewis index (TLI; Tucker & Lewis, 1973) is similar to the CFI and NFI but additionally takes model complexity into account.

Because it can be difficult to obtain adequate fit for models that specify many indicators per latent factor (Hatcher, 1994), item parcels were constructed for the four longest scales, Resourcefulness (17 items became 8 parcels), Doing Whatever It Takes (14 items became 7 parcels), Leading Employees (13 items became 6 parcels), and Building/Mending Relationships (11 items became 5 parcels). This parceling scheme was used for all rating sources, with the exception of the self ratings on Resourcefulness which used the two-factor item-level structure mentioned earlier. In each case, parcels were calculated as the mean of adjacent items (e.g., the first and second items on a scale formed one parcel; the third and fourth items formed another

parcel, etc.). Each of the four scales except for Doing Whatever It Takes contained one parcel composed of three items in order to compensate for the odd numbers of items. This "adjacent items" method resulted in an essentially random combination of items into parcels because scales are intermixed on the administration form such that the items are not adjacent from the perspective of the rater.

In order to determine that the item parceling technique did not spuriously alter scales' factor structures, the exploratory factor analyses of the pretraining data were repeated for these four scales using the item parcels (except for self ratings on Resourcefulness). Using parcels instead of item-level responses did not alter any of the conclusions regarding factor structure. In most cases, the factor solutions were even more strongly unidimensional than they had been when item-level data were analyzed.

The two-factor model specified for self ratings on Resourcefulness did not fit the post-training data (χ^2=234.21, df=118, p<.05, CFI=.75, RMSEA=.11), suggesting that gamma change might have occurred. To examine how the structure had changed, an exploratory factor analysis was conducted on the post-training data which confirmed that the post-training structure was indeed different from the pretraining structure. Specifically, the "congruence with higher management" factor emerged as the primary factor at Time 2 (eigenvalue=5.66, variance proportion=.63), whereas it had been the secondary factor at Time 1. Further, a third factor emerged that had not been present before training (eigenvalue=1.05, variance proportion=.12). Examination of the items loading on that factor suggested that it might be characterized as "managing remotely," as it included several items related to managing from a distance or with little contact. The second factor (eigenvalue=1.18, variance proportion=.13) was the same Resourcefulness factor found as the primary factor in the pretraining data. On the basis of these

results, it was concluded that gamma change did indeed occur for the Resourcefulness scale in the self group. Although no a priori hypotheses had been offered regarding gamma change, and this finding certainly complicates subsequent assessment of beta change for this scale, it seems worth noting that the result is consistent with Golembiewski et al.'s (1976) conception of gamma change insofar as it occurred (1) in actual trainees and not observers and (2) on a performance dimension rated as being addressed extensively during the intervention.

No other scales were concluded to show evidence of gamma change in any rating group, but several findings related to correlated error terms bear mentioning. Recall that all the confirmatory factor analyses initially constrained error terms to be uncorrelated. Three of the 16 scales showed inadequate fit under those conditions (Leading Employees and Straightforwardness and Composure in the self and superior groups; Building and Mending Relationships in the self group). An inspection of the modification indices suggested that the lack of fit was due to the specification of uncorrelated errors. Because error correlation was not a component of the Time 1 structure that was being evaluated in the Time 2 data, it was deemed acceptable to retest these models in the Time 2 data with the constraint of uncorrelated errors removed. To conserve degrees of freedom, only a single error covariance (i.e., the one with the largest Lagrange modification index) was estimated in each retest, except for the retest of Leading Employees in the self group, which had two error covariances with large Lagrange indices in the initial test. Two error covariances were estimated in that analysis. In each case, estimating one (or two) error covariances substantially improved the fit of the model to well above the guidelines for adequate fit described earlier. Most dramatically, the NNFI for the Straightforwardness and Composure scale in the superiors group improved from .53 to .91 when a single error covariance was

estimated from the data rather than constrained to be zero. Fit indices from all confirmatory factor analyses are presented in Tables 10, 11, 12, and 13.

Beta Change

Having established that gamma change occurred in the trainee (self) group on the Resourcefulness scale and in no other scale-by-group combination, the hypotheses regarding beta change could be tested (see Appendix C for all item parameters, metric transformation coefficients, and DFIT indices). Because the graded response IRT model (Samejima, 1969) essentially models each response category as a dichotomous item, categories that contain no observations are akin to items with no variance; their parameters cannot be estimated. Therefore, before any IRT-based analyses were begun, all item-level frequency distributions were inspected for unused response categories. It was discovered that several items had zero endorsement for the lowest response category. As a result, it was necessary to collapse the two lowest response categories for all IRT-related analyses. The collapsing was done for every item on every scale, in every rater group. This procedure yielded a four point scale with acceptable population of each response category.

It should also be noted that a problem with the DFITP4 software (Raju, 1995) prevented three of the 64 planned DFIT analyses from being conducted. Specifically, the DFIT analyses of self ratings on the Hiring Talented Staff scale and of superiors' ratings on the Decisiveness and Putting People at Ease scales generated error messages for reasons that could not be identified. Conversations with the software's developer are currently ongoing in an effort to locate the source of the problems.

Hypotheses 2, 2a, 2b, 2c, and 2d specified the scales and rating sources in which beta change was predicted to occur. Hypothesis 2, which predicted that at least some items and scales

would show beta change, was partially supported. None of the 16 scales showed a significant level of DTF in any rating group, but several items did manifest significant NCDIF, suggesting that beta change did occur in those items. Specifically, in the trainee (self) group one item on each of the following scales showed beta change: Building and Mending Relationships, Self-Awareness, and Acting with Flexibility. Interestingly, there was also evidence of beta change in the superiors group, with one item on each of the following four scales showing significant differential functioning: Resourcefulness, Doing Whatever It Takes, Confronting Problem Employees, and Work Team Orientation. Two items also showed significant NCDIF on the Resourcefulness Scale in the self group, but that differential functioning cannot be unequivocally interpreted as beta change because that scale was found to have undergone gamma change in earlier analyses. Some issues associated with interpreting beta change in the presence of gamma change will be discussed in more detail later in this document.

Hypotheses 2a and 2b predicted, respectively, that beta change would be found in self ratings and not found in observer ratings. Hypothesis 2a was supported; a total of 5 items across four scales were found to show significant differential functioning for self raters at Time 2 compared to Time 1, as discussed above (two of those were on the Resourcefulness scale, which also showed gamma change). Hypothesis 2b was partially supported; no item or scale showed beta change in either the peer or direct report ratings. However, four items showed beta change in superiors' ratings, as described above, diminishing support for Hypothesis 2b.

Hypotheses 2c and 2d predicted that beta change would occur on performance dimensions associated with implicit theory change (2c) and not occur on dimensions with no corresponding implicit theory change (2d). Of the seven instances of item-level beta change detected in the self and superiors groups, only three were found on dimensions that had associated implicit theory

change. Stated differently, of the 29 total instances of significant change in the importance ratings of performance domains, only three had concomitant beta change. Thus, in these data, the probability that implicit theory change would "result" in beta change was only .10. In reverse, the probability that beta change would "result" in implicit theory change was .43. In conclusion, the evidence for a link between beta change and implicit theory change—at least as operationalized here—is very weak.

Hypotheses 3, 3a, and 3b posited a link between the direction of implicit theory change and the direction of beta change. These hypotheses can be evaluated in the three instances where implicit theory change and beta change co-occurred. Because every instance of implicit theory change was in the same negative direction (i.e., lower importance ratings at Time 2), Hypothesis 3a, which predicted that positive implicit theory change would be associated with increasing-severity beta change, cannot be tested. Hypothesis 3b, however, predicted that negative implicit theory change would be associated with decreasing-severity beta change. That is, support would be obtained for Hypothesis 3b if raters with the same standing on the latent construct at Time 1 and Time 2 were expected to give higher ratings at Time 2.

In the self group, the item "is tough and at the same time compassionate," from the Acting with Flexibility scale, showed beta change in the direction of increasing severity, counter to prediction; raters with identical standings on the latent construct would be expected to respond 0.37 scale points lower (on average) after training than before training (NCDIF=.134, $p<.05$). This despite the fact that Acting with Flexibility was less likely to be rated as important to success after training than before training. Figure 1 displays a comparison of the expected item response ("true score") functions for the two administration times.

In the superiors group the item "once the more glaring problems in an assignment are solved, can see the underlying problems and patterns that were obscured before," from the Resourcefulness scale, did provide some support for Hypothesis 3b. Ratings would be expected to average .26 scale points higher after training than before, for raters with identical standings on the construct (NCDIF=.068, $p<.05$). Figure 2 depicts the beta change graphically.

The third differentially functioning item from a scale with significant importance rating change was also detected in the superiors group. The item "is able to fire or deal firmly with loyal but incompetent people without procrastinating," from Confronting Problem Employees, showed evidence of beta change (NCDIF=.105, $p<.05$). This result was in the direction predicted by Hypothesis 3b, with raters at Time 2 expected to provide ratings .32 scale points higher than raters at Time 1 with identical conceptions of ratee performance.

Tests of Hypotheses 3, 3a, and 3b were plagued by two problems. First, the number of scales showing significant importance rating change and also beta change was very low (3), making the detection of systematic trends nearly impossible. Second, all three instances of importance rating change were in the same direction (negative), making a test of Hypothesis 3b impossible and a test of Hypothesis 3 difficult to interpret. In sum, two of the three instances that could have supported Hypothesis 3b did so, with the third instance tending in the direction opposite to that predicted.

Hypothesis 4 predicted that the magnitude of implicit theory change would be positively related to the magnitude of beta change. Limiting the test of Hypothesis 4 to those instances in which significant implicit theory change and significant beta change co-occurred entails re-examination of the same three cases discussed in the tests of Hypotheses 3 through 3b. The first item considered, "is tough and at the same time compassionate," was from the Acting with

Flexibility scale which, in the self group, decreased in proportion of endorsement by .143 ($p<.05$). The second item discussed, "once the more glaring problems in an assignment are solved, can see the underlying problems and patterns that were obscured before," came from superiors' ratings on the Resourcefulness scale, which had a decrease in proportion of endorsement as important of .111 ($p<.05$). The third item was "is able to fire or deal firmly with loyal but incompetent people without procrastinating." That item came from superior ratings on the Confronting Problem Employees scale, the proportion of endorsement for which decreased by .177 ($p<.05$). The NCDIF indices for the three items, respectively, were .134, .068, and .105. The Spearman correlation coefficient for the two variables (implicit theory change and beta change) is .50 ($p=.46$). Of course, we would not expect a significant correlation with only three observations, but the magnitude and sign of the correlation suggests partial support for Hypothesis 4. Summaries of the outcomes of each stage of the analyses can be found in Tables 14, 15, 16, and 17.

Discussion

When Golembiewski et al. (1976) introduced their framework for plural change, methods for assessing gamma change were cumbersome and no method at all was available for detecting beta change. As a result, much of the attention received by the typology in the literature has been in service of developing measurement techniques. In the intervening years since 1976, methods such as covariance structure modeling and item response theory have advanced to the point of offering the promise of finally settling questions about how to measure gamma and beta change. But in order for this area of inquiry to advance it must move beyond measurement debates and seek to understand different types of change in organizations, what are the antecedents and inhibitors of each, what patterns does each manifest, and so on. The present study was an early

step in that direction. This study examined managerial performance ratings from approximately 800 raters on 16 dimensions for evidence of gamma and beta change following a leadership development intervention. The primary objective was to gather evidence regarding how different types of change are related to the content of training interventions and to raters' implicit theories of job performance. Secondarily, earlier applications of item response theory to the assessment of beta change (Craig et al., 1999, 2000; Meade et al., 2001) were extended in the examination of trainees and observers separately. Results further supported the operationalization of beta change as differential item/test functioning across time.

One set of findings concerned the relation between training program content and implicit theory change. Logically, training program content should matter. That is, domain areas that were covered in training should be more likely to show change than areas that were not covered. This was generally what was found in this study; the greater the level of coverage in training, the higher the probability that the proportion of the sample endorsing the domain as important would change from Time 1 to Time 2. But, unexpectedly, this result was primarily driven by importance rating change in the three observer groups rather than among the trainees themselves. Indeed, implicit theory change occurred far more frequently in the observer groups than in the trainee groups. One possible reason is simply that the smaller sample size in the self group set a higher hurdle for change to be declared statistically significant. This fact did appear to influence the results; several domains changed in importance as rated by selves at a magnitude that would have been significant in the peer or direct report groups, but which was nonsignificant in the smaller self group. Statistical power does not fully explain the unexpected pattern however. The superiors group also showed more change in domain importance ratings than did the self group and it was only slightly larger than the self group.

Another possibility is that the differences between rating sources are meaningless because members of the observer groups actually received the intervention at a higher rate than assumed. That is, the data set analyzed here does not identify raters in the observer groups; they are anonymous and thus impossible to track across ratees. The a priori hypotheses tested here were predicated on the supposition that, although some fraction of the observer groups probably also received the intervention, that proportion would be smaller than the proportion of the self group receiving the intervention (i.e., 100%) by a magnitude sufficient to produce observable group-level differences due to training. If that supposition were incorrect by a large enough margin, it might partially explain the results obtained. Unfortunately, this interpretation is impossible to confirm or disconfirm with the data available, but it does seem a rather unlikely explanation.

The higher incidence of implicit theory change in the observer groups might also have been related to the fact that those groups were more likely to have changed composition from one administration to the next. The self group is known to contain the exact same set of individuals at Time 2 as at Time 1, but such is not the case for the observer groups. Although this explanation is appealing, it is somewhat at odds with the fact that significance tests were employed that did not assume the same individuals at both times.

Another, more intriguing, possibility is that participation in the program served as a sort of inoculation against some external factor that was acting in the broader organization at the time. There may have been internal organizational communications that influenced the implicit theories of nontrainees to a greater degree than that to which they influenced those of trainees. Certainly the trainees were removed from their jobs to the training setting for a one week period, but that hardly seems sufficient to have insulated them from effects that were detected in ratings up to a

year later. It may be that the training succeeded in reinforcing implicit theories that were already in place before training. Those reinforced implicit theories might then have been less susceptible to organizational influences experienced after training than those of the nontrainees.

In any case the data presently available do not lend themselves to a conclusive explanation. Future research should examine the link between training and implicit theory change under more highly controlled conditions, such as by ensuring identical sample composition at each time for the observer groups.

Program content was more strongly associated with beta change than with implicit theory change. No formal hypotheses had been offered positing a direct link between program content and beta change; implicit theory change was expected to mediate that relation. But, although any relation between program content and implicit theory change was dubious, all instances of beta change occurred on dimensions that were moderately or extensively covered in training. The reverse was not true however; not every dimension receiving coverage in training showed beta change. This asymmetry suggests that coverage in training may be a necessary, but not sufficient, condition for beta change to occur. This interpretation makes sense when we consider that not all "coverage" is equivalent, though equal training time may have been allocated to topics. Future research can more precisely identify the components of training that give rise to beta change by distinguishing among types of topic coverage, in addition to assessing extent of coverage. For example, topic coverage that makes use of specific examples and anchors them on metrics may be one type of coverage more likely to result in beta change. Relatedly, future research may be able to link aspects of how topics are addressed in training with the specific direction of observed beta change.

One instance of gamma change was detected in this study. Self ratings on the Resourcefulness scale showed a markedly different factor structure after training than they did before training. Several aspects of this finding are interesting. First, the self group evidenced a different factor structure from the other three groups at Time 1, even before the start of training. Two factors were found in the self ratings whereas only one was found in each of the other three groups. This difference may simply be due to members of the observer groups responding on the basis of a general impression to a greater degree than did the trainees when rating themselves. Second, after training, observer ratings on Resourcefulness were still unidimensional and self ratings were still multidimensional, but the nature of the dimensions had changed for self raters. Given that Resourcefulness was rated by the trainer as having been "covered extensively—a primary focus of the program," this result seems to be a "textbook" case of intervention-induced gamma change, exactly as hypothesized by Golembiewski et al. (1976). It does, however, underscore the difficulty of achieving gamma change; six other domains were also rated as extensively addressed in training, but none of the others showed gamma change. As conjectured with beta change, above, subtleties in the types of training coverage may moderate the relation between extent of coverage and gamma change.

Another interesting result related to the gamma change finding was that two items on the same scale (Resourcefulness) also showed differential functioning across the time interval. Those items were "understands strategy as a manager several levels higher does" and "modifies plans in response to changing conditions rather than pursuing one course doggedly." In both cases, the general trend was for raters to give higher ratings after training, controlling for standing on the latent construct. Before training, both items loaded primarily on Factor 2, "congruence with higher management and organization values." After training, the "understands strategy..." item

still had its primary loading on the same factor, although that same factor was Factor 1 at Time 2 whereas it had been Factor 2 at Time 1. But the "modifies plans..." item changed its primary loading over the time interval; at Time 2 that item loaded primarily on the Resourcefulness factor instead of the "congruence with higher management" factor.

Attempting to draw conclusions about beta change in the presence of gamma change is perilous at best; indeed, Golembiewski et al. (1976) considered it impossible. However, it may be that, given the pattern of change in loadings described above, one of the items showed differential functioning due to gamma change and the other showed differential functioning due to beta change. Specifically, the "understands strategy..." item, which continued to load on the same factor at approximately the same magnitude over time, may have exhibited beta change. The "modifies plans..." item, which loaded on different factors at Times 1 and 2, may be an example of differential functioning due to gamma change. This interpretation is only speculative, of course.

No beta change occurred in the peer or direct reports group, but four instances of beta change were detected in the superiors group. Also, the superiors group showed a level of domain importance rating change closer to that found in the self group than to that found in the peer and direct report groups. Thus, the superiors group was more similar to the self group than it was to the other observer groups on at least two dimensions. This result may be due to the fact that trainees were required to involve superiors in the execution of their personal development plans. Campbell and Stanley (1963) warned of "diffusion of treatments" as a threat to internal validity in research designs. They were referring to the fact that communication between members of treatment groups and members of control groups can act as a sort of mini-intervention on the control group. Such a diffusion of treatments effect may have been at work here, with regard to the superiors group. Because trainees involved their bosses in their development processes, they

can be expected to have discussed their training experiences with the bosses, perhaps relaying specific information about training content. The result might have been the instances of beta change detected in superiors' performance ratings and the reduced frequency of importance rating change, relative to the other observer groups.

If a diffusion of treatments did occur with superiors, the fact that beta change did not occur in peer and direct report ratings is consistent with the notion that the observed beta change was attributable to the training intervention. That is, if beta change had been detected in the peer and direct report groups, who presumably experienced the intervention at a much lower rate than did selves and superiors (if at all), then some cause of beta change other than training would need to be sought. As it is, a supposition of diffusion of treatments to superiors is sufficient to render the training adequate to explain the results. It should be stressed however that the putative diffusion of treatments to superiors is only post hoc speculation. Future research might be able to better assess the extent to which observers received some form of the intervention, either by being trainees themselves or through diffusion of treatments. Researchers who undertake studies like the one here are strongly encouraged to use data that identify raters as well as ratees, so the aforementioned factors can be assessed.

As discussed, the fact that raters were anonymous in the current design was one limitation of this study. As a result, it was not possible to assess the extent to which members of the observer groups also received the intervention or to collect information from observers regarding possible diffusion of treatments.

Perhaps the most significant limitation of this study concerned the operationalization of implicit theories of performance. In some ways, Section 4 of the Benchmarks® instrument is similar to previous attempts to assess implicit theories. For example, Offerman, Kennedy, and

Wirtz (1994) developed an instrument for assessing implicit leadership theories that asks raters to indicate the extent to which various traits are characteristic of business leaders. Similarly, the measure used here asked raters to indicate the extent to which various performance domains are important to leadership effectiveness (success).

Further, the specific domains for which importance was rated in this study overlap to some degree with the dimensions of implicit leadership theories identified by Offermann et al. (1994). Although it should be emphasized that Offermann et al. were assessing implicit leadership theories, or person schemata, and Benchmarks® assesses implicit theories of performance—performance schemata—the similarity is still noteworthy. For example, Offermann et al.'s "sensitivity" corresponds directly to Benchmarks' "compassion and sensitivity" and overlaps with "building and mending relationships," "putting people at ease," and "straightforwardness and composure." Offermann et al.'s "intelligence" shares elements with Benchmarks' "being a quick study" and "resourcefulness." The implicit leadership theory dimension "strength" contains elements of "decisiveness." A later refinement of Offermann et al.'s measure by Epitropaki (in press) added two dimensions, including "motivation," which is similar to Benchmarks' "leading direct reports" and "setting a developmental climate."

Some important differences exist however. One is that the "extent" to which the domains were important was dichotomous in the present study; domains were rated as either important or not important. That difference, in combination with the requirement that raters endorse exactly eight of the sixteen domains, made within-rater comparisons among domains nearly impossible. Each rater essentially marked eight of the domains as equally important and the other eight as equally unimportant. As a result, distinctions among domains could only be drawn at the aggregate level, by assessing the proportion of the sample that had marked each domain as

important. In this manner, implicit theory change was operationalized as the extent to which the proportion of the sample endorsing a domain changed. This method created a potential confound between real changes in rated importance and changes in sample composition. The self group was known to contain the same individuals at both times and that group showed little implicit theory change. The observer groups probably contained largely overlapping compositions at both times, because they were the superiors, peers, and direct reports of the same ratees at both times. But the extent of that overlap cannot be assessed. Presumably there was some degree of organizational attrition, turnover, promotion, etc. that rendered the observer group compositions at least slightly different at Time 2. Those differences might have played a role in the unexpected finding of more implicit theory change in observers than in trainees.

Another difference between the present operationalization of implicit theories and previous operationalizations is that previous methods have included an unstructured component in which raters were free to list as many characteristics as they could think of. Even the Offerman et al. (1994) instrument was developed on the basis of such a method. In contrast, the domains rated here were chosen because of their empirical relation to managerial career success rather than because they had been explicitly identified as components of an implicit theory of performance. In sum, the analyses of relations involving implicit theory change yielded the most unexpected findings of this study. That result may be at least partially due to the way implicit theories were operationalized.

An important next step in research on the relation of beta and gamma change to changes in implicit theories of performance will be to repeat the analyses reported here, but to do so with a data set in which (1) raters are identified so their ratings can be compared within-person across time and (2) implicit theories of performance are measured on a graded scale rather than

dichotomously. Further, if raters are identified, it will be possible to both assess the extent of sample composition overlap at multiple time points and to collect data from raters regarding the extent to which they received the intervention. If findings from such a study replicate the findings obtained here, then strong evidence would exist suggesting that implicit theory change is not the mechanism underlying beta change and gamma change. If such a study failed to replicate the present findings, then we would have evidence suggesting that the differences in the two designs are important, perhaps indicative of moderators or boundary conditions.

In conclusion, this study found that beta and gamma change do occur as apparent results of training interventions and are detectable with available analytic methods. One method with the potential to allow interpretation of beta change in the presence of gamma change was discussed. There was partial support for the hypothesis that content domains addressed extensively in training are more likely to show beta change than domains not addressed in training. But there was evidence to suggest that some aspect of training other than "extent" of coverage also influenced which dimensions would show beta change. There was practically no systematic relation between implicit theory change and any other phenomenon studied here. But that finding may be an artifact of the manner in which this study operationalized implicit theories or of unmeasured external processes ongoing in the organization at the time these data were collected. The discussion above has attempted to highlight aspects of this study's design that may have led to ambiguities in the results in the hope that future research can build on what was begun here and advance toward a deeper understanding of change due to organizational interventions.

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Table 1
Sample Sizes for Each Rating Source and Administration Time

	Time 1	Time 2
Immediate Superiors	84	83
Nonimmediate Superiors	14	4
Peers	385	326
Direct Reports (Subordinates)	319	280
Focal Managers (self ratings)	84	84
Total	886	777

Note. Ratings from nonimmediate superiors and immediate superiors were combined in all analyses.

Table 2
Scale Titles and Sample Items for Benchmarks® Instrument (Section 1)

Title	Number of Items	Sample Item
(1) Resourcefulness	17	Is able to transfer principles and knowledge, such as that from coursework and seminars, to the job at hand
(2) Doing Whatever It Takes	14	Faces difficult situations with guts and tenacity
(3) Being a Quick Study	4	Learns a new skill quickly
(4) Decisiveness	4	Does not hesitate when making decisions
(5) Leading Employees	13	Sets clear performance standards for direct reports
(6) Setting a Developmental Climate	5	Develops direct reports by providing challenge and opportunity
(7) Confronting Problem Employees	4	Moves quickly in confronting a problem direct report
(8) Work Team Orientation	4	Clearly believes that managerial success is built by having a team of strong direct reports
(9) Hiring Talented Staff	3	Recruits good people
(10) Building and Mending Relationships	11	Can settle problems with external groups without alienating them
(11) Compassion and Sensitivity	4	Treats people fairly when they make a mistake
(12) Straightforwardness and Composure	6	Becomes hostile or moody when things are not going his/her way.
(13) Balance between Personal Life and Work	4	Acts as if there is more to life than just having a career
(14) Self-Awareness	4	Sorts out his/her strengths and weaknesses fairly accurately (I.e., knows him/herself)
(15) Putting People at Ease	4	Has a warm personality that puts people at ease
(16) Acting with Flexibility	5	Can lead and let others lead

Table 3
Performance Domain Importance Ratings Before Program (Time 1)

	Self N = 84	Superiors N = 98	Peers N = 385	Direct Reports N = 319
Resourcefulness	71 (84.52%)	92 (93.88%)	320 (83.12%)	247 (77.43%)
Doing Whatever It Takes	47 (55.95%)	68 (69.39%)	200 (51.95%)	107 (33.54%)
Being a Quick Study	31 (36.90%)	43 (43.88%)	148 (38.44%)	100 (31.35%)
Decisiveness	61 (72.62%)	72 (73.47%)	283 (73.51%)	181 (56.74%)
Leading Employees	66 (78.57%)	88 (89.80%)	312 (81.04%)	237 (74.29%)
Setting a Developmental Climate	49 (58.33%)	52 (53.06%)	226 (58.70%)	178 (55.80%)
Confronting Problem Employees	15 (17.86%)	23 (23.47%)	83 (21.56%)	92 (28.84%)
Work Team Orientation	51 (60.71%)	62 (63.27%)	245 (63.64%)	201 (63.01%)
Hiring Talented Staff	32 (38.10%)	36 (36.73%)	165 (42.86%)	137 (42.95%)
Building/Mending Relationships	40 (47.62%)	56 (57.14%)	215 (55.84%)	147 (46.08%)
Compassion/Sensitivity	13 (15.48%)	21 (21.43%)	78 (20.26%)	83 (26.02%)
Straightforwardness and Composure	43 (51.19%)	45 (45.92%)	191 (49.61%)	201 (63.01%)
Balance between Personal Life and Work	29 (34.52%)	22 (22.45%)	123 (31.95%)	142 (44.51%)
Self-Awareness	12 (14.29%)	13 (13.27%)	62 (16.10%)	74 (23.20%)
Putting People at Ease	12 (14.29%)	13 (13.27%)	59 (15.32%)	88 (27.59%)
Acting with Flexibility	74 (88.10%)	77 (78.57%)	297 (77.14%)	246 (77.12%)

Table 4
Performance Domain Importance Ratings After Program (Time 2)

	Self N = 84	Superiors N = 87	Peers N = 326	Direct Reports N = 280
Resourcefulness	71 (84.52%)	72 (82.76%)	224 (68.71%)	179 (63.93%)
Doing Whatever It Takes	54 (64.29%)	51 (58.62%)	152 (46.63%)	94 (33.57%)
Being a Quick Study	33 (39.29%)	41 (47.13%)	112 (34.36%)	87 (31.07%)
Decisiveness	64 (76.19%)	69 (79.31%)	207 (63.50%)	138 (49.29%)
Leading Employees	64 (76.19%)	67 (77.01%)	210 (64.42%)	181 (64.64%)
Setting a Developmental Climate	46 (54.76%)	54 (62.07%)	146 (44.79%)	151 (53.93%)
Confronting Problem Employees	13 (15.48%)	5 (5.75%)	30 (9.20%)	54 (19.29%)
Work Team Orientation	59 (70.24%)	66 (75.86%)	194 (59.51%)	151 (53.93%)
Hiring Talented Staff	26 (30.95%)	21 (24.14%)	97 (29.75%)	90 (32.14%)
Building/Mending Relationships	35 (41.67%)	43 (49.43%)	133 (40.80%)	127 (45.36%)
Compassion/Sensitivity	10 (11.90%)	2 (2.30%)	33 (10.12%)	54 (19.29%)
Straightforwardness and Composure	38 (45.24%)	27 (31.03%)	126 (38.65%)	133 (47.50%)
Balance between Personal Life and Work	13 (15.48%)	18 (20.69%)	75 (23.01%)	93 (33.21%)
Self-Awareness	5 (5.95%)	6 (6.90%)	41 (12.58%)	44 (15.71%)
Putting People at Ease	5 (5.95%)	8 (9.20%)	26 (7.98%)	68 (24.29%)
Acting with Flexibility	62 (73.81%)	66 (75.86%)	196 (60.12%)	186 (66.43%)

Table 5
Implicit Theory Change

	Self N = 84/84	Superiors N = 98/87	Peers N = 385/326	Direct Reports N = 319/280
Resourcefulness	0.00%	*-11.12%	*-14.41%	*-13.50%
Doing Whatever It Takes	8.34%	-10.77%	-5.32%	0.03%
Being a Quick Study	2.39%	3.25%	-4.08%	-0.28%
Decisiveness	3.57%	5.84%	*-10.01%	-7.45%
Leading Employees	-2.38%	*-12.79%	*-16.62%	*-9.65%
Setting a Developmental Climate	-3.57%	9.01%	*-13.91%	-1.87%
Confronting Problem Employees	-2.38%	*-17.72%	*-12.36%	*-9.55%
Work Team Orientation	9.53%	12.59%	-4.13%	*-9.08%
Hiring Talented Staff	-7.15%	-12.59%	*-13.11%	*-10.81%
Building/Mending Relationships	-5.95%	-7.71%	*-15.04%	-0.72%
Compassion/Sensitivity	-3.58%	*-19.13%	*-10.14%	*-6.73%
Straightforwardness and Composure	-5.95%	*-14.89%	*-10.96%	*-15.51%
Balance between Personal Life and Work	*-19.04%	-1.76%	*-8.94%	*-11.30%
Self-Awareness	-8.34%	-6.37%	-3.52%	*-7.49%
Putting People at Ease	-8.34%	-4.07%	*-7.34%	-3.30%
Acting with Flexibility	*-14.29%	-2.71%	*-17.02%	*-10.69%

Note. Numbers in body of table are percent endorsement at T2 minus percent endorsement at T1.
*$p < .05$, two-tailed

Table 6
Summary of Exploratory Factor Analysis Results for Self Group at Time 1

	First Four Eigenvalues	Variance Accounted For	Conclusion (model to be tested at T2)
Resourcefulness (17 items)	5.9, 1.19, 0.72, 0.56	70%, 14%, 8%, 6%	Two factors
Doing Whatever It Takes (14 items)	4.82, 1.09, 0.67, 0.46	72%, 16%, 10%, 7%	One factor
Being a Quick Study (4 items)	2.3, -, -, -	114%, -, -, -	One factor
Decisiveness (4 items)	2.05, -, -, -	120%, -, -, -	One factor
Leading Employees (13 items)	4.08, 0.63, 0.53, 0.38	79%, 12%, 10%, 75	One factor
Setting a Developmental Climate (5 items)	1.61, 0.05, -, -	123%, 4%, -, -	One factor
Confronting Problem Employees (4 items)	2.07, 0.02, -, -	115%, 1%, -, -	One factor
Work Team Orientation (4 items)	1.45, 0.07, -, -	127%, 6%, -, -	One factor
Hiring Talented Staff (3 items)	1.52, -, -	125%, -, -	One factor
Building/Mending Relationships (11 items)	3.86, 0.53, 0.35, 0.23	90%, 12%, 8%, 5%	One factor
Compassion/Sensitivity (4 items)	1.32, -, -, -	139%, -, -, -	One factor
Straightforwardness and Composure (6 items)	1.55, 0.26, -, -	122%, 20%, -, -	One factor
Balance between Personal Life and Work (4 items)	2.18, 0.03, -, -	113%, 1%, -, -	One factor
Self-Awareness (4 items)	1.41, -, -, -	136%, -, -, -	One factor
Putting People at Ease (4 items)	2.07, 0.06, -, -	112%, 3%, -, -	One factor
Acting with Flexibility (5 items)	1.5, 0.23, -, -	122%, 19%, -, -	One factor

Note. " - " = negative value; All exploratory factor analyses used principal factors extraction. N = 84.

Table 7
Summary of Exploratory Factor Analysis Results for Superiors Group at Time 1

	First Four Eigenvalues	Variance Accounted For	Conclusion (model to be tested at T2)
Resourcefulness (17 items)	6.85, 0.95, 0.56, 0.46	79%, 11%, 6%, 5%	One factor
Doing Whatever It Takes (14 items)	6.77, 0.68, 0.61, 0.28	85%, 9%, 8%, 4%	One factor
Being a Quick Study (4 items)	2.17, 0.03, -, -	115%, 1%, -, -	One factor
Decisiveness (4 items)	2.61, 0.01, -, -	109%, 0%, -, -	One factor
Leading Employees (13 items)	6.59, 0.6, 0.35, 0.3	88%, 8%, 5%, 4%	One factor
Setting a Developmental Climate (5 items)	2.73, 0.05, -, -	111%, 2%, -, -	One factor
Confronting Problem Employees (4 items)	2.1, -, -, -	115%, -, -, -	One factor
Work Team Orientation (4 items)	1.89, 0.16, -, -	113%, 9%, -, -	One factor
Hiring Talented Staff (3 items)	1.51, -, -	125%, -, -	One factor
Building/Mending Relationships (11 items)	5.61, 0.38, 0.27, 0.18	95%, 6%, 5%, 3%	One factor
Compassion/Sensitivity (4 items)	2.03, -, -, -	119%, -, -, -	One factor
Straightforwardness and Composure (6 items)	1.82, 0.39, 0.09, -	103%, 22%, 5%, -	One factor
Balance between Personal Life and Work (4 items)	1.47, 0.11, -, -	124%, 9%, -, -	One factor
Self-Awareness (4 items)	2.08, 0.01, -, -	117%, 1%, -, -	One factor
Putting People at Ease (4 items)	2.12, 0.06, -, -	113%, 3%, -, -	One factor
Acting with Flexibility (5 items)	2.64, 0.12, -, -	110%, 5%, -, -	One factor

Note. " - " = negative value; All exploratory factor analyses used principal factors extraction. N = 98.

Table 8
Summary of Exploratory Factor Analysis Results for Peers Group at Time 1

	First Four Eigenvalues	Variance Accounted For	Conclusion (model to be tested at T2)
Resourcefulness (17 items)	6.76, 0.79, 0.44, 0.3	89%, 10%, 6%, 4%	One factor
Doing Whatever It Takes (14 items)	5.98, 0.58, 0.34, 0.27	93%, 9%, 5%, 4%	One factor
Being a Quick Study (4 items)	2.15, 0.02, -, -	115%, 1%, -, -	One factor
Decisiveness (4 items)	2.23, 0.03, -, -	113%, 1%, -, -	One factor
Leading Employees (13 items)	5.57, 0.42, 0.31, 0.16	97%, 7%, 5%, 3%	One factor
Setting a Developmental Climate (5 items)	2.35, 0.03, -, -	114%, 1%, -, -	One factor
Confronting Problem Employees (4 items)	2.19, -, -, -	115%, -, -, -	One factor
Work Team Orientation (4 items)	1.67, 0.07, -, -	122%, 5%, -, -	One factor
Hiring Talented Staff (3 items)	1.59, -, -	124%, -, -	One factor
Building/Mending Relationships (11 items)	5.44, 0.31, 0.14, 0.11	101%, 6%, 3%, 2%	One factor
Compassion/Sensitivity (4 items)	2.03, -, -, -	120%, -, -, -	One factor
Straightforwardness and Composure (6 items)	2.06, 0.3, -, -	113%, 16%, -, -	One factor
Balance between Personal Life and Work (4 items)	1.96, 0.02, -, -	119%, 1%, -, -	One factor
Self-Awareness (4 items)	1.90, -, -, -	121%, -, -, -	One factor
Putting People at Ease (4 items)	2.58, -, -, -	109%, -, -, -	One factor
Acting with Flexibility (5 items)	2.16, 0.01, -, -	121%, 1%, -, -	One factor

Note. " - " = negative value; All exploratory factor analyses used principal factors extraction. N = 385.

Table 9
Summary of Exploratory Factor Analysis Results for Direct Reports Group at Time 1

	First Four Eigenvalues	Variance Accounted For	Conclusion (model to be tested at T2)
Resourcefulness (17 items)	7.42, 0.56, 0.35, 0.28	91%, 7%, 4%, 3%	One factor
Doing Whatever It Takes (14 items)	5.89, 0.59, 0.41, 0.28	89%, 9%, 6%, 4%	One factor
Being a Quick Study (4 items)	2.31, 0.03, -, -	112%, 2%, -, -	One factor
Decisiveness (4 items)	1.91, 0.02, -, -	119%, 1%, -, -	One factor
Leading Employees (13 items)	5.64, 0.45, 0.34, 0.14	95%, 8%, 6%, 2%	One factor
Setting a Developmental Climate (5 items)	2.24, 0.04, -, -	116%, 2%, -, -	One factor
Confronting Problem Employees (4 items)	1.96, -, -, -	121%, -, -, -	One factor
Work Team Orientation (4 items)	1.5, 0.01, -, -	131%, 1%, -, -	One factor
Hiring Talented Staff (3 items)	1.27, -, -	135%, -, -	One factor
Building/Mending Relationships (11 items)	5.43, 0.43, 0.19, 0.11	97%, 8%, 3%, 2%	One factor
Compassion/Sensitivity (4 items)	1.75, -, -, -	124%, -, -, -	One factor
Straightforwardness and Composure (6 items)	1.61, 0.33, 0.02, -	114%, 23%, 1%, -	One factor
Balance between Personal Life and Work (4 items)	2.00, 0.04, -, -	116%, 2%, -, -	One factor
Self-Awareness (4 items)	1.78, 0.04, -, -	121%, 2%, -, -	One factor
Putting People at Ease (4 items)	2.68, 0.02, -, -	108%, 1%, -, -	One factor
Acting with Flexibility (5 items)	2.20, 0.08, -, -	116%, 4%, -, -	One factor

Note. " - " = negative value; All exploratory factor analyses used principal factors extraction. N = 319.

Table 10
Confirmatory Factor Analysis Fit Indices for Self Group at Time 2 (N = 84)

	χ^2	df	NFI	NNFI	CFI	RMSEA
Resourcefulness (17 items, 2 factors)	*234.21	118	0.61	0.72	0.75	0.11
Doing Whatever It Takes (7 parcels)	8.84	14	0.96	1.04	1.00	0.00
Being a Quick Study (4 items)	3.41	2	0.98	0.97	0.99	0.09
Decisiveness (4 items)	1.64	2	0.99	1.01	1.00	0.00
Leading Employees (6 parcels)	*24.53 (3.05)	9 (7)	0.85 (.98)	0.82 (1.06)	0.89 (1.00)	0.14 (0.00)
Setting a Developmental Climate (5 items)	3.36	5	0.97	1.03	1.00	0.00
Confronting Problem Employees (4 items)	*7.33	2	0.91	0.78	0.93	0.19
Work Team Orientation (4 items)	5.19	2	0.93	0.85	0.95	0.14
Hiring Talented Staff (3 items)	*0.00	0	1.00	NA	1.00	0.00
Building/Mending Relationships (5 parcels)	*25.47 (*11.14)	5 (4)	0.88 (.95)	0.80 (.91)	0.90 (.97)	0.22 (.15)
Compassion/Sensitivity (4 items)	0.41	2	0.99	1.11	1.00	0.00
Straightforwardness and Composure (6 items)	*18.51 (10.72)	9 (8)	0.81 (.89)	0.81 (.94)	0.89 (.97)	0.11 (.06)
Balance between Personal Life and Work (4 items)	*14.88	2	0.91	0.75	0.92	0.28
Self-Awareness (4 items)	2.88	2	0.93	0.93	0.98	0.07
Putting People at Ease (4 items)	*11.40	2	0.93	0.81	0.94	0.24
Acting with Flexibility (5 items)	4.41	5	0.95	1.01	1.00	0.00

*p < .05

Note. Values in parentheses indicate results of CFA with correlated uniquenesses specified. NFI = normed fit index (Bentler & Bonnet, 1980); NNFI = non-normed fit index (Bentler & Bonnet, 1980); CFI = comparative fit index (Bentler, 1989); RMSEA = root mean square error of approximation.

Table 11
Confirmatory Factor Analysis Fit Indices for Superiors Group at Time 2 (N = 87)

	χ^2	df	NFI	NNFI	CFI	RMSEA
Resourcefulness (8 parcels)	*26.34	14	0.92	0.94	0.96	0.10
Doing Whatever It Takes (7 parcels)	6.41	14	0.98	1.05	1.00	0.00
Being a Quick Study (4 items)	0.31	2	1.00	1.03	1.00	0.00
Decisiveness (4 items)	*7.66	2	0.95	0.90	0.97	0.18
Leading Employees (6 parcels)	*24.53 (12.05)	9 (7)	0.85 (.94)	0.82 (.95)	0.89 (.97)	0.14 (.09)
Setting a Developmental Climate (5 items)	*13.95	5	0.87	0.82	0.91	0.15
Confronting Problem Employees (4 items)	3.87	2	0.97	0.95	0.98	0.11
Work Team Orientation (4 items)	5.47	2	0.94	0.88	0.96	0.14
Hiring Talented Staff (3 items)	*0.00	0	1.00	NA	1.00	0.00
Building/Mending Relationships (5 parcels)	5.57	5	0.98	1.00	1.00	0.03
Compassion/Sensitivity (4 items)	0.23	2	1.00	1.09	1.00	0.00
Straightforwardness and Composure (6 items)	*35.71 (10.84)	9 (7)	0.68 (.90)	0.53 (.91)	0.72 (.96)	0.19 (.08)
Balance between Personal Life and Work (4 items)	*7.73	2	0.90	0.76	0.92	0.18
Self-Awareness (4 items)	*10.27	2	0.92	0.79	0.93	0.22
Putting People at Ease (4 items)	3.38	2	0.98	0.98	0.99	0.08
Acting with Flexibility (5 items)	*11.48	5	0.91	0.88	0.94	0.12

*p < .05

Note. Values in parentheses indicate results of CFA with correlated uniquenesses specified. NFI = normed fit index (Bentler & Bonnet, 1980); NNFI = non-normed fit index (Bentler & Bonnet, 1980); CFI = comparative fit index (Bentler, 1989); RMSEA = root mean square error of approximation.

Table 12
Confirmatory Factor Analysis Fit Indices for Peers Group at Time 2 (N = 326)

	χ^2	df	NFI	NNFI	CFI	RMSEA
Resourcefulness (8 parcels)	*51.23	14	0.96	0.96	0.97	0.09
Doing Whatever It Takes (7 parcels)	*30.95	14	0.98	0.98	0.99	0.06
Being a Quick Study (4 items)	4.30	2	0.99	0.99	1.00	0.06
Decisiveness (4 items)	*13.17	2	0.97	0.93	0.98	0.13
Leading Employees (6 parcels)	*24.82	9	0.98	0.98	0.99	0.07
Setting a Developmental Climate (5 items)	*25.37	5	0.95	0.93	0.96	0.12
Confronting Problem Employees (4 items)	2.70	2	0.99	0.99	1.00	0.03
Work Team Orientation (4 items)	4.01	2	0.99	0.98	0.99	0.05
Hiring Talented Staff (3 items)	*0.00	0	1.00	NA	1.00	0.00
Building/Mending Relationships (5 parcels)	*23.22	5	0.98	0.97	0.98	0.11
Compassion/Sensitivity (4 items)	2.34	2	1.00	1.00	1.00	0.02
Straightforwardness and Composure (6 items)	*20.11	9	0.96	0.96	0.97	0.06
Balance between Personal Life and Work (4 items)	*18.20	2	0.95	0.87	0.96	0.17
Self-Awareness (4 items)	*10.78	2	0.98	0.94	0.98	0.12
Putting People at Ease (4 items)	*16.86	2	0.98	0.95	0.98	0.15
Acting with Flexibility (5 items)	*17.46	5	0.97	0.96	0.98	0.08

*p < .05
Note. NFI = normed fit index (Bentler & Bonnet, 1980); NNFI = non-normed fit index (Bentler & Bonnet, 1980); CFI = comparative fit index (Bentler, 1989); RMSEA = root mean square error of approximation.

Table 13
Confirmatory Factor Analysis Fit Indices for Direct Reports Group at Time 2 (N = 280)

	χ^2	df	NFI	NNFI	CFI	RMSEA
Resourcefulness (8 parcels)	*37.69	14	0.96	0.97	0.98	0.08
Doing Whatever It Takes (7 parcels)	*25.69	14	0.98	0.99	0.99	0.05
Being a Quick Study (4 items)	5.57	2	0.99	0.98	0.99	0.08
Decisiveness (4 items)	*6.21	2	0.98	0.97	0.99	0.08
Leading Employees (6 parcels)	6.91	9	0.99	1.00	1.00	0.00
Setting a Developmental Climate (5 items)	8.50	5	0.99	0.99	0.99	0.05
Confronting Problem Employees (4 items)	0.27	2	1.00	1.01	1.00	0.00
Work Team Orientation (4 items)	*7.53	2	0.97	0.93	0.98	0.10
Hiring Talented Staff (3 items)	*0.00	0	1.00	NA	1.00	0.00
Building/Mending Relationships (5 parcels)	4.82	5	1.00	1.00	1.00	0.00
Compassion/Sensitivity (4 items)	2.17	2	0.99	1.00	1.00	0.01
Straightforwardness and Composure (6 items)	*28.13	9	0.92	0.91	0.95	0.09
Balance between Personal Life and Work (4 items)	*14.14	2	0.95	0.87	0.96	0.16
Self-Awareness (4 items)	*16.56	2	0.95	0.88	0.96	0.18
Putting People at Ease (4 items)	*11.55	2	0.99	0.97	0.99	0.13
Acting with Flexibility (5 items)	6.44	5	0.99	0.99	1.00	0.03

*p < .05
Note. NFI = normed fit index (Bentler & Bonnet, 1980); NNFI = non-normed fit index (Bentler & Bonnet, 1980); CFI = comparative fit index (Bentler, 1989); RMSEA = root mean square error of approximation.

Table 14
Summary of Results for Self Group

	Coverage in Program	Domain Importance Change (T2-T1)	Gamma Change	Number of Items Exhibiting Beta Change
Resourcefulness	Extensive	0.00%	Yes	2 (12%)
Doing Whatever It Takes	Extensive	8.34%	No	0
Being a Quick Study	Extensive	2.39%	No	0
Decisiveness	Extensive	3.57%	No	0
Leading Employees	Moderate	-2.38%	No	0
Setting a Developmental Climate	Brief	-3.57%	No	0
Confronting Problem Employees	Moderate	-2.38%	No	0
Work Team Orientation	Extensive	9.53%	No	0
Hiring Talented Staff	None	-7.15%	No	NA
Building/Mending Relationships	Extensive	-5.95%	No	1 (9%)
Compassion/Sensitivity	Moderate	-3.58%	No	0
Straightforwardness and Composure	Moderate	-5.95%	No	0
Balance between Personal Life and Work	Moderate	*-19.04%	No	0
Self-Awareness	Extensive	-8.34%	No	1 (25%)
Putting People at Ease	Brief	-8.34%	No	0
Acting with Flexibility	Moderate	*-14.29%	No	1 (20%)

*$p < .05$
Note. Time 1 $N = 84$. Time 2 $N = 84$.

Table 15
Summary of Results for Superiors Group

	Coverage in Program	Domain Importance Change (T2-T1)	Gamma Change	Number of Items Exhibiting Beta Change
Resourcefulness	Extensive	*-11.12%	No	1 (6%)
Doing Whatever It Takes	Extensive	-10.77%	No	1 (7%)
Being a Quick Study	Extensive	3.25%	No	0
Decisiveness	Extensive	5.84%	No	NA
Leading Employees	Moderate	*-12.79%	No	0
Setting a Developmental Climate	Brief	9.01%	No	0
Confronting Problem Employees	Moderate	*-17.72%	No	1 (25%)
Work Team Orientation	Extensive	12.59%	No	1 (25%)
Hiring Talented Staff	None	-12.59%	No	0
Building/Mending Relationships	Extensive	-7.71%	No	0
Compassion/Sensitivity	Moderate	*-19.13%	No	0
Straightforwardness and Composure	Moderate	*-14.89%	No	0
Balance between Personal Life and Work	Moderate	-1.76%	No	0
Self-Awareness	Extensive	-6.37%	No	0
Putting People at Ease	Brief	-4.07%	No	NA
Acting with Flexibility	Moderate	-2.71%	No	0

*$p < .05$
Note. Time 1 $N = 98$. Time 2 $N = 87$.

Table 16
Summary of Results for Peers Group

	Coverage in Program	Domain Importance Change (T2-T1)	Gamma Change	Number of Items Exhibiting Beta Change
Resourcefulness	Extensive	*-14.41%	No	0
Doing Whatever It Takes	Extensive	-5.32%	No	0
Being a Quick Study	Extensive	-4.08%	No	0
Decisiveness	Extensive	*-10.01%	No	0
Leading Employees	Moderate	*-16.62%	No	0
Setting a Developmental Climate	Brief	*-13.91%	No	0
Confronting Problem Employees	Moderate	*-12.36%	No	0
Work Team Orientation	Extensive	-4.13%	No	0
Hiring Talented Staff	None	*-13.11%	No	0
Building/Mending Relationships	Extensive	*-15.04%	No	0
Compassion/Sensitivity	Moderate	*-10.14%	No	0
Straightforwardness and Composure	Moderate	*-10.96%	No	0
Balance between Personal Life and Work	Moderate	*-8.94%	No	0
Self-Awareness	Extensive	-3.52%	No	0
Putting People at Ease	Brief	*-7.34%	No	0
Acting with Flexibility	Moderate	*-17.02%	No	0

*$p < .05$
Note. Time 1 $N = 385$. Time 2 $N = 326$.

Table 17
Summary of Results for Direct Reports Group

	Coverage in Program	Domain Importance Change (T2-T1)	Gamma Change	Number of Items Exhibiting Beta Change
Resourcefulness	Extensive	*-13.50%	No	0
Doing Whatever It Takes	Extensive	0.03%	No	0
Being a Quick Study	Extensive	-0.28%	No	0
Decisiveness	Extensive	-7.45%	No	0
Leading Employees	Moderate	*-9.65%	No	0
Setting a Developmental Climate	Brief	-1.87%	No	0
Confronting Problem Employees	Moderate	*-9.55%	No	0
Work Team Orientation	Extensive	*-9.08%	No	0
Hiring Talented Staff	None	*-10.81%	No	0
Building/Mending Relationships	Extensive	-0.72%	No	0
Compassion/Sensitivity	Moderate	*-6.73%	No	0
Straightforwardness and Composure	Moderate	*-15.51%	No	0
Balance between Personal Life and Work	Moderate	*-11.30%	No	0
Self-Awareness	Extensive	*-7.49%	No	0
Putting People at Ease	Brief	-3.30%	No	0
Acting with Flexibility	Moderate	*-10.69%	No	0

*$p < .05$
Note. Time 1 $N = 319$. Time 2 $N = 280$

Figure 1
"Is tough and at the same time compassionate"
(Self Group, Acting with Flexibility Scale)

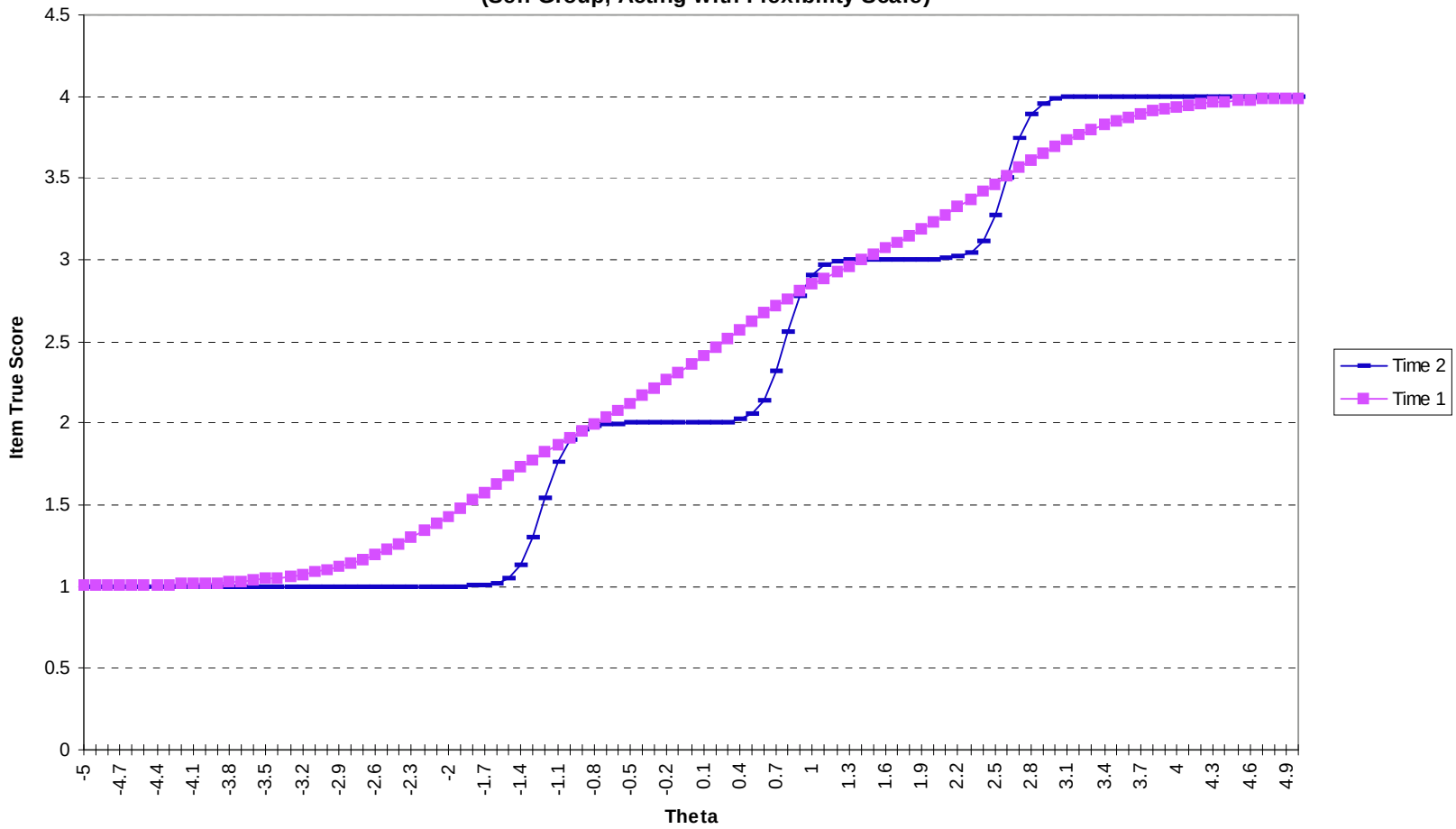


Figure 2
"Once the more glaring problems in an assignment are solved, can see the underlying problems and patterns that were obscured before"
(Superiors Group, Resourcefulness Scale)

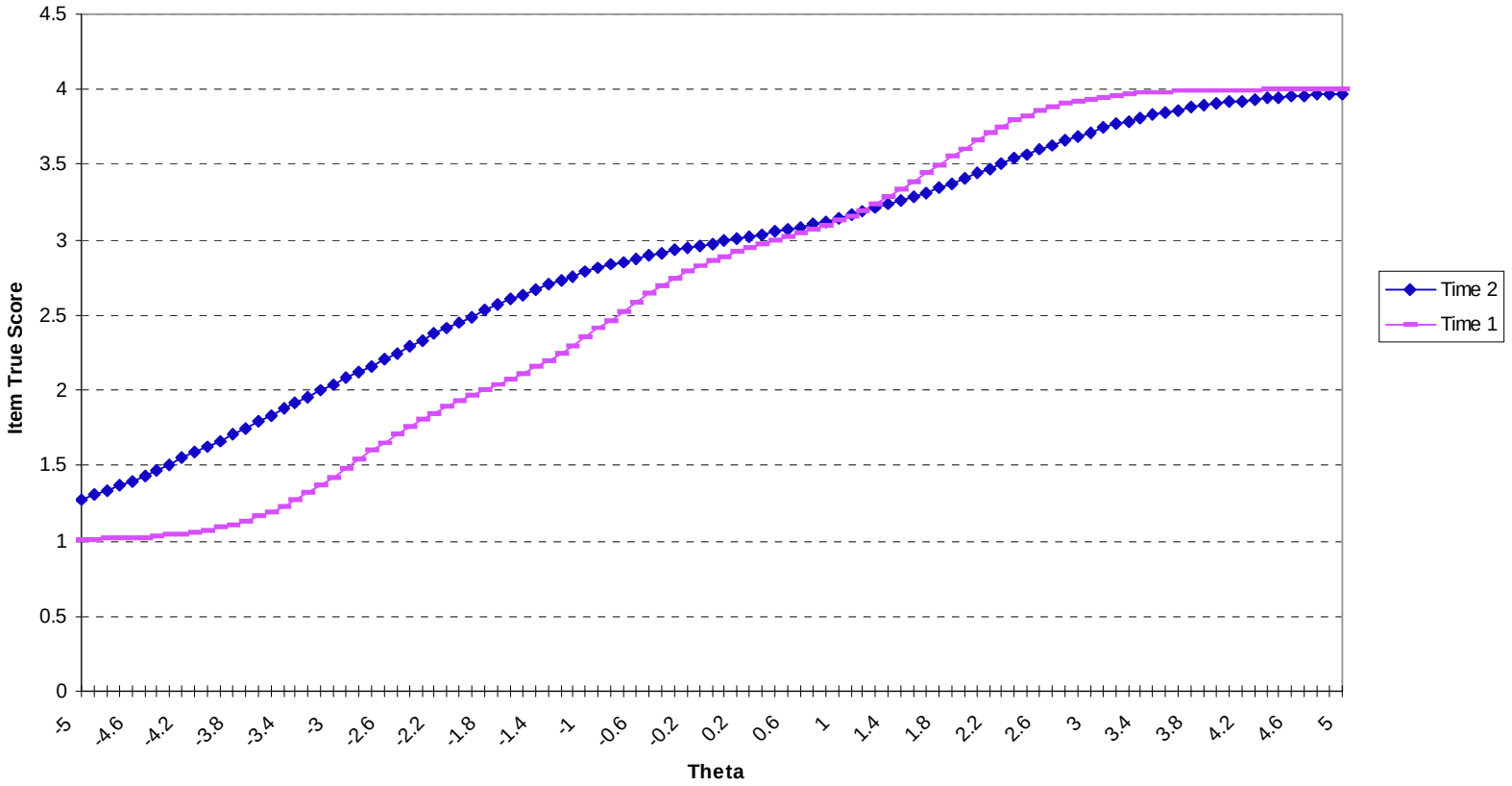
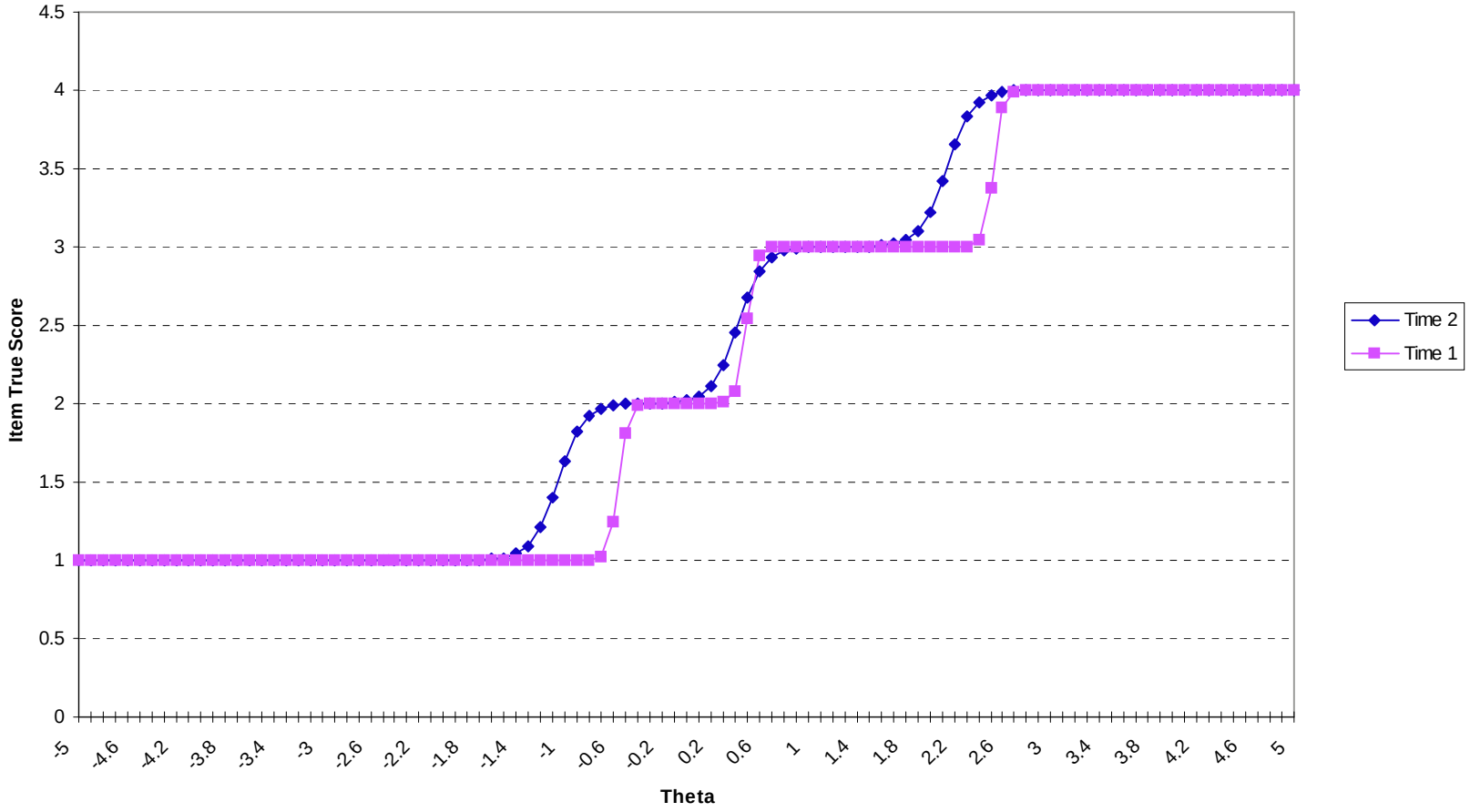


Figure 3
"Is able to fire or deal firmly with loyal but incompetent people without procrastinating."
(Superiors Group, Confronting Problem Employees Scale)



Appendix A

Items from Section 4 of the Benchmarks® Instrument

1. Leading direct reports—broadening direct reports; delegating to direct reports; using power wisely; changing things without creating chaos; being patient and fair; setting clear performance expectations.
2. Balancing personal life and work—balancing work priorities with personal life so that neither is neglected.
3. Acting with flexibility—being an individual contributor and a part of a team; being tough and at the same time compassionate; leading and letting others lead; being self-confident and having a healthy humility; being close enough to others to be empathetic and distant enough to be objective
4. Resourcefulness—being a flexible problem solver; understanding and working effectively with higher management; setting up effective structures and control systems; handling pressure and ambiguity; being a strategic thinker
5. Setting a developmental climate—rewarding hard work; encouraging growth; leading by example; providing visibility, challenge, and opportunity.
6. Compassion and sensitivity—caring about the hopes and dreams of others; providing wise counsel; being sensitive to signs of overwork in others.
7. Self-awareness—recognizing strengths and weaknesses; seeking corrective feedback.
8. Being a quick study—quickly mastering new technical knowledge and skills; learning the business quickly.
9. Confronting problem direct reports—moving quickly; not waffling; basing decisions on performance.

10. Doing whatever it takes—persevering through adversity; taking full responsibility; seizing opportunities; knowing what one likes; taking charge of career.
11. Putting people at ease—having personal warmth and a good sense of humor.
12. Building and mending relationships—working hard to understand others; getting the cooperation of peers, clients; negotiating well; not alienating others.
13. Straightforwardness and Composure—not blaming or abusing others; relying on substance and straightforwardness; not being arrogant, cynical, or moody; coping with situations beyond one's control
14. Hiring talented staff—recruiting the best; building a team.
15. Work team orientation—focusing on others to accomplish tasks; building strengths in others; not being a loner.
16. Decisiveness—displaying a bias for action and calculated risks; being quick and approximate when necessary.

Appendix B

Descriptive Statistics and Inter-Scale Correlations

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Self Group at Time 1 (N = 84)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.89	0.83	0.56	0.52	0.67	0.60	0.73	0.40	0.38	0.66	0.34	0.38	0.09	0.55	0.14	0.72
(2) Doing Whatever It Takes		0.88	0.53	0.66	0.61	0.66	0.72	0.23	0.36	0.55	0.32	0.24	-0.06	0.55	0.13	0.67
(3) Being a Quick Study			0.85	0.34	0.48	0.38	0.39	0.12	0.19	0.50	0.29	0.16	0.06	0.42	0.20	0.56
(4) Decisiveness				0.82	0.34	0.43	0.52	0.22	0.35	0.30	0.14	0.05	0.02	0.17	-0.01	0.52
(5) Leading Employees					0.84	0.70	0.58	0.52	0.42	0.73	0.45	0.43	0.23	0.62	0.38	0.68
(6) Setting a Developmental Climate						0.69	0.55	0.41	0.34	0.56	0.51	0.32	0.04	0.46	0.26	0.69
(7) Confronting Problem Employees							0.82	0.39	0.54	0.53	0.26	0.29	0.06	0.34	-0.02	0.55
(8) Work Team Orientation								0.71	0.20	0.30	0.28	0.32	0.48	0.16	0.14	0.39
(9) Hiring Talented Staff									0.78	0.35	0.13	0.06	0.00	0.06	0.00	0.19
(10) Building/Mending Relationships										0.84	0.55	0.46	0.25	0.59	0.46	0.66
(11) Compassion/Sensitivity											0.68	0.39	0.25	0.53	0.45	0.49
(12) Straightforwardness and Composure												0.66	0.19	0.40	0.23	0.45
(13) Balance between Personal Life & Work													0.83	0.02	0.13	0.16
(14) Self-Awareness														0.70	0.28	0.53
(15) Putting People at Ease															0.79	0.32
(16) Acting with Flexibility																0.69
Mean	3.64	3.73	3.74	3.67	3.72	3.80	3.21	3.79	3.84	3.72	3.85	4.03	3.68	3.71	3.62	3.70
Standard Deviation	0.42	0.46	0.57	0.65	0.41	0.44	0.67	0.62	0.67	0.43	0.48	0.50	0.74	0.50	0.58	0.44

Note. Cronbach's coefficient alphas on the diagonal.

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Self Group at Time 2 (N = 84)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.88	0.82	0.66	0.56	0.72	0.63	0.60	0.43	0.56	0.67	0.47	0.38	0.04	0.59	0.33	0.72
(2) Doing Whatever It Takes		0.88	0.48	0.63	0.62	0.60	0.66	0.33	0.53	0.55	0.42	0.24	0.06	0.59	0.23	0.71
(3) Being a Quick Study			0.88	0.35	0.42	0.34	0.25	0.18	0.33	0.44	0.25	0.19	0.08	0.47	0.24	0.33
(4) Decisiveness				0.85	0.29	0.31	0.52	0.26	0.47	0.30	0.11	0.09	-0.04	0.21	0.07	0.42
(5) Leading Employees					0.83	0.78	0.62	0.51	0.55	0.80	0.63	0.47	0.14	0.60	0.51	0.70
(6) Setting a Developmental Climate						0.77	0.57	0.48	0.55	0.74	0.62	0.34	0.03	0.52	0.42	0.71
(7) Confronting Problem Employees							0.77	0.41	0.55	0.54	0.46	0.34	0.11	0.42	0.32	0.64
(8) Work Team Orientation								0.73	0.41	0.39	0.45	0.44	0.38	0.26	0.24	0.43
(9) Hiring Talented Staff									0.75	0.44	0.44	0.16	0.11	0.31	0.26	0.49
(10) Building/Mending Relationships										0.87	0.55	0.44	0.14	0.47	0.58	0.75
(11) Compassion/Sensitivity											0.66	0.32	0.14	0.54	0.60	0.63
(12) Straightforwardness and Composure												0.69	0.23	0.29	0.33	0.41
(13) Balance between Personal Life & Work													0.84	0.12	0.11	0.20
(14) Self-Awareness														0.64	0.36	0.51
(15) Putting People at Ease															0.84	0.42
(16) Acting with Flexibility																0.74
Mean	3.77	3.83	3.86	3.74	3.88	3.93	3.36	4.01	3.85	3.77	3.91	4.07	3.77	3.84	3.78	3.82
Standard Deviation	0.38	0.41	0.58	0.66	0.35	0.45	0.58	0.55	0.54	0.43	0.46	0.52	0.74	0.45	0.59	0.40

Note. Cronbach's coefficient alphas on the diagonal.

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Superiors Group at Time 1 (N = 98)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.92	0.81	0.72	0.47	0.82	0.78	0.60	0.46	0.61	0.75	0.62	0.50	0.03	0.71	0.46	0.80
(2) Doing Whatever It Takes		0.92	0.69	0.68	0.71	0.75	0.71	0.42	0.59	0.54	0.51	0.36	0.00	0.67	0.27	0.76
(3) Being a Quick Study			0.84	0.44	0.56	0.54	0.43	0.19	0.41	0.46	0.35	0.30	-0.06	0.52	0.25	0.52
(4) Decisiveness				0.88	0.38	0.43	0.55	0.31	0.33	0.15	0.20	0.14	0.05	0.41	0.14	0.48
(5) Leading Employees					0.92	0.88	0.51	0.54	0.55	0.78	0.75	0.60	0.00	0.82	0.58	0.84
(6) Setting a Developmental Climate						0.86	0.58	0.51	0.62	0.68	0.67	0.50	-0.06	0.73	0.44	0.78
(7) Confronting Problem Employees							0.83	0.34	0.48	0.35	0.23	0.30	-0.12	0.45	0.05	0.52
(8) Work Team Orientation								0.78	0.43	0.30	0.36	0.27	0.24	0.49	0.31	0.50
(9) Hiring Talented Staff									0.76	0.35	0.41	0.14	-0.03	0.29	0.14	0.53
(10) Building/Mending Relationships										0.91	0.69	0.51	-0.06	0.73	0.66	0.78
(11) Compassion/Sensitivity											0.82	0.48	0.06	0.65	0.62	0.68
(12) Straightforwardness and Composure												0.69	0.00	0.54	0.40	0.46
(13) Balance between Personal Life & Work													0.71	0.06	0.19	0.09
(14) Self-Awareness														0.82	0.58	0.74
(15) Putting People at Ease															0.82	0.55
(16) Acting with Flexibility																0.85
Mean	3.83	3.89	4.04	3.54	3.81	3.86	3.42	3.79	3.84	3.94	3.93	4.19	3.93	3.72	4.04	3.83
Standard Deviation	0.45	0.51	0.53	0.75	0.50	0.53	0.63	0.58	0.55	0.53	0.53	0.51	0.52	0.60	0.52	0.52

Note. Cronbach's coefficient alphas on the diagonal.

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Superiors Group at Time 2 (N = 87)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.91	0.82	0.73	0.29	0.80	0.73	0.56	0.56	0.56	0.73	0.60	0.45	-0.05	0.66	0.58	0.75
(2) Doing Whatever It Takes		0.88	0.62	0.52	0.71	0.72	0.65	0.40	0.55	0.56	0.41	0.30	-0.12	0.61	0.36	0.69
(3) Being a Quick Study			0.86	0.30	0.56	0.46	0.31	0.26	0.34	0.43	0.32	0.28	0.08	0.41	0.50	0.50
(4) Decisiveness				0.85	0.27	0.33	0.45	0.15	0.23	0.03	0.05	0.03	-0.14	0.25	0.11	0.35
(5) Leading Employees					0.85	0.79	0.42	0.69	0.60	0.77	0.70	0.50	-0.03	0.70	0.62	0.76
(6) Setting a Developmental Climate						0.75	0.52	0.60	0.68	0.59	0.55	0.30	-0.06	0.55	0.45	0.71
(7) Confronting Problem Employees							0.83	0.36	0.53	0.30	0.21	0.28	-0.08	0.51	0.03	0.44
(8) Work Team Orientation								0.75	0.50	0.53	0.56	0.51	0.11	0.52	0.35	0.55
(9) Hiring Talented Staff									0.89	0.46	0.40	0.29	-0.01	0.36	0.26	0.55
(10) Building/Mending Relationships										0.90	0.73	0.40	-0.03	0.61	0.71	0.74
(11) Compassion/Sensitivity											0.70	0.41	0.06	0.57	0.65	0.65
(12) Straightforwardness and Composure												0.70	0.11	0.45	0.33	0.38
(13) Balance between Personal Life & Work													0.71	-0.02	0.00	-0.01
(14) Self-Awareness														0.81	0.45	0.61
(15) Putting People at Ease															0.89	0.59
(16) Acting with Flexibility																0.79
Mean	3.89	3.89	4.08	3.59	3.83	3.86	3.47	3.84	3.86	3.96	3.91	4.31	4.05	3.72	4.07	3.87
Standard Deviation	0.40	0.41	0.52	0.65	0.40	0.39	0.57	0.56	0.55	0.48	0.44	0.52	0.55	0.59	0.64	0.46

Note. Cronbach's coefficient alphas on the diagonal.

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Peers Group at Time 1 (N = 385)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.91	0.84	0.69	0.60	0.66	0.67	0.58	0.40	0.53	0.72	0.49	0.45	0.05	0.66	0.42	0.72
(2) Doing Whatever It Takes		0.90	0.64	0.72	0.55	0.66	0.63	0.30	0.51	0.59	0.39	0.42	0.01	0.58	0.33	0.66
(3) Being a Quick Study			0.83	0.43	0.44	0.47	0.43	0.23	0.42	0.48	0.29	0.34	0.12	0.49	0.25	0.50
(4) Decisiveness				0.83	0.36	0.45	0.55	0.20	0.37	0.36	0.19	0.23	-0.01	0.35	0.17	0.45
(5) Leading Employees					0.90	0.80	0.49	0.58	0.55	0.79	0.72	0.49	0.19	0.72	0.57	0.81
(6) Setting a Developmental Climate						0.81	0.53	0.47	0.63	0.69	0.63	0.44	0.12	0.64	0.48	0.75
(7) Confronting Problem Employees							0.84	0.31	0.50	0.42	0.33	0.31	0.12	0.39	0.24	0.51
(8) Work Team Orientation								0.75	0.34	0.45	0.47	0.25	0.30	0.39	0.33	0.50
(9) Hiring Talented Staff									0.79	0.45	0.37	0.23	0.12	0.40	0.30	0.51
(10) Building/Mending Relationships										0.91	0.72	0.56	0.17	0.75	0.71	0.80
(11) Compassion/Sensitivity											0.82	0.44	0.24	0.63	0.70	0.67
(12) Straightforwardness and Composure												0.75	0.15	0.49	0.42	0.46
(13) Balance between Personal Life & Work													0.81	0.16	0.24	0.19
(14) Self-Awareness														0.80	0.57	0.69
(15) Putting People at Ease															0.88	0.57
(16) Acting with Flexibility																0.80
Mean	3.79	3.80	4.00	3.56	3.67	3.70	3.41	3.75	3.64	3.79	3.71	4.05	3.89	3.62	3.98	3.69
Standard Deviation	0.46	0.52	0.53	0.74	0.51	0.57	0.73	0.64	0.63	0.58	0.62	0.60	0.71	0.63	0.73	0.56

Note. Cronbach's coefficient alphas on the diagonal.

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Peers Group at Time 2 (N = 326)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.94	0.84	0.69	0.60	0.66	0.67	0.58	0.40	0.53	0.72	0.49	0.45	0.05	0.66	0.42	0.72
(2) Doing Whatever It Takes		0.92	0.64	0.72	0.55	0.66	0.63	0.30	0.51	0.59	0.39	0.42	0.01	0.58	0.33	0.66
(3) Being a Quick Study			0.88	0.43	0.44	0.47	0.43	0.23	0.42	0.48	0.29	0.34	0.12	0.49	0.25	0.50
(4) Decisiveness				0.84	0.36	0.45	0.55	0.20	0.37	0.36	0.19	0.23	-0.01	0.35	0.17	0.45
(5) Leading Employees					0.92	0.80	0.49	0.58	0.55	0.79	0.72	0.49	0.19	0.72	0.57	0.81
(6) Setting a Developmental Climate						0.84	0.53	0.47	0.63	0.69	0.63	0.44	0.12	0.64	0.48	0.75
(7) Confronting Problem Employees							0.85	0.31	0.50	0.42	0.33	0.31	0.12	0.39	0.24	0.51
(8) Work Team Orientation								0.78	0.34	0.45	0.47	0.25	0.30	0.39	0.33	0.50
(9) Hiring Talented Staff									0.83	0.45	0.37	0.23	0.12	0.40	0.30	0.51
(10) Building/Mending Relationships										0.93	0.72	0.56	0.17	0.75	0.71	0.80
(11) Compassion/Sensitivity											0.85	0.44	0.24	0.63	0.70	0.67
(12) Straightforwardness and Composure												0.78	0.15	0.49	0.42	0.46
(13) Balance between Personal Life & Work													0.80	0.16	0.24	0.19
(14) Self-Awareness														0.83	0.57	0.69
(15) Putting People at Ease															0.90	0.57
(16) Acting with Flexibility																0.86
Mean	3.86	3.84	4.05	3.60	3.76	3.77	3.47	3.82	3.76	3.88	3.77	4.11	3.96	3.73	4.06	3.80
Standard Deviation	0.51	0.56	0.58	0.68	0.56	0.60	0.71	0.65	0.65	0.58	0.65	0.63	0.70	0.61	0.71	0.59

Note. Cronbach's coefficient alphas on the diagonal.

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Direct Reports Group at Time 1 (N = 319)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.92	0.85	0.76	0.56	0.77	0.74	0.66	0.39	0.56	0.79	0.57	0.46	0.31	0.65	0.41	0.81
(2) Doing Whatever It Takes		0.90	0.73	0.66	0.68	0.73	0.66	0.28	0.55	0.66	0.49	0.37	0.24	0.59	0.32	0.73
(3) Being a Quick Study			0.85	0.48	0.59	0.62	0.45	0.20	0.47	0.59	0.43	0.36	0.21	0.52	0.28	0.64
(4) Decisiveness				0.79	0.41	0.49	0.53	0.23	0.36	0.36	0.22	0.17	0.10	0.37	0.07	0.40
(5) Leading Employees					0.90	0.81	0.57	0.52	0.55	0.81	0.72	0.51	0.39	0.75	0.55	0.82
(6) Setting a Developmental Climate						0.81	0.55	0.38	0.53	0.70	0.64	0.44	0.30	0.67	0.51	0.76
(7) Confronting Problem Employees							0.81	0.39	0.46	0.50	0.35	0.34	0.26	0.49	0.20	0.59
(8) Work Team Orientation								0.71	0.39	0.45	0.30	0.32	0.38	0.39	0.28	0.43
(9) Hiring Talented Staff									0.74	0.52	0.40	0.26	0.15	0.44	0.29	0.53
(10) Building/Mending Relationships										0.91	0.68	0.53	0.34	0.69	0.69	0.83
(11) Compassion/Sensitivity											0.77	0.44	0.36	0.60	0.61	0.68
(12) Straightforwardness and Composure												0.66	0.37	0.48	0.43	0.53
(13) Balance between Personal Life & Work													0.80	0.35	0.37	0.38
(14) Self-Awareness														0.77	0.51	0.69
(15) Putting People at Ease															0.90	0.60
(16) Acting with Flexibility																0.80
Mean	3.75	3.75	3.92	3.41	3.64	3.61	3.34	3.79	3.66	3.72	3.64	4.09	3.79	3.51	3.90	3.65
Standard Deviation	0.56	0.59	0.71	0.82	0.62	0.69	0.76	0.74	0.73	0.64	0.71	0.59	0.80	0.69	0.81	0.64

Note. Cronbach's coefficient alphas on the diagonal.

Means, Standard Deviations, Intercorrelations, and Internal Consistencies for Direct Reports Group at Time 2 (N = 280)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Resourcefulness	0.94	0.92	0.75	0.69	0.85	0.83	0.72	0.57	0.63	0.82	0.63	0.56	0.24	0.72	0.49	0.81
(2) Doing Whatever It Takes		0.93	0.72	0.72	0.81	0.82	0.75	0.51	0.61	0.78	0.62	0.52	0.24	0.72	0.48	0.80
(3) Being a Quick Study			0.90	0.49	0.61	0.62	0.52	0.34	0.48	0.60	0.47	0.44	0.25	0.54	0.33	0.59
(4) Decisiveness				0.80	0.56	0.60	0.63	0.46	0.47	0.50	0.36	0.33	0.09	0.52	0.26	0.54
(5) Leading Employees					0.93	0.87	0.67	0.66	0.63	0.87	0.77	0.58	0.34	0.80	0.66	0.87
(6) Setting a Developmental Climate						0.86	0.67	0.60	0.65	0.82	0.77	0.53	0.27	0.75	0.60	0.81
(7) Confronting Problem Employees							0.87	0.47	0.47	0.60	0.45	0.43	0.19	0.61	0.35	0.60
(8) Work Team Orientation								0.74	0.57	0.53	0.44	0.40	0.34	0.50	0.41	0.55
(9) Hiring Talented Staff									0.80	0.58	0.46	0.40	0.21	0.51	0.41	0.60
(10) Building/Mending Relationships										0.94	0.78	0.61	0.35	0.72	0.75	0.86
(11) Compassion/Sensitivity											0.79	0.51	0.34	0.66	0.71	0.76
(12) Straightforwardness and Composure												0.79	0.40	0.49	0.46	0.55
(13) Balance between Personal Life & Work													0.79	0.28	0.36	0.34
(14) Self-Awareness														0.80	0.56	0.74
(15) Putting People at Ease															0.92	0.67
(16) Acting with Flexibility																0.86
Mean	3.75	3.75	3.92	3.41	3.64	3.61	3.34	3.79	3.66	3.72	3.64	4.09	3.79	3.51	3.90	3.65
Standard Deviation	0.60	0.63	0.69	0.81	0.66	0.74	0.83	0.75	0.79	0.70	0.72	0.67	0.72	0.74	0.83	0.69

Note. Cronbach's coefficient alphas on the diagonal.

Appendix C

Output from the DFITP4 Computer Program (Raju, 1999)

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Resourcefulness, Self (Run 2)

 FOCAL GROUP ITEM PARAMETERS

    1  2.320 -3.340  -.752  2.120
    2  1.700 -3.200 -1.160  1.430
    3  1.160 -3.590  -.915  2.140
    4  1.370 -3.190  -.464  2.130
    5  1.610 -3.310  -.963  1.350
    6  1.230 -3.840 -1.490  2.280
    7  1.780 -2.340  -.204  2.210
    8  1.600 -3.880 -2.050   .855
    9  1.670 -2.330   .272  2.490
   10  2.120 -2.590 -1.120  1.050
   11  1.780 -2.230 -1.210  1.210
   12  1.600 -3.850  -.991  2.420
   13  1.820 -2.550  -.895  2.070
   14  1.780 -3.090  -.666  2.350
   15  2.190 -2.870  -.601  1.430
   16  1.210 -3.500  -.932  2.810
   17  2.210 -2.860  -.765  1.770

 REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

    1  1.410 -3.640  -.833  1.840
    2  1.600 -2.530  -.572  2.100
    3  1.810 -3.090  -.806  2.260
    4  1.350 -2.490   .171  3.070
    5  1.970 -2.880  -.810  1.270
    6  1.140 -3.610  -.390  2.510
    7   .641 -4.740   .054  4.180
    8  1.040 -3.860 -1.560  1.610
    9  2.640 -1.860  -.189  1.610
   10  1.590 -2.540  -.574  2.000
   11  1.250 -4.080 -1.440  1.970
   12   .990 -4.100 -2.170  1.750
   13  1.700 -2.750  -.326  2.360
   14  1.580 -3.340  -.667  2.420
   15  1.570 -3.500  -.672  1.520
   16  1.980 -2.260  -.757  1.550
   17  2.550 -2.530  -.708  1.560

 REFERENCE GROUP (EQUATED) ITEM PARAMETERS

    1  1.523 -3.576  -.976  1.499
    2  1.728 -2.548  -.735  1.740
    3  1.955 -3.066  -.951  1.888
    4  1.458 -2.511  -.047  2.638
    5  2.127 -2.872  -.955   .971
    6  1.231 -3.548  -.566  2.119
    7   .692 -4.594  -.155  3.666
    8  1.123 -3.779 -1.650  1.286
    9  2.851 -1.927  -.380  1.286
   10  1.717 -2.557  -.737  1.647
   11  1.350 -3.983 -1.538  1.619
   12  1.069 -4.002 -2.214  1.416
   13  1.836 -2.751  -.507  1.980
   14  1.706 -3.298  -.823  2.036
   15  1.695 -3.446  -.827  1.203
   16  2.138 -2.298  -.906  1.230
   17  2.754 -2.548  -.861  1.240

 NUMBER OF CASES:    84, D =  1.0, CRT =   .054, A =   .926, B =   -.205

 ITEM    M-d   SD-d  M-ldl  SD-ldl  C(d,D)  C-DIF   NC-DIF        CHI    PROB
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    1  -.100   .051   .100    .051    .004   .017     .012     408.81   .0000
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2	.180	.054	.180	.054	.012	-.012	.035	1029.27	.0000
3	-.035	.059	.061	.032	.008	.013	.005	112.96	.0160
4	.182	.018	.182	.018	.004	-.021	.033	8488.38	.0000
5	-.037	.072	.068	.044	.019	.024	.007	106.11	.0445
6	.207	.080	.208	.076	.019	-.008	.049	649.51	.0000
7	-.068	.198	.168	.125	-.047	-.038	.044	93.98	.1925
8	.153	.026	.153	.026	.002	-.019	.024	2919.01	.0000
9	-.216	.193	.248	.149	.048	.077	.084	188.97	.0000
10	.189	.047	.189	.047	-.006	-.032	.038	1424.97	.0000
11	-.097	.166	.132	.140	-.038	-.025	.037	112.69	.0167
12	-.282	.052	.282	.052	-.007	.031	.082	2517.53	.0000
13	.099	.060	.105	.049	.006	-.007	.013	311.83	.0000
14	-.065	.012	.065	.012	-.001	.008	.004	2496.49	.0000
15	-.117	.033	.118	.031	-.005	.010	.015	1118.37	.0000
16	-.066	.192	.166	.117	.047	.056	.041	93.93	.1936
17	-.062	.071	.080	.050	.016	.025	.009	149.63	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	45.253	45.388	-.13491	.00581	.22650
VARIANCE	40.577	43.675	.08049	.00091	.04739
STD. DEV.	6.370	6.609	.28371	.03010	.21769

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99972

DIFFERENTIAL TEST FUNCTIONING (DTF): .09869
SQURE-ROOT OF DTF: .31416
SD OF D**2: .21414

CHI-SQUARE VALUE: 102.99
PROB: .0677
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.09869	102.99	.068	-.13491	.22650

Resourcefulness, Superiors (Run 2)

FOCAL GROUP ITEM PARAMETERS

1	2.100	-3.440	-.732	2.220
2	1.690	-3.210	-1.160	1.470
3	1.170	-3.570	-.907	2.170
4	1.380	-3.180	-.461	2.160
5	1.590	-3.340	-.963	1.330
6	1.220	-3.860	-1.490	2.330
7	1.800	-2.320	-.198	2.230
8	1.600	-3.880	-2.050	.892
9	1.630	-2.350	.317	2.560
10	2.130	-2.580	-1.110	1.080
11	1.790	-2.220	-1.200	1.250
12	1.600	-3.850	-.985	2.450
13	1.830	-2.540	-.888	2.100
14	1.780	-3.090	-.661	2.390
15	2.170	-2.880	-.595	1.460
16	1.200	-3.500	-.929	2.850
17	2.230	-2.850	-.755	1.800

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.050	-2.780	-.389	1.460
2	4.150	-2.080	-.893	1.060
3	1.630	-3.680	-1.220	1.730
4	1.630	-2.890	-.541	1.910
5	2.230	-3.060	-.994	1.320
6	1.370	-3.410	-1.160	1.590
7	1.690	-2.820	-.756	2.290
8	1.890	-3.300	-1.700	.936
9	2.070	-2.210	-.238	1.730
10	3.750	-2.370	-.756	.867
11	1.500	-3.690	-1.700	1.380
12	1.170	-2.850	-1.360	2.050
13	2.870	-2.670	-1.000	1.850
14	1.810	-2.780	-1.250	2.560
15	1.110	-4.510	-1.850	2.080
16	.955	-5.140	-2.220	2.900
17	1.410	-3.960	-2.010	1.890

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.773	-2.869	-.239	1.795
2	3.773	-2.099	-.793	1.355
3	1.482	-3.859	-1.153	2.092
4	1.482	-2.990	-.406	2.290
5	2.027	-3.177	-.904	1.641
6	1.245	-3.562	-1.087	1.938
7	1.536	-2.913	-.643	2.708
8	1.718	-3.441	-1.681	1.219
9	1.882	-2.242	-.073	2.092
10	3.409	-2.418	-.643	1.143
11	1.364	-3.870	-1.681	1.707
12	1.064	-2.946	-1.307	2.444
13	2.609	-2.748	-.911	2.224
14	1.645	-2.869	-1.186	3.005
15	1.009	-4.772	-1.846	2.477
16	.868	-5.465	-2.253	3.379
17	1.282	-4.167	-2.022	2.268

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = 1.100, B = .189

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.114	.162	.176	.092	-.078	-.121	.039	146.50	.0009
2	.060	.156	.111	.125	-.058	-.080	.028	112.54	.1339
3	-.074	.030	.074	.030	.014	.042	.006	713.42	.0000
4	.032	.009	.032	.009	.000	-.012	.001	1298.96	.0000
5	.055	.040	.055	.040	.014	-.007	.005	281.51	.0000
6	.032	.076	.072	.041	-.041	-.053	.007	115.70	.0948
7	-.106	.117	.144	.065	.061	.100	.025	178.23	.0000
8	.109	.030	.109	.030	-.004	-.045	.013	1362.52	.0000

9	-.137	.064	.140	.058	-.028	.023	.023	551.78	.0000
10	.117	.106	.134	.084	-.046	-.091	.025	217.02	.0000
11	-.044	.174	.130	.123	.085	.101	.032	104.32	.2876
12	.002	.032	.021	.025	-.010	-.010	.001	98.38	.4418
13	-.026	.063	.060	.030	.026	.036	.005	114.46	.1089
14	-.070	.115	.119	.064	.054	.081	.018	133.92	.0078
15	-.114	.264	.238	.162	.138	.181	.083	116.11	.0904
16	-.164	.128	.172	.117	.065	.127	.043	259.02	.0000
17	-.162	.206	.207	.160	.103	.164	.068	158.65	.0001

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	47.947	48.323	-.37576	.02564	.58754
VARIANCE	47.985	41.256	.29467	.00760	.09066
STD. DEV.	6.927	6.423	.54283	.08720	.30109

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99954

DIFFERENTIAL TEST FUNCTIONING (DTF): .43587
SQURE-ROOT OF DTF: .66020
SD OF D**2: .38090

CHI-SQUARE VALUE: 144.96
PROB: .0012
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.43587	144.96	.001	-.37576	.58754
2	15	.15746	173.96	.000	-.26222	.34971
3	17	.04162	129.36	.016	-.10045	.17393

Resourcefulness, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.380	-3.400	-1.390	1.440
2	1.770	-2.650	-.669	1.280
3	1.580	-2.210	-.492	2.000
4	1.370	-2.450	-.367	2.210
5	1.450	-2.670	-.908	1.510
6	1.200	-3.820	-.939	2.140
7	1.390	-2.780	-.375	2.160
8	1.700	-3.510	-1.600	.704
9	1.370	-2.420	-.272	1.930
10	1.560	-2.710	-.896	1.350
11	1.740	-2.770	-1.040	1.170
12	1.320	-3.140	-.935	1.630
13	1.710	-2.640	-.711	2.030
14	2.010	-2.770	-.558	1.810
15	1.550	-2.730	-.779	1.650
16	1.620	-2.720	-.803	1.920
17	1.940	-2.810	-.843	1.890

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.140	-2.920	-1.140	1.130
2	1.900	-2.620	-1.030	1.340
3	1.820	-2.550	-.669	1.970
4	1.380	-2.930	-.612	2.220
5	1.700	-2.810	-1.060	1.430
6	1.470	-3.340	-.962	1.690
7	1.640	-2.460	-.548	2.010
8	1.980	-3.290	-1.530	.774
9	1.980	-2.350	-.622	1.050
10	1.690	-2.720	-1.020	1.280
11	1.730	-2.720	-1.190	1.140
12	1.760	-2.650	-1.040	1.430
13	2.220	-2.590	-.694	1.740
14	2.090	-2.730	-.659	1.820
15	1.720	-2.700	-.932	1.340
16	2.030	-2.600	-.937	1.550
17	2.490	-2.780	-1.040	1.220

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.962	-3.021	-1.079	1.398
2	1.742	-2.693	-.959	1.627
3	1.668	-2.617	-.565	2.314
4	1.265	-3.032	-.503	2.587
5	1.558	-2.901	-.991	1.725
6	1.347	-3.479	-.885	2.009
7	1.503	-2.519	-.433	2.358
8	1.815	-3.424	-1.504	1.009
9	1.815	-2.399	-.514	1.311
10	1.549	-2.803	-.948	1.561
11	1.586	-2.803	-1.133	1.409
12	1.613	-2.726	-.970	1.725
13	2.035	-2.661	-.592	2.063
14	1.916	-2.813	-.554	2.151
15	1.577	-2.781	-.852	1.627
16	1.861	-2.672	-.857	1.856
17	2.282	-2.868	-.970	1.496

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.091, B = .165

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.047	.053	.059	.040	-.007	-.012	.005	686.24	.0000
2	-.020	.084	.077	.039	.020	.023	.007	407.13	.1998
3	-.025	.062	.055	.038	.012	.015	.004	446.35	.0153
4	-.035	.068	.061	.046	.012	.017	.006	490.00	.0002
5	-.005	.043	.038	.021	.010	.010	.002	390.38	.4001
6	.002	.025	.019	.017	-.004	-.004	.001	387.12	.4457
7	.014	.025	.019	.021	.002	.001	.001	507.46	.0000
8	.083	.034	.083	.034	.006	-.004	.008	2710.19	.0000

9	-.154	.073	.155	.071	-.014	.005	.029	2073.15	.0000
10	.017	.034	.031	.023	.008	.006	.001	474.59	.0011
11	.026	.042	.039	.030	.009	.006	.002	526.83	.0000
12	.011	.030	.021	.024	.003	.001	.001	436.71	.0325
13	.025	.018	.026	.016	-.002	-.004	.001	1133.87	.0000
14	.031	.041	.034	.039	.008	.004	.003	610.45	.0000
15	-.024	.008	.024	.008	.002	.005	.001	3904.13	.0000
16	-.026	.015	.027	.013	.002	.005	.001	1497.76	.0000
17	-.086	.036	.086	.036	-.004	.006	.009	2559.21	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	47.412	47.532	-.11955	.00465	.25275
VARIANCE	49.389	47.022	.06474	.00007	.01514
STD. DEV.	7.028	6.857	.25443	.00828	.12306

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99964

DIFFERENTIAL TEST FUNCTIONING (DTF): .07903
SQURE-ROOT OF DTF: .28112
SD OF D**2: .05660

CHI-SQUARE VALUE: 470.00
PROB: .0017
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.07903	470.00	.002	-.11955	.25275
2	2	.04065	508.87	.000	-.09947	.17925

Resourcefulness, Direct Reports (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.370	-3.430	-1.700	1.360
2	1.430	-2.400	-.574	1.340
3	1.520	-1.730	-.230	1.460
4	.942	-2.280	.106	2.600
5	1.150	-3.160	-.967	1.500
6	1.560	-2.150	-.553	1.830
7	1.060	-1.940	-.001	2.460
8	1.650	-3.230	-1.580	.637
9	1.520	-2.500	-.764	1.550
10	1.320	-2.590	-.788	1.590
11	1.600	-2.220	-.933	1.290
12	1.610	-2.420	-1.020	1.250
13	1.960	-2.040	-.427	1.690
14	2.080	-2.070	-.372	1.800
15	2.120	-1.940	-.718	1.210
16	1.710	-2.420	-.670	1.560
17	2.140	-2.090	-.514	1.530

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.580	-3.280	-1.690	.924
2	1.750	-2.130	-.806	1.010
3	1.840	-1.670	-.411	1.470
4	1.690	-1.820	-.319	1.770
5	1.730	-2.730	-1.090	.848
6	1.530	-2.420	-.624	1.590
7	1.650	-2.030	-.492	1.800
8	1.800	-2.950	-1.590	.517
9	1.720	-2.340	-1.010	1.140
10	1.500	-2.570	-.886	1.030
11	1.940	-2.050	-1.120	.941
12	1.600	-2.800	-1.030	1.310
13	2.200	-1.990	-.410	1.480
14	2.080	-1.900	-.536	1.540
15	2.260	-2.010	-.899	1.120
16	1.910	-2.170	-.793	1.260
17	1.870	-2.340	-.823	1.240

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.399	-3.483	-1.688	1.263
2	1.550	-2.185	-.690	1.360
3	1.630	-1.665	-.244	1.880
4	1.497	-1.835	-.140	2.218
5	1.532	-2.862	-1.011	1.177
6	1.355	-2.512	-.484	2.015
7	1.461	-2.072	-.335	2.252
8	1.594	-3.111	-1.575	.804
9	1.523	-2.422	-.920	1.507
10	1.329	-2.682	-.780	1.383
11	1.718	-2.094	-1.044	1.282
12	1.417	-2.941	-.943	1.699
13	1.949	-2.027	-.243	1.891
14	1.842	-1.925	-.385	1.959
15	2.002	-2.049	-.795	1.484
16	1.692	-2.230	-.675	1.643
17	1.656	-2.422	-.709	1.620

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.129, B = .220

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.018	.009	.018	.009	-.001	.000	.000	1542.57	.0000
2	-.012	.025	.023	.015	.001	.002	.001	387.02	.0048
3	.060	.040	.060	.040	.006	.002	.005	1037.71	.0000
4	-.047	.101	.096	.056	-.006	-.003	.012	388.57	.0041
5	-.069	.060	.081	.042	-.004	.000	.008	747.17	.0000
6	.016	.052	.046	.030	.002	.001	.003	350.35	.1024
7	-.123	.042	.125	.033	.001	.010	.017	2983.48	.0000
8	.047	.016	.047	.016	.001	-.002	.003	2995.28	.0000

9	-.036	.015	.037	.013	.002	.004	.002	2146.08	.0000
10	-.037	.017	.037	.017	-.002	.000	.002	1882.65	.0000
11	-.020	.020	.026	.013	.002	.003	.001	651.35	.0000
12	.067	.082	.092	.053	.005	.001	.011	529.40	.0000
13	.079	.022	.079	.022	-.000	-.005	.007	4519.87	.0000
14	.031	.016	.031	.016	.002	-.000	.001	1475.96	.0000
15	.022	.064	.055	.040	.008	.006	.005	355.00	.0749
16	.025	.014	.025	.014	.001	-.001	.001	1278.46	.0000
17	-.051	.066	.065	.053	.006	.009	.007	510.71	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
	------	------	-	-----	---
MEAN	46.895	46.962	-.06685	.00159	.14616
VARIANCE	66.187	64.918	.02249	.00001	.00559
STD. DEV.	8.136	8.057	.14996	.00382	.07479

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99988

DIFFERENTIAL TEST FUNCTIONING (DTF): .02696
SQURE-ROOT OF DTF: .16419
SD OF D**2: .02162

CHI-SQUARE VALUE: 382.38
PROB: .0077
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
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1	NONE	.02696	382.38	.008	-.06685	.14616

Doing Whatever It Takes, Self (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.180	-4.280	-1.650	1.670
2	1.420	-1.870	-.315	1.970
3	2.070	-3.040	-1.260	.620
4	1.730	-1.570	.446	2.370
5	2.200	-2.920	-.927	1.170
6	1.100	-3.230	-.087	2.060
7	1.250	-2.080	-.457	1.720
8	1.100	-2.150	-.260	2.120
9	2.170	-2.240	-.633	1.940
10	2.010	-2.660	-.617	1.200
11	2.040	-2.120	-.367	1.830
12	1.220	-2.290	-.635	1.910
13	1.450	-3.650	-2.100	.635
14	1.770	-2.850	-1.440	.893

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.350	-3.700	-1.470	1.370
2	1.210	-3.120	-.620	2.270
3	1.880	-3.500	-1.240	.857
4	2.780	-1.570	.311	2.330
5	2.880	-1.960	-.693	1.320
6	1.250	-3.950	-.608	2.000
7	1.710	-2.290	-.509	1.480
8	1.570	-1.930	-.202	1.910
9	2.200	-3.320	-.569	1.720
10	1.740	-2.420	-.689	1.450
11	2.850	-3.140	-.341	1.560
12	1.760	-1.920	-.429	1.730
13	1.560	-3.760	-2.710	.672
14	1.840	-3.430	-1.740	1.070

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.371	-3.560	-1.363	1.434
2	1.228	-2.988	-.526	2.321
3	1.909	-3.362	-1.136	.929
4	2.822	-1.461	.391	2.380
5	2.924	-1.846	-.598	1.385
6	1.269	-3.806	-.514	2.055
7	1.736	-2.171	-.416	1.543
8	1.594	-1.816	-.114	1.966
9	2.234	-3.185	-.475	1.779
10	1.766	-2.299	-.594	1.513
11	2.893	-3.008	-.251	1.622
12	1.787	-1.806	-.338	1.789
13	1.584	-3.619	-2.584	.747
14	1.868	-3.294	-1.629	1.139

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = .985, B = .085

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.020	.053	.047	.033	.003	.009	.003	96.33	.1503
2	-.111	.113	.128	.093	-.008	-.038	.025	165.25	.0000
3	.099	.042	.100	.040	.002	.028	.012	557.79	.0000
4	.003	.050	.038	.033	.002	.002	.003	84.33	.4385
5	.181	.106	.182	.105	.004	.052	.044	330.82	.0000
6	-.114	.021	.114	.021	-.002	-.033	.013	2532.99	.0000
7	-.033	.032	.036	.030	.003	-.006	.002	174.12	.0000
8	.054	.071	.073	.051	.006	.021	.008	133.95	.0003
9	.009	.066	.048	.046	.006	.009	.004	85.68	.3985
10	.076	.034	.076	.034	-.002	.018	.007	489.05	.0000
11	-.003	.081	.055	.059	.009	.008	.007	84.08	.4462
12	.098	.089	.108	.076	.007	.033	.017	186.10	.0000
13	-.017	.052	.038	.039	.000	-.004	.003	92.75	.2175
14	.003	.075	.064	.040	-.002	-.001	.006	84.10	.4456

TRUE-F	TRUE-R	D	C-DIF	lDl
		-		

MEAN	38.362	38.095	.26605	.00702	.30014
VARIANCE	31.915	32.915	.02749	.00053	.00818
STD. DEV.	5.649	5.737	.16579	.02304	.09047

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99969

DIFFERENTIAL TEST FUNCTIONING (DTF): .09827
SQURE-ROOT OF DTF: .31348
SD OF D**2: .05551

CHI-SQUARE VALUE: 300.31
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.09827	300.31	.000	.26605	.30014
2	5	.03795	103.50	.063	.08455	.16576

Doing Whatever It Takes, Superiors [Run 2 (Run 1 used .861 -.203)]

FOCAL GROUP ITEM PARAMETERS

1	1.290	-3.980	-2.030	1.180
2	2.010	-2.410	-.868	.930
3	1.320	-3.880	-1.950	.205
4	2.070	-2.170	-.217	2.560
5	1.830	-3.790	-1.450	.949
6	1.120	-4.290	-1.380	1.340
7	1.700	-2.930	-1.270	.887
8	1.540	-2.800	-.964	1.300
9	2.560	-2.950	-1.170	.660
10	2.200	-2.870	-.896	1.080
11	2.730	-2.700	-.654	1.410
12	2.100	-2.220	-.656	1.260
13	1.840	-3.880	-1.270	.721
14	2.850	-2.710	-1.550	.512

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.820	-3.450	-1.870	1.010
2	1.100	-3.390	-1.260	2.280
3	2.010	-3.280	-1.970	.452
4	1.550	-2.400	.301	2.920
5	2.210	-2.730	-1.430	.899
6	.723	-6.610	-1.350	2.490
7	1.400	-2.860	-.809	2.070
8	1.240	-3.350	-.792	2.380
9	2.170	-2.570	-1.390	.673
10	1.420	-3.470	-1.140	1.530
11	2.710	-2.420	-.984	1.090
12	1.600	-2.920	-.983	2.030
13	1.170	-4.600	-2.050	1.790
14	2.300	-2.740	-1.640	.662

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.164	-3.140	-1.812	.610
2	1.308	-3.090	-1.299	1.678
3	2.390	-2.997	-1.896	.141
4	1.843	-2.257	.014	2.217
5	2.628	-2.535	-1.442	.517
6	.860	-5.798	-1.374	1.855
7	1.665	-2.644	-.919	1.502
8	1.474	-3.056	-.905	1.763
9	2.580	-2.400	-1.408	.327
10	1.688	-3.157	-1.198	1.048
11	3.222	-2.274	-1.067	.678
12	1.902	-2.695	-1.066	1.468
13	1.391	-4.108	-1.963	1.266
14	2.735	-2.543	-1.618	.318

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .841, B = -.239

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.082	.116	.115	.083	.001	.036	.020	147.53	.0007
2	.004	.175	.137	.108	.020	.018	.030	98.06	.4506
3	-.039	.095	.069	.076	.008	.024	.010	114.27	.1112
4	.053	.062	.075	.033	-.010	-.032	.007	169.32	.0000
5	-.071	.147	.133	.095	.012	.041	.027	120.78	.0514
6	.052	.069	.074	.044	.003	-.018	.007	153.13	.0002
7	.195	.028	.195	.028	-.001	-.083	.039	4840.01	.0000
8	.062	.058	.072	.043	.005	-.021	.007	209.13	.0000
9	-.118	.098	.142	.057	.017	.066	.023	240.99	.0000
10	-.079	.052	.085	.041	.011	.044	.009	320.78	.0000
11	-.222	.148	.249	.095	.017	.110	.071	320.45	.0000
12	-.108	.109	.129	.083	.019	.064	.024	193.29	.0000
13	-.005	.143	.117	.082	.020	.022	.020	98.10	.4496
14	-.063	.051	.069	.042	.003	.030	.007	242.99	.0000

TRUE-F	TRUE-R	D	C-DIF	lDl
		-		

MEAN	40.582	41.002	-.41946	.02143	.49846
VARIANCE	40.360	39.491	.12413	.00215	.05162
STD. DEV.	6.353	6.284	.35232	.04634	.22721

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99852

DIFFERENTIAL TEST FUNCTIONING (DTF): .30008
SQURE-ROOT OF DTF: .54780
SD OF D**2: .28424

CHI-SQUARE VALUE: 236.91
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.30008	236.91	.000	-.41946	.49846
2	11	.15157	131.76	.011	-.19707	.30568

Doing Whatever It Takes, Peers [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.200	-4.260	-1.490	1.740
2	1.240	-2.660	-.897	1.950
3	1.680	-3.010	-1.260	.695
4	1.450	-1.240	.811	3.020
5	1.930	-2.100	-.595	1.400
6	1.290	-2.510	-.522	2.020
7	1.770	-2.570	-.847	1.330
8	1.480	-1.870	-.209	1.710
9	2.180	-1.880	-.342	1.430
10	2.010	-2.360	-.490	1.520
11	1.720	-1.680	-.034	1.980
12	1.740	-1.760	-.235	1.370
13	1.510	-3.500	-1.020	1.210
14	1.840	-2.920	-.846	1.220

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.360	-3.750	-1.610	1.350
2	1.760	-1.990	-.563	1.710
3	1.770	-2.180	-1.160	.856
4	1.600	-1.510	.442	2.440
5	2.330	-1.980	-.502	1.290
6	1.400	-2.620	-.664	1.970
7	1.760	-2.200	-.886	1.360
8	1.680	-1.810	-.400	1.670
9	2.330	-1.900	-.549	1.280
10	1.850	-2.140	-.684	1.420
11	2.150	-1.830	-.211	1.610
12	1.980	-1.630	-.291	1.380
13	2.160	-2.320	-.909	1.040
14	2.200	-2.370	-.983	1.060

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.205	-4.181	-1.765	1.577
2	1.559	-2.194	-.583	1.984
3	1.568	-2.408	-1.257	1.019
4	1.417	-1.652	.552	2.808
5	2.064	-2.182	-.514	1.509
6	1.240	-2.905	-.697	2.277
7	1.559	-2.431	-.947	1.588
8	1.488	-1.990	-.399	1.938
9	2.064	-2.092	-.567	1.498
10	1.639	-2.363	-.719	1.656
11	1.904	-2.013	-.185	1.871
12	1.754	-1.787	-.276	1.611
13	1.913	-2.566	-.973	1.227
14	1.949	-2.623	-1.057	1.250

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.129, B = .053

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.060	.010	.060	.010	.002	.010	.004	14450.90	.0000
2	.083	.055	.084	.053	-.011	-.022	.010	1260.48	.0000
3	.112	.027	.112	.027	.005	-.010	.013	7221.44	.0000
4	-.134	.019	.134	.019	.005	.023	.018	19524.39	.0000
5	.033	.017	.035	.012	.002	-.002	.001	1860.82	.0000
6	-.027	.053	.049	.033	.013	.017	.004	485.23	.0003
7	.041	.039	.043	.037	.012	.006	.003	815.02	.0000
8	-.028	.048	.051	.023	.014	.018	.003	511.51	.0000
9	-.063	.060	.073	.047	.018	.026	.007	811.79	.0000
10	-.025	.050	.048	.030	.015	.018	.003	479.35	.0007
11	-.091	.025	.091	.025	.007	.019	.009	5420.71	.0000
12	.029	.039	.036	.033	.011	.008	.002	596.27	.0000
13	.026	.060	.036	.054	-.004	-.007	.004	458.05	.0055
14	-.030	.037	.035	.032	.010	.014	.002	628.22	.0000

TRUE-F	TRUE-R	D	C-DIF	lDl
		-		

MEAN	39.192	39.325	-.13281	.00846	.30428
VARIANCE	41.388	38.649	.10082	.00018	.02588
STD. DEV.	6.433	6.217	.31753	.01349	.16086

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99931

DIFFERENTIAL TEST FUNCTIONING (DTF): .11846
SQURE-ROOT OF DTF: .34418
SD OF D**2: .09793

CHI-SQUARE VALUE: 452.36
PROB: .0092
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.11846	452.36	.009	-.13281	.30428
2	9	.07361	412.48	.152	-.07003	.23996

Doing Whatever It Takes, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.220	-3.260	-1.440	1.240
2	1.360	-1.910	-.621	1.360
3	1.520	-3.320	-1.590	.469
4	1.820	-1.080	.547	2.290
5	1.840	-1.770	-.585	1.070
6	1.930	-1.600	-.263	1.340
7	1.640	-2.490	-1.160	.701
8	1.450	-1.880	-.334	1.610
9	1.980	-1.800	-.574	1.190
10	1.750	-2.160	-.628	1.100
11	1.430	-1.610	-.097	1.720
12	1.700	-1.960	-.759	.764
13	1.290	-3.240	-1.000	1.260
14	1.640	-2.540	-.831	1.350

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.280	-3.650	-1.630	1.330
2	1.630	-1.920	-.657	1.410
3	1.610	-3.110	-1.530	.433
4	1.590	-1.310	.467	2.480
5	2.440	-1.730	-.833	.995
6	2.250	-1.820	-.461	1.300
7	1.530	-3.000	-1.450	.857
8	1.470	-1.960	-.475	1.640
9	1.990	-1.780	-.661	1.390
10	1.970	-2.130	-.693	1.020
11	1.460	-1.940	-.197	1.900
12	2.420	-1.960	-.793	.680
13	1.780	-2.640	-1.300	1.010
14	1.920	-2.850	-1.050	1.160

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.271	-3.586	-1.551	1.429
2	1.619	-1.843	-.572	1.510
3	1.599	-3.042	-1.451	.526
4	1.579	-1.229	.560	2.587
5	2.423	-1.652	-.749	1.092
6	2.234	-1.743	-.374	1.399
7	1.519	-2.931	-1.370	.953
8	1.460	-1.884	-.388	1.741
9	1.976	-1.702	-.576	1.490
10	1.956	-2.055	-.608	1.117
11	1.450	-1.864	-.108	2.003
12	2.403	-1.884	-.709	.775
13	1.768	-2.568	-1.219	1.107
14	1.907	-2.780	-.967	1.258

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.007, B = .090

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.001	.038	.033	.020	.005	.005	.001	319.31	.4688
2	.032	.017	.032	.016	.001	-.002	.001	1462.75	.0000
3	.039	.026	.039	.026	-.003	-.006	.002	1040.98	.0000
4	-.014	.052	.045	.030	.009	.010	.003	342.86	.1617
5	-.042	.054	.058	.036	.007	.011	.005	510.21	.0000
6	-.047	.032	.049	.029	.007	.011	.003	977.48	.0000
7	.005	.084	.071	.046	.011	.010	.007	320.12	.4562
8	.003	.018	.014	.011	.004	.003	.000	330.02	.3096
9	.064	.038	.064	.038	.008	.002	.006	1213.57	.0000
10	.012	.020	.016	.017	-.001	-.002	.001	441.23	.0000
11	-.004	.051	.043	.028	.009	.009	.003	320.56	.4492
12	-.003	.051	.036	.036	-.005	-.005	.003	320.53	.4498
13	-.064	.059	.081	.031	.002	.007	.008	692.61	.0000
14	-.067	.019	.067	.019	.003	.009	.005	4076.70	.0000

TRUE-F	TRUE-R	D	C-DIF	lDl
		-		

MEAN	38.810	38.893	-.08324	.00454	.22368
VARIANCE	50.696	48.879	.05656	.00003	.01346
STD. DEV.	7.120	6.991	.23783	.00590	.11600

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99958

DIFFERENTIAL TEST FUNCTIONING (DTF): .06349
SQURE-ROOT OF DTF: .25197
SD OF D**2: .05227

CHI-SQUARE VALUE: 358.07
PROB: .0602
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.06349	358.07	.060	-.08324	.22368

Being a Quick Study, Self [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.270	-2.660	-.414	1.380
2	3.580	-2.680	-.528	1.180
3	3.570	-2.370	-.459	1.340
4	3.570	-2.370	-.663	1.330

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.770	-2.900	-.521	1.180
2	3.890	-2.430	-.731	1.150
3	3.240	-2.490	-.720	1.240
4	3.520	-2.460	-.681	1.610

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.787	-2.817	-.452	1.239
2	3.913	-2.349	-.661	1.209
3	3.260	-2.409	-.650	1.299
4	3.541	-2.379	-.611	1.666

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = .994, B = .066

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.038	.034	.042	.028	-.003	.001	.003	187.94	.0000
2	-.030	.072	.055	.055	.007	.009	.006	99.08	.1100
3	-.071	.050	.071	.049	.005	.011	.008	255.66	.0000
4	.056	.067	.056	.067	.005	-.000	.008	142.12	.0001

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.003	11.087	-.08341	.00514	.12145
VARIANCE	3.771	3.594	.01362	.00002	.00583
STD. DEV.	1.942	1.896	.11671	.00498	.07635

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99844

DIFFERENTIAL TEST FUNCTIONING (DTF): .02058
SQURE-ROOT OF DTF: .14345
SD OF D**2: .02152

CHI-SQUARE VALUE: 126.90
PROB: .0014
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.02058	126.90	.001	-.08341	.12145

Being a Quick Study, Superiors [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.520	-2.210	-1.150	1.060
2	2.410	-2.890	-1.430	.650
3	3.190	-2.600	-1.290	.898
4	3.850	-1.840	-1.010	1.340

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.220	-2.200	-1.090	.870
2	5.450	-1.780	-1.370	.683
3	3.560	-2.510	-1.400	.889
4	2.430	-2.850	-1.320	1.110

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.026	-2.228	-1.047	1.039
2	5.122	-1.781	-1.345	.840
3	3.346	-2.558	-1.377	1.059
4	2.284	-2.919	-1.291	1.294

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = 1.064, B = .113

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.007	.026	.020	.018	-.001	-.001	.001	105.07	.2704
2	.072	.130	.118	.091	.011	.012	.022	128.02	.0191
3	.019	.058	.047	.039	.006	.006	.004	109.15	.1878
4	-.076	.132	.090	.124	.008	.007	.023	130.53	.0131

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	12.165	12.143	.02221	.00614	.13145
VARIANCE	3.160	2.978	.02405	.00002	.00727
STD. DEV.	1.778	1.726	.15508	.00465	.08524

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99654

DIFFERENTIAL TEST FUNCTIONING (DTF): .02454
SQURE-ROOT OF DTF: .15667
SD OF D**2: .02889

CHI-SQUARE VALUE: 100.01
PROB: .3968
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.02454	100.01	.397	.02221	.13145

Being a Quick Study, Peers [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.770	-3.120	-1.220	.938
2	3.100	-2.390	-1.160	.968
3	4.110	-2.390	-1.120	1.080
4	2.200	-2.570	-1.130	1.300

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.800	-2.690	-1.310	1.100
2	4.040	-2.290	-1.180	.897
3	4.590	-2.610	-1.190	.898
4	3.030	-2.660	-1.060	1.040

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.721	-2.738	-1.294	1.227
2	3.862	-2.319	-1.158	1.014
3	4.388	-2.654	-1.169	1.015
4	2.897	-2.706	-1.033	1.164

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.046, B = .076

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.058	.040	.058	.040	.001	.002	.005	1220.32	.0000
2	.007	.035	.028	.021	.002	.002	.001	401.08	.2639
3	-.029	.032	.029	.032	.001	.000	.002	695.78	.0000
4	-.017	.044	.032	.035	.001	.001	.002	443.23	.0197

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.992	11.973	.01895	.00139	.06339
VARIANCE	3.073	3.076	.00521	.00000	.00155
STD. DEV.	1.753	1.754	.07218	.00077	.03938

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99922

DIFFERENTIAL TEST FUNCTIONING (DTF): .00557
SQURE-ROOT OF DTF: .07462
SD OF D**2: .00653

CHI-SQUARE VALUE: 411.55
PROB: .1598
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00557	411.55	.160	.01895	.06339

Being a Quick Study, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.580	-2.730	-1.190	.977
2	3.020	-1.550	-.738	.932
3	5.630	-1.690	-.662	.787
4	2.170	-2.180	-.826	1.090

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.410	-2.420	-1.340	.572
2	4.560	-1.910	-1.010	.530
3	4.110	-2.120	-1.030	.528
4	3.220	-2.070	-1.060	.662

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.163	-2.328	-1.125	1.005
2	4.093	-1.760	-.757	.958
3	3.689	-1.994	-.779	.956
4	2.890	-1.938	-.813	1.105

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.114, B = .368

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.015	.049	.032	.040	-.000	-.001	.003	350.54	.1011
2	-.036	.054	.055	.034	.006	.007	.004	464.59	.0000
3	-.005	.133	.096	.092	.012	.012	.018	319.41	.4671
4	.009	.051	.036	.037	.001	.001	.003	328.39	.3322

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.725	11.742	-.01701	.00483	.11524
VARIANCE	5.216	4.889	.01905	.00003	.00606
STD. DEV.	2.284	2.211	.13802	.00516	.07785

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99863

DIFFERENTIAL TEST FUNCTIONING (DTF): .01934
SQURE-ROOT OF DTF: .13907
SD OF D**2: .01940

CHI-SQUARE VALUE: 323.85
PROB: .3987
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.01934	323.85	.399	-.01701	.11524

Decisiveness, Self [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.790	-1.580	-.099	1.310
2	2.170	-1.270	.159	1.660
3	3.000	-2.770	-.938	.713
4	2.270	-1.490	-.333	1.760

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.550	-1.930	-.310	1.110
2	2.150	-1.580	-.043	1.750
3	2.940	-2.760	-1.110	.694
4	2.410	-1.780	-.540	1.330

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.593	-1.711	-.110	1.293
2	2.176	-1.365	.153	1.925
3	2.976	-2.531	-.901	.882
4	2.439	-1.563	-.338	1.510

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = .988, B = .196

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.023	.030	.029	.024	.001	.001	.001	130.55	.0007
2	.012	.048	.034	.036	.001	.001	.002	89.20	.3010
3	.062	.033	.062	.033	.002	.002	.005	373.79	.0000
4	-.046	.034	.046	.034	-.000	-.000	.003	240.04	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.710	10.705	.00542	.00095	.04214
VARIANCE	4.735	4.628	.00378	.00000	.00203
STD. DEV.	2.176	2.151	.06147	.00085	.04508

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99966

DIFFERENTIAL TEST FUNCTIONING (DTF): .00381
SQURE-ROOT OF DTF: .06171
SD OF D**2: .00692

CHI-SQUARE VALUE: 84.65
PROB: .4289
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00381	84.65	.429	.00542	.04214

Decisiveness, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	3.650	-1.080	.007	1.150
2	1.340	-1.140	.291	2.250
3	3.610	-1.540	-.574	.849
4	2.840	-1.390	-.217	1.450

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.530	-1.590	-.093	1.460
2	2.040	-1.590	.003	1.990
3	3.140	-1.940	-.621	.983
4	2.750	-1.580	-.356	1.280

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.805	-1.297	.053	1.454
2	2.262	-1.297	.139	1.932
3	3.481	-1.613	-.423	1.024
4	3.049	-1.288	-.184	1.292

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = .902, B = .137

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.035	.124	.110	.067	.004	.005	.017	416.27	.1236
2	-.100	.071	.113	.046	-.002	-.004	.015	1137.04	.0000
3	.089	.055	.098	.036	.003	.005	.011	1387.93	.0000
4	-.001	.055	.046	.031	-.002	-.002	.003	385.18	.4734

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.289	10.266	.02323	.00091	.04862
VARIANCE	6.180	6.029	.00312	.00002	.00129
STD. DEV.	2.486	2.455	.05583	.00417	.03595

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99982

DIFFERENTIAL TEST FUNCTIONING (DTF): .00366
SQURE-ROOT OF DTF: .06047
SD OF D**2: .00459

CHI-SQUARE VALUE: 451.65
PROB: .0098
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00366	451.65	.010	.02323	.04862

Decisiveness, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.570	-.838	.208	1.180
2	1.360	-.660	.388	2.300
3	2.410	-1.510	-.445	1.070
4	2.350	-1.290	-.240	1.330

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.360	-.776	.095	1.200
2	1.420	-.939	.467	2.230
3	2.190	-1.690	-.502	1.060
4	3.060	-1.160	-.150	1.260

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.268	-.775	.120	1.257
2	1.381	-.942	.503	2.315
3	2.130	-1.714	-.493	1.113
4	2.977	-1.169	-.131	1.318

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.028, B = .023

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.003	.047	.040	.025	.001	.001	.002	320.12	.4560
2	-.032	.029	.035	.025	-.000	-.000	.002	709.86	.0000
3	-.026	.052	.041	.041	-.000	-.000	.003	396.13	.0019
4	.053	.051	.061	.041	.001	.000	.005	653.79	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	9.842	9.844	-.00218	.00030	.03052
VARIANCE	6.096	6.124	.00121	.00000	.00028
STD. DEV.	2.469	2.475	.03478	.00060	.01682

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99991

DIFFERENTIAL TEST FUNCTIONING (DTF): .00121
SQURE-ROOT OF DTF: .03485
SD OF D**2: .00106

CHI-SQUARE VALUE: 320.25
PROB: .4540
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00121	320.25	.454	-.00218	.03052

Leading Employees, Self [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.520	-2.210	-.480	2.240
2	1.200	-3.140	-.860	1.870
3	1.350	-2.430	-.574	1.540
4	1.750	-2.350	-.765	1.490
5	1.510	-2.940	-.628	1.430
6	2.020	-2.810	-1.340	.663
7	1.550	-3.320	-.585	1.880
8	1.630	-2.830	-1.140	1.650
9	1.980	-2.270	-.626	1.770
10	1.190	-1.560	.644	3.020
11	1.730	-3.180	-.926	1.200
12	1.320	-2.850	-.358	3.500
13	1.080	-3.290	.699	4.680

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.580	-2.920	-.447	2.040
2	1.150	-4.460	-1.190	2.110
3	1.190	-3.190	-1.270	1.380
4	1.830	-3.050	-1.140	1.600
5	1.930	-3.040	-1.240	1.490
6	1.230	-4.170	-1.990	.660
7	1.580	-3.390	-1.240	1.460
8	1.410	-3.810	-2.140	1.370
9	1.950	-3.000	-.716	1.960
10	1.080	-2.630	.206	2.970
11	1.130	-4.230	-2.110	.973
12	2.320	-2.760	-.641	1.690
13	1.660	-3.300	.064	2.420

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.693	-2.309	-.002	2.318
2	1.233	-3.746	-.695	2.384
3	1.275	-2.561	-.770	1.703
4	1.961	-2.431	-.649	1.908
5	2.069	-2.421	-.742	1.805
6	1.318	-3.476	-1.442	1.031
7	1.693	-2.748	-.742	1.777
8	1.511	-3.140	-1.582	1.693
9	2.090	-2.384	-.253	2.244
10	1.158	-2.039	.607	3.186
11	1.211	-3.532	-1.554	1.323
12	2.487	-2.160	-.183	1.992
13	1.779	-2.664	.475	2.673

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = .933, B = .415

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.133	.044	.133	.043	.001	.027	.020	866.01	.0000
2	.069	.038	.070	.036	.007	.020	.006	369.25	.0000
3	-.029	.040	.044	.023	.006	.000	.002	130.36	.0007
4	.073	.047	.073	.047	.009	.023	.008	289.51	.0000
5	.024	.064	.053	.044	.007	.012	.005	95.61	.1625
6	.086	.077	.095	.065	.015	.032	.013	188.94	.0000
7	-.042	.021	.045	.013	-.002	-.011	.002	420.06	.0000
8	-.078	.060	.080	.057	.010	-.005	.010	225.46	.0000
9	.152	.040	.152	.040	.005	.034	.025	1304.48	.0000
10	-.064	.043	.067	.039	.006	-.006	.006	272.25	.0000
11	-.088	.092	.108	.066	.015	-.002	.016	160.90	.0000
12	-.000	.151	.128	.080	-.015	-.015	.023	84.00	.4487
13	-.044	.117	.084	.093	-.008	-.017	.016	95.69	.1611

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	35.369	35.176	.19302	.00707	.25505
VARIANCE	21.538	20.334	.05466	.00031	.02687
STD. DEV.	4.641	4.509	.23380	.01757	.16393

```
 CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES:     .99912

 DIFFERENTIAL TEST FUNCTIONING (DTF):   .09192
                   SQURE-ROOT OF DTF:   .30319
                          SD OF D**2:   .12060

                    CHI-SQUARE VALUE:   141.25
                                PROB:    .0001
       DEGREES OF FREEDOM CHI-SQAURE:       83



                           ITEM DELETION PROCEDURE: A

RUN      ITEM REMOVED      DTF   CHI-SQUARE   PROB    MEAN D  MEAN lDl
---      ------------      ---   ----------   ----    ------  --------

  1         NONE         .09192      141.25   .000    .19302    .25505

  2            6         .04109      116.44   .009    .10699    .16264
```

Leading Employees, Superiors [Run 2 (Run 1 used .799 .058)]

FOCAL GROUP ITEM PARAMETERS

1	2.170	-2.050	-.517	1.530
2	1.750	-2.620	-.929	1.710
3	2.350	-2.060	-.539	1.380
4	2.010	-2.830	-.821	1.270
5	1.730	-2.990	-.995	1.770
6	1.580	-3.470	-1.660	.987
7	1.380	-2.670	-.471	2.390
8	2.680	-2.870	-1.050	.986
9	1.330	-2.890	-.958	1.980
10	1.170	-2.380	-.361	2.390
11	2.390	-2.950	-.932	1.640
12	1.320	-4.330	-1.080	1.830
13	1.120	-3.330	-.548	2.900

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	.909	-4.260	-1.240	2.290
2	1.290	-2.690	-1.310	2.050
3	1.660	-2.570	-.527	2.040
4	2.050	-3.180	-.899	1.490
5	1.710	-3.390	-1.390	1.210
6	1.120	-4.790	-2.200	1.140
7	.850	-4.090	-1.060	4.650
8	.921	-5.570	-2.950	1.750
9	2.400	-3.070	-1.000	1.250
10	1.370	-2.820	-.542	2.340
11	1.230	-2.380	-1.260	2.110
12	2.270	-3.650	-1.590	2.030
13	1.100	-4.160	-.319	4.360

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.086	-3.521	-.993	1.962
2	1.541	-2.207	-1.051	1.761
3	1.983	-2.106	-.396	1.752
4	2.449	-2.617	-.707	1.292
5	2.043	-2.792	-1.118	1.058
6	1.338	-3.964	-1.796	.999
7	1.016	-3.378	-.842	3.937
8	1.100	-4.617	-2.424	1.510
9	2.867	-2.525	-.792	1.091
10	1.637	-2.315	-.409	2.004
11	1.470	-1.947	-1.010	1.811
12	2.712	-3.010	-1.286	1.744
13	1.314	-3.437	-.222	3.694

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .837, B = .045

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.100	.196	.148	.162	.047	.071	.048	123.59	.0355
2	.018	.027	.019	.027	-.004	-.008	.001	143.82	.0014
3	.094	.052	.098	.044	.011	-.011	.012	414.24	.0000
4	.038	.031	.040	.027	-.007	-.016	.002	245.59	.0000
5	-.145	.095	.151	.085	-.021	.014	.030	322.84	.0000
6	-.017	.035	.027	.029	.007	.011	.002	122.11	.0433
7	-.012	.124	.096	.080	.032	.035	.016	98.92	.4267
8	-.099	.251	.198	.183	.060	.084	.073	113.14	.1257
9	-.111	.164	.169	.102	-.040	-.013	.039	142.70	.0018
10	-.058	.053	.069	.037	-.012	.001	.006	216.18	.0000
11	.092	.076	.093	.075	-.013	-.035	.014	244.08	.0000
12	-.032	.111	.092	.071	.003	.011	.013	105.87	.2527
13	.089	.030	.090	.028	.005	-.016	.009	964.47	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	36.444	36.684	-.24034	.00987	.29295
VARIANCE	32.931	30.188	.07054	.00113	.04249
STD. DEV.	5.739	5.494	.26560	.03360	.20613

```
 CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES:     .99983

 DIFFERENTIAL TEST FUNCTIONING (DTF):   .12831
                   SQURE-ROOT OF DTF:   .35820
                          SD OF D**2:   .14255

                    CHI-SQUARE VALUE:   178.24
                                PROB:    .0000
       DEGREES OF FREEDOM CHI-SQAURE:       97



                           ITEM DELETION PROCEDURE: A

RUN      ITEM REMOVED      DTF   CHI-SQUARE   PROB    MEAN D  MEAN lDl
---      ------------      ---   ----------   ----    ------  --------

  1         NONE         .12831      178.24   .000   -.24034    .29295

  2            8         .03313      249.00   .000   -.14175    .17268
```

Leading Employees, Peers [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.650	-2.200	-.644	1.950
2	1.840	-1.790	-.342	1.680
3	1.550	-2.000	-.279	2.020
4	1.940	-1.970	-.424	1.700
5	1.810	-2.510	-.717	1.440
6	2.000	-2.280	-1.080	1.010
7	1.690	-1.760	-.126	1.930
8	1.620	-2.530	-1.130	1.440
9	1.660	-2.240	-.609	1.740
10	1.490	-2.040	-.215	2.160
11	1.770	-2.060	-.725	1.410
12	2.020	-2.290	-.485	2.060
13	1.730	-1.650	.252	2.520

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.660	-2.170	-.476	1.700
2	1.960	-1.970	-.378	1.740
3	1.740	-2.100	-.333	1.670
4	2.750	-1.700	-.537	1.180
5	1.830	-2.350	-1.020	1.240
6	1.800	-2.350	-1.020	1.090
7	2.100	-1.840	-.321	1.760
8	1.810	-2.870	-1.210	1.290
9	1.800	-2.710	-.762	1.630
10	1.380	-2.270	-.314	2.430
11	1.710	-2.420	-.927	1.200
12	2.250	-2.400	-.620	1.690
13	2.260	-1.910	-.080	2.110

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.613	-2.083	-.340	1.899
2	1.905	-1.877	-.239	1.940
3	1.691	-2.011	-.193	1.868
4	2.672	-1.599	-.403	1.364
5	1.778	-2.268	-.900	1.426
6	1.749	-2.268	-.900	1.272
7	2.041	-1.743	-.180	1.961
8	1.759	-2.803	-1.095	1.477
9	1.749	-2.639	-.634	1.827
10	1.341	-2.186	-.173	2.650
11	1.662	-2.340	-.804	1.385
12	2.187	-2.320	-.488	1.889
13	2.196	-1.815	.068	2.321

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.029, B = .150

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.089	.043	.089	.042	.001	.004	.010	2022.86	.0000
2	.048	.034	.051	.028	.000	.002	.003	1149.05	.0000
3	.005	.023	.020	.013	.000	.001	.001	404.39	.2275
4	-.010	.112	.091	.065	.001	.000	.013	388.16	.4311
5	-.032	.026	.037	.018	-.001	-.002	.002	955.33	.0000
6	.103	.022	.103	.022	.001	.004	.011	8724.54	.0000
7	-.018	.022	.025	.014	.000	-.000	.001	642.76	.0000
8	-.005	.020	.015	.014	.000	-.000	.000	407.02	.2008
9	-.024	.040	.034	.032	-.000	-.001	.002	520.80	.0000
10	.036	.049	.049	.036	-.001	.001	.004	598.42	.0000
11	-.042	.033	.043	.033	-.000	-.002	.003	1016.63	.0000
12	-.021	.017	.021	.017	.000	-.000	.001	990.58	.0000
13	-.092	.022	.092	.021	.000	-.003	.009	7365.44	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	34.692	34.655	.03718	.00025	.04415
VARIANCE	34.100	34.227	.00186	.00000	.00130
STD. DEV.	5.840	5.850	.04318	.00207	.03603

```
 CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES:     .99996

 DIFFERENTIAL TEST FUNCTIONING (DTF):   .00325
                   SQURE-ROOT OF DTF:   .05699
                          SD OF D**2:   .00389

                    CHI-SQUARE VALUE:   670.42
                                PROB:    .0000
       DEGREES OF FREEDOM CHI-SQAURE:      384



                           ITEM DELETION PROCEDURE: A

RUN      ITEM REMOVED      DTF   CHI-SQUARE   PROB    MEAN D  MEAN lDl
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  1         NONE         .00325      670.42   .000    .03718    .04415
```

Leading Employees, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.480	-2.300	-.691	1.570
2	1.480	-1.600	-.195	1.500
3	1.160	-1.820	-.144	1.850
4	2.010	-1.520	-.354	1.270
5	1.730	-1.750	-.642	1.220
6	1.680	-2.340	-.970	.912
7	1.630	-1.370	-.073	1.970
8	1.490	-2.030	-.606	1.230
9	1.480	-2.140	-.730	1.300
10	1.280	-1.250	.176	2.470
11	1.740	-1.740	-.812	1.100
12	1.930	-1.550	-.253	1.620
13	1.260	-1.270	.616	2.910

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.910	-1.920	-.480	1.430
2	1.770	-1.680	-.605	1.310
3	1.600	-1.700	-.287	1.440
4	2.350	-1.610	-.405	1.080
5	2.030	-1.870	-.744	.865
6	1.550	-2.020	-1.060	.918
7	1.660	-1.740	-.346	1.460
8	1.860	-1.830	-.664	1.130
9	1.970	-1.890	-.709	1.110
10	1.510	-1.490	.170	1.960
11	1.800	-2.190	-1.030	.990
12	2.100	-1.940	-.653	1.410
13	1.940	-1.420	.061	1.700

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.705	-1.941	-.329	1.811
2	1.580	-1.673	-.469	1.676
3	1.429	-1.695	-.112	1.822
4	2.098	-1.594	-.245	1.419
5	1.813	-1.885	-.624	1.178
6	1.384	-2.053	-.978	1.237
7	1.482	-1.740	-.179	1.844
8	1.661	-1.841	-.535	1.475
9	1.759	-1.908	-.585	1.452
10	1.348	-1.460	.399	2.404
11	1.607	-2.244	-.945	1.318
12	1.875	-1.964	-.522	1.788
13	1.732	-1.381	.277	2.113

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.120, B = .209

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.150	.037	.150	.037	-.005	-.001	.024	5472.47	.0000
2	-.059	.047	.068	.034	.006	.004	.006	820.25	.0000
3	.014	.038	.031	.026	-.005	-.004	.002	364.26	.0377
4	.048	.026	.050	.022	.003	.005	.003	1426.96	.0000
5	-.022	.008	.022	.008	.000	-.000	.001	2739.84	.0000
6	.111	.027	.111	.027	.004	.007	.013	5578.90	.0000
7	-.094	.041	.094	.041	.005	.003	.011	1972.10	.0000
8	.073	.015	.073	.015	.001	.002	.006	8171.35	.0000
9	.071	.029	.071	.029	-.002	-.001	.006	2190.84	.0000
10	.016	.024	.026	.013	.003	.003	.001	472.62	.0000
11	-.027	.095	.077	.061	.013	.012	.010	345.66	.1373
12	-.101	.094	.118	.071	.013	.011	.019	689.88	.0000
13	-.154	.087	.157	.081	-.011	-.014	.031	1311.32	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	34.488	34.463	.02537	.00206	.13779
VARIANCE	44.103	42.531	.02611	.00004	.00777
STD. DEV.	6.641	6.522	.16160	.00646	.08815

```
 CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES:     .99985

 DIFFERENTIAL TEST FUNCTIONING (DTF):   .02676
                   SQURE-ROOT OF DTF:   .16358
                          SD OF D**2:   .02855

                    CHI-SQUARE VALUE:   326.86
                                PROB:    .3540
       DEGREES OF FREEDOM CHI-SQAURE:      318



                           ITEM DELETION PROCEDURE: A

RUN      ITEM REMOVED      DTF   CHI-SQUARE   PROB    MEAN D  MEAN lDl
---      ------------      ---   ----------   ----    ------  --------

  1         NONE         .02676      326.86   .354    .02537    .13779
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Setting a Developmental Climate, Self [Run 2 (Run 1 used 1.312 .308)]

FOCAL GROUP ITEM PARAMETERS

1	.955	-4.260	-1.480	2.070
2	1.580	-3.660	-.555	1.750
3	3.690	-1.490	-.145	1.690
4	3.460	-2.700	-.555	1.680
5	1.140	-4.500	-2.180	1.180

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.020	-4.640	-1.680	1.910
2	2.220	-2.750	-.711	1.470
3	7.820	-1.760	-.406	1.320
4	26.200	-1.580	-.520	.613
5	1.710	-3.090	-2.400	.460

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	.856	-5.248	-1.720	2.560
2	1.862	-2.995	-.565	2.035
3	6.560	-1.815	-.201	1.856
4	21.980	-1.600	-.337	1.014
5	1.435	-3.400	-2.578	.831

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = 1.192, B = .283

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.003	.045	.035	.027	-.004	-.005	.002	84.31	.4391
2	.035	.033	.035	.033	-.002	-.006	.002	174.64	.0000
3	-.049	.135	.103	.100	.007	.011	.021	94.97	.1739
4	.005	.307	.217	.217	.069	.068	.095	84.03	.4479
5	-.093	.022	.093	.022	.002	.011	.009	1665.79	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	13.982	14.081	-.09942	.01612	.23764
VARIANCE	3.057	3.477	.07071	.00073	.02412
STD. DEV.	1.748	1.865	.26592	.02699	.15532

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99123

DIFFERENTIAL TEST FUNCTIONING (DTF): .08059
SQURE-ROOT OF DTF: .28389
SD OF D**2: .09015

CHI-SQUARE VALUE: 95.74
PROB: .1602
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.08059	95.74	.160	-.09942	.23764

Setting a Developmental Climate, Superiors [Run 2 (Run 1 used .646 -.018)]

FOCAL GROUP ITEM PARAMETERS

1	2.280	-2.280	-.912	1.580
2	2.680	-2.690	-.733	1.330
3	7.790	-1.550	-.504	1.700
4	3.180	-1.800	-.489	1.680
5	2.370	-2.810	-1.330	.466

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.660	-3.080	-1.330	1.890
2	1.110	-4.670	-1.170	3.160
3	3.190	-2.490	-.440	2.590
4	8.700	-2.040	-.739	1.700
5	1.010	-4.910	-2.670	1.420

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.823	-1.892	-.863	1.030
2	1.888	-2.827	-.769	1.777
3	5.425	-1.545	-.340	1.442
4	14.796	-1.281	-.516	.919
5	1.718	-2.968	-1.651	.754

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .588, B = -.081

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.067	.135	.114	.098	.046	.046	.023	121.92	.0443
2	.060	.078	.075	.064	-.025	-.025	.010	155.92	.0001
3	.042	.143	.110	.101	.031	.031	.022	106.37	.2420
4	-.084	.342	.261	.237	.123	.124	.124	103.87	.2982
5	.045	.095	.087	.059	-.026	-.026	.011	120.56	.0528

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	14.269	14.273	-.00302	.02985	.23521
VARIANCE	5.387	6.859	.14924	.00304	.09393
STD. DEV.	2.321	2.619	.38632	.05516	.30648

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99504

DIFFERENTIAL TEST FUNCTIONING (DTF): .14925
SQURE-ROOT OF DTF: .38633
SD OF D**2: .28178

CHI-SQUARE VALUE: 98.01
PROB: .4523
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.14925	98.01	.452	-.00302	.23521

Setting a Developmental Climate, Peers [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.720	-2.460	-.818	1.720
2	1.560	-2.590	-.522	1.860
3	3.160	-1.460	-.010	1.770
4	3.840	-1.650	-.212	1.450
5	1.360	-2.610	-1.140	1.300

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.930	-2.400	-.732	1.420
2	2.150	-2.140	-.455	1.600
3	2.830	-1.420	-.259	1.760
4	4.090	-1.440	-.429	1.280
5	1.760	-2.220	-1.070	1.010

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.703	-2.649	-.759	1.679
2	1.898	-2.355	-.446	1.883
3	2.498	-1.539	-.223	2.064
4	3.610	-1.562	-.416	1.520
5	1.553	-2.445	-1.142	1.214

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.133, B = .070

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.001	.014	.011	.009	-.002	-.002	.000	387.65	.4383
2	.028	.025	.030	.023	.000	-.003	.001	885.69	.0000
3	-.059	.084	.090	.050	.010	.016	.011	575.25	.0000
4	-.059	.080	.082	.057	.011	.017	.010	596.38	.0000
5	-.019	.022	.026	.013	.000	.002	.001	665.30	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	13.479	13.587	-.10794	.00615	.14632
VARIANCE	5.254	5.110	.01911	.00008	.00935
STD. DEV.	2.292	2.261	.13824	.00870	.09670

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99827

DIFFERENTIAL TEST FUNCTIONING (DTF): .03076
SQURE-ROOT OF DTF: .17539
SD OF D**2: .03171

CHI-SQUARE VALUE: 619.71
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.03076	619.71	.000	-.10794	.14632

Setting a Developmental Climate, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.420	-2.470	-.919	1.240
2	1.370	-1.750	-.102	1.700
3	2.690	-1.250	-.023	1.640
4	3.390	-1.260	-.120	1.260
5	1.250	-2.140	-.771	1.650

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.760	-2.010	-.841	1.120
2	1.880	-1.360	-.250	1.270
3	3.340	-1.070	-.191	1.390
4	2.920	-1.400	-.351	1.290
5	2.390	-1.550	-.604	.813

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.564	-2.150	-.835	1.371
2	1.671	-1.419	-.170	1.540
3	2.969	-1.093	-.104	1.675
4	2.596	-1.464	-.284	1.562
5	2.124	-1.633	-.568	1.026

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.125, B = .111

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.059	.026	.059	.026	.006	.005	.004	2026.88	.0000
2	.003	.078	.065	.043	.017	.017	.006	319.58	.4645
3	.006	.054	.044	.032	.011	.011	.003	323.44	.4049
4	-.037	.125	.112	.067	-.018	-.018	.017	347.25	.1246
5	-.045	.186	.161	.104	.039	.039	.037	337.97	.2112

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	13.139	13.153	-.01381	.01078	.19436
VARIANCE	7.083	8.210	.05372	.00034	.01613
STD. DEV.	2.661	2.865	.23177	.01843	.12702

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99918

DIFFERENTIAL TEST FUNCTIONING (DTF): .05391
SQURE-ROOT OF DTF: .23218
SD OF D**2: .07704

CHI-SQUARE VALUE: 320.13
PROB: .4559
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.05391	320.13	.456	-.01381	.19436

Confronting Problem Employees, Self [Run 2 (Run 1 used .863 .219)]

FOCAL GROUP ITEM PARAMETERS

1	2.480	-1.060	.469	1.730
2	8.880	-.474	.555	2.120
3	1.570	-1.670	.012	2.280
4	1.600	-1.990	.271	2.470

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.910	-1.460	.410	1.920
2	2.450	-1.200	.720	2.200
3	1.540	-1.770	.022	2.190
4	1.910	-3.210	.042	2.240

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.212	-1.121	.573	1.942
2	2.704	-.885	.854	2.195
3	1.700	-1.402	.222	2.186
4	2.108	-2.706	.240	2.231

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = .906, B = .202

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.036	.057	.059	.033	.015	.015	.005	117.93	.0071
2	-.075	.297	.239	.191	.091	.091	.094	89.37	.2967
3	.098	.041	.100	.036	-.009	-.008	.011	553.05	.0000
4	-.052	.056	.052	.056	.003	.002	.006	156.17	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	8.894	8.886	.00726	.02505	.27485
VARIANCE	4.285	3.360	.10014	.00151	.02465
STD. DEV.	2.070	1.833	.31645	.03884	.15701

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99421

DIFFERENTIAL TEST FUNCTIONING (DTF): .10019
SQURE-ROOT OF DTF: .31653
SD OF D**2: .09251

CHI-SQUARE VALUE: 84.04
PROB: .4473
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.10019	84.04	.447	.00726	.27485

Confronting Problem Employees, Superiors [Run 2 (Run 1 used .931 .146)]

FOCAL GROUP ITEM PARAMETERS

1	3.090	-1.190	.153	1.560
2	26.100	-.557	.494	2.520
3	1.930	-1.920	.147	2.160
4	2.180	-1.660	-.284	2.110

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.060	-1.390	.300	1.710
2	8.580	-1.190	.433	2.310
3	2.330	-1.670	-.020	2.080
4	1.760	-2.320	-.373	2.610

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.355	-1.242	.300	1.586
2	9.408	-1.059	.421	2.133
3	2.555	-1.497	.008	1.923
4	1.930	-2.090	-.314	2.406

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .912, B = .026

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.056	.040	.059	.037	.005	-.003	.005	285.92	.0000
2	-.157	.284	.187	.265	.084	.107	.105	127.85	.0196
3	-.034	.085	.075	.053	-.006	-.001	.008	113.82	.1167
4	-.016	.066	.049	.048	.005	.007	.005	103.57	.3053

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	9.684	9.835	-.15083	.02745	.19110
VARIANCE	3.933	3.561	.08707	.00214	.07330
STD. DEV.	1.983	1.887	.29508	.04631	.27074

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .98960

DIFFERENTIAL TEST FUNCTIONING (DTF): .10982
SQURE-ROOT OF DTF: .33139
SD OF D**2: .24281

CHI-SQUARE VALUE: 123.60
PROB: .0355
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.10982	123.60	.035	-.15083	.19110

Confronting Problem Employees, Peers [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.630	-1.360	-.102	1.580
2	3.150	-1.060	.240	1.630
3	2.260	-1.470	-.057	1.570
4	1.800	-1.530	.037	2.190

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	4.030	-1.270	.050	1.280
2	3.470	-1.090	.104	1.510
3	2.280	-1.380	-.135	1.710
4	1.810	-2.070	-.309	1.890

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.886	-1.215	.154	1.429
2	3.346	-1.028	.210	1.668
3	2.199	-1.329	-.038	1.875
4	1.745	-2.045	-.218	2.062

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.037, B = .102

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.107	.096	.128	.064	.003	.005	.021	866.09	.0000
2	-.000	.018	.015	.010	.000	-.000	.000	385.04	.4754
3	.064	.032	.064	.032	-.001	.001	.005	1898.99	.0000
4	-.149	.051	.149	.051	-.000	-.004	.025	3683.78	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	9.721	9.700	.02137	.00052	.03667
VARIANCE	4.945	4.976	.00161	.00001	.00072
STD. DEV.	2.224	2.231	.04015	.00305	.02692

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99986

DIFFERENTIAL TEST FUNCTIONING (DTF): .00207
SQURE-ROOT OF DTF: .04549
SD OF D**2: .00254

CHI-SQUARE VALUE: 494.07
PROB: .0001
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00207	494.07	.000	.02137	.03667

Confronting Problem Employees, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.150	-.979	.071	1.520
2	2.480	-.738	.458	1.800
3	1.700	-1.420	-.205	1.660
4	1.730	-1.610	.043	1.960

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.700	-1.130	.038	1.370
2	3.110	-.912	.312	1.730
3	2.100	-1.280	-.019	1.570
4	2.170	-1.320	-.213	1.420

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.404	-1.195	.116	1.613
2	2.769	-.950	.424	2.017
3	1.870	-1.363	.053	1.837
4	1.932	-1.408	-.165	1.669

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.123, B = .074

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.017	.041	.034	.029	.001	.002	.002	377.04	.0127
2	-.046	.059	.066	.037	.003	.004	.006	509.82	.0000
3	.109	.017	.109	.017	-.001	-.003	.012	13361.08	.0000
4	-.071	.068	.091	.036	-.000	.001	.010	658.64	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	9.473	9.497	-.02465	.00098	.05298
VARIANCE	4.814	4.735	.00331	.00001	.00112
STD. DEV.	2.194	2.176	.05758	.00267	.03340

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99968

DIFFERENTIAL TEST FUNCTIONING (DTF): .00392
SQURE-ROOT OF DTF: .06263
SD OF D**2: .00421

CHI-SQUARE VALUE: 377.48
PROB: .0122
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00392	377.48	.012	-.02465	.05298

Work Team Orientation, Self [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.440	-2.470	-.410	1.520
2	.935	-5.130	-2.580	.609
3	2.400	-1.390	.167	1.520
4	2.080	-1.560	-.343	.785

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.170	-2.540	-1.010	1.030
2	1.480	-3.640	-2.440	.456
3	1.930	-2.110	-.500	1.280
4	2.140	-1.860	-1.150	.858

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.013	-2.318	-.669	1.530
2	1.373	-3.504	-2.210	.912
3	1.790	-1.855	-.119	1.800
4	1.985	-1.585	-.820	1.345

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = 1.078, B = .420

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.073	.037	.074	.035	.005	.014	.007	419.18	.0000
2	.084	.038	.087	.030	-.007	-.018	.008	490.83	.0000
3	-.124	.117	.153	.075	.027	.043	.029	177.73	.0000
4	-.017	.156	.141	.067	.039	.041	.024	84.99	.4189

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.148	11.278	-.12994	.01993	.25765
VARIANCE	3.448	2.705	.06282	.00062	.01332
STD. DEV.	1.857	1.645	.25063	.02483	.11540

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99709

DIFFERENTIAL TEST FUNCTIONING (DTF): .07970
SQURE-ROOT OF DTF: .28231
SD OF D**2: .05495

CHI-SQUARE VALUE: 106.58
PROB: .0417
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.07970	106.58	.042	-.12994	.25765

Work Team Orientation, Superiors [Run 2 (Run 1 used .986 .066)]

FOCAL GROUP ITEM PARAMETERS

1	2.490	-2.450	-.396	1.660
2	1.770	-3.260	-1.210	1.330
3	3.570	-1.670	-.454	1.660
4	1.970	-2.010	-.224	1.180

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.700	-2.400	-.930	2.020
2	1.590	-3.010	-1.310	1.700
3	3.140	-1.930	-.517	1.690
4	2.430	-1.730	-.505	.575

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.852	-2.221	-.872	1.836
2	1.732	-2.781	-1.221	1.543
3	3.420	-1.790	-.493	1.533
4	2.647	-1.606	-.482	.510

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .918, B = -.018

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.083	.090	.097	.075	.003	.030	.015	183.07	.0000
2	.047	.023	.047	.023	.001	-.014	.003	503.96	.0000
3	-.040	.030	.040	.030	-.004	.009	.002	266.46	.0000
4	-.240	.197	.279	.137	.029	.104	.096	242.34	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.122	11.438	-.31509	.03211	.34235
VARIANCE	3.345	3.740	.02915	.00197	.01124
STD. DEV.	1.829	1.934	.17074	.04440	.10600

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99742

DIFFERENTIAL TEST FUNCTIONING (DTF): .12844
SQURE-ROOT OF DTF: .35838
SD OF D**2: .05474

CHI-SQUARE VALUE: 431.76
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.12844	431.76	.000	-.31509	.34235
2	4	.01634	150.59	.000	-.07553	.09391

Work Team Orientation, Peers [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.660	-1.780	-.294	1.230
2	1.460	-2.670	-.900	1.280
3	2.120	-1.680	-.438	1.560
4	1.460	-2.120	-.725	.888

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.510	-1.930	-.540	1.340
2	1.470	-2.860	-1.010	1.710
3	2.960	-1.570	-.443	1.090
4	1.780	-2.170	-.865	.688

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.449	-1.882	-.458	1.469
2	1.434	-2.835	-.939	1.849
3	2.888	-1.513	-.358	1.213
4	1.737	-2.128	-.791	.801

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.025, B = .096

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.024	.080	.075	.037	.003	.004	.007	418.49	.1088
2	.068	.070	.076	.062	.002	-.000	.010	743.92	.0000
3	-.020	.102	.084	.061	-.002	-.001	.011	399.43	.2832
4	-.055	.023	.056	.020	.000	.002	.003	2641.76	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.060	11.090	-.03021	.00093	.05262
VARIANCE	3.926	3.871	.00281	.00000	.00095
STD. DEV.	1.981	1.968	.05300	.00197	.03086

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99969

DIFFERENTIAL TEST FUNCTIONING (DTF): .00372
SQURE-ROOT OF DTF: .06101
SD OF D**2: .00350

CHI-SQUARE VALUE: 510.14
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00372	510.14	.000	-.03021	.05262

Work Team Orientation, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	1.500	-1.620	-.205	1.440
2	1.410	-2.150	-.849	1.210
3	2.330	-1.580	-.450	.964
4	1.630	-1.870	-.903	.373

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.840	-1.580	-.244	1.200
2	2.140	-1.780	-.678	.824
3	2.360	-1.330	-.520	1.040
4	1.130	-2.460	-1.280	.449

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.764	-1.595	-.201	1.305
2	2.052	-1.804	-.654	.912
3	2.263	-1.334	-.489	1.138
4	1.083	-2.513	-1.282	.521

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.043, B = .053

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.024	.038	.036	.026	.000	.000	.002	445.30	.0000
2	-.015	.116	.097	.066	.001	.001	.014	324.42	.3900
3	.065	.027	.065	.027	.000	.001	.005	2210.78	.0000
4	-.012	.148	.122	.085	-.001	-.001	.022	321.27	.4382

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.248	11.233	.01421	.00023	.02365
VARIANCE	4.252	4.290	.00073	.00000	.00037
STD. DEV.	2.062	2.071	.02700	.00088	.01928

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99992

DIFFERENTIAL TEST FUNCTIONING (DTF): .00093
SQURE-ROOT OF DTF: .03051
SD OF D**2: .00123

CHI-SQUARE VALUE: 407.29
PROB: .0005
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00093	407.29	.001	.01421	.02365

Hiring Talented Staff, Superiors [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	6.340	-2.220	-.846	.829
2	2.540	-2.550	-.772	1.620
3	2.650	-2.440	-.810	1.810

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	12.900	-1.720	-1.030	.923
2	6.010	-2.330	-1.060	1.530
3	3.920	-2.450	-.906	1.520

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	11.792	-1.801	-1.046	1.091
2	5.494	-2.468	-1.079	1.755
3	3.583	-2.599	-.910	1.744

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = 1.094, B = .081

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.020	.199	.106	.169	.062	.060	.040	98.98	.4251
2	-.078	.143	.128	.101	.045	.053	.027	127.15	.0217
3	-.046	.044	.055	.033	.012	.017	.004	205.95	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	8.603	8.708	-.10463	.04314	.26537
VARIANCE	1.539	1.326	.11847	.00036	.05899
STD. DEV.	1.240	1.152	.34419	.01898	.24289

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .96130

DIFFERENTIAL TEST FUNCTIONING (DTF): .12942
SQURE-ROOT OF DTF: .35974
SD OF D**2: .19103

CHI-SQUARE VALUE: 107.06
PROB: .2278
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.12942	107.06	.228	-.10463	.26537

Hiring Talented Staff, Peers [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	3.020	-2.120	-.450	1.470
2	3.120	-2.130	-.586	1.630
3	2.210	-1.890	-.107	1.940

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.230	-2.190	-.720	1.280
2	5.610	-1.990	-.652	1.260
3	2.590	-2.230	-.507	1.610

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.996	-2.119	-.534	1.622
2	5.204	-1.903	-.461	1.600
3	2.403	-2.162	-.305	1.978

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.078, B = .242

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.011	.045	.036	.029	.003	.003	.002	409.59	.1768
2	.038	.082	.068	.060	.005	.003	.008	467.90	.0022
3	-.088	.042	.090	.037	.003	.008	.010	2090.31	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	8.011	8.072	-.06140	.00494	.10065
VARIANCE	1.797	1.789	.01106	.00001	.00470
STD. DEV.	1.340	1.337	.10518	.00247	.06858

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99688

DIFFERENTIAL TEST FUNCTIONING (DTF): .01483
SQURE-ROOT OF DTF: .12179
SD OF D**2: .01597

CHI-SQUARE VALUE: 516.22
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.01483	516.22	.000	-.06140	.10065

Hiring Talented Staff, Direct Reports [Run 1]

FOCAL GROUP ITEM PARAMETERS

1	2.360	-1.730	-.616	1.110
2	1.730	-2.100	-.566	1.330
3	2.070	-1.540	-.131	1.580

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.940	-1.580	-.543	.842
2	2.690	-1.700	-.495	1.130
3	2.230	-1.460	-.283	1.490

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.506	-1.797	-.581	1.044
2	2.293	-1.938	-.525	1.381
3	1.901	-1.657	-.276	1.804

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.173, B = .056

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.012	.014	.014	.013	-.000	.000	.000	554.29	.0000
2	.017	.031	.023	.026	.000	-.000	.001	422.37	.0001
3	-.035	.055	.059	.028	.002	.003	.004	450.10	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	8.111	8.141	-.02994	.00076	.04416
VARIANCE	2.095	2.050	.00140	.00000	.00034
STD. DEV.	1.448	1.432	.03737	.00134	.01851

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99974

DIFFERENTIAL TEST FUNCTIONING (DTF): .00229
SQURE-ROOT OF DTF: .04789
SD OF D**2: .00172

CHI-SQUARE VALUE: 523.66
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00229	523.66	.000	-.02994	.04416

Building/Mending Relationships, Self (Run 2 [Run 1 used 1.019 .208])

FOCAL GROUP ITEM PARAMETERS

1	1.810	-2.200	-.748	1.100
2	1.230	-3.120	-.567	2.000
3	1.410	-2.800	-.040	3.420
4	.984	-2.710	-.132	3.250
5	1.140	-3.280	-1.040	2.130
6	1.530	-2.870	-.885	1.760
7	2.010	-2.510	-.507	1.700
8	1.950	-2.250	-.459	1.770
9	2.130	-2.840	-.891	1.260
10	1.210	-1.870	.797	3.780
11	2.110	-2.930	-1.080	1.700

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.070	-3.980	-.932	2.120
2	1.760	-2.890	-.739	1.420
3	2.300	-2.120	-.127	2.060
4	2.160	-2.060	-.321	2.280
5	1.300	-3.960	-1.370	2.050
6	1.450	-3.710	-1.030	1.730
7	2.650	-2.800	-.785	1.370
8	1.590	-2.980	-.810	1.820
9	3.370	-1.940	-.925	1.030
10	.970	-2.840	.102	5.010
11	2.240	-3.070	-1.080	1.540

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	.990	-4.057	-.762	2.537
2	1.628	-2.879	-.554	1.780
3	2.128	-2.047	.108	2.472
4	1.998	-1.982	-.102	2.710
5	1.203	-4.036	-1.236	2.461
6	1.341	-3.766	-.868	2.115
7	2.451	-2.782	-.604	1.726
8	1.471	-2.976	-.631	2.212
9	3.117	-1.852	-.755	1.358
10	.897	-2.825	.355	5.661
11	2.072	-3.074	-.922	1.910

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = 1.081, B = .245

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.151	.212	.218	.142	.045	.061	.067	126.61	.0015
2	-.022	.039	.038	.024	-.008	-.010	.002	111.08	.0215
3	.042	.110	.095	.070	-.022	-.018	.014	96.00	.1558
4	-.004	.106	.091	.056	-.017	-.017	.011	84.12	.4451
5	-.026	.054	.050	.034	.012	.009	.004	103.80	.0609
6	.030	.053	.049	.035	.011	.014	.004	111.06	.0216
7	-.037	.034	.045	.023	.007	.003	.003	182.52	.0000
8	-.020	.096	.077	.060	.020	.018	.010	87.60	.3438
9	.078	.100	.082	.096	-.008	.001	.016	135.09	.0003
10	-.140	.087	.152	.066	.018	.003	.027	302.29	.0000
11	.058	.021	.058	.021	.002	.008	.004	711.63	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	29.905	29.797	.10808	.00658	.17629
VARIANCE	16.017	14.431	.06069	.00042	.04129
STD. DEV.	4.002	3.799	.24635	.02059	.20321

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99937

DIFFERENTIAL TEST FUNCTIONING (DTF): .07237
SQURE-ROOT OF DTF: .26902
SD OF D**2: .13794

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                    CHI-SQUARE VALUE:   100.17
                                PROB:    .0966
          DEGREES OF FREEDOM CHI-SQAURE:      83


                            ITEM DELETION PROCEDURE: A

RUN      ITEM REMOVED      DTF   CHI-SQUARE   PROB    MEAN D  MEAN lDl
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  1         NONE         .07237      100.17   .097    .10808    .17629
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Building/Mending Relationships, Superiors (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.580	-2.690	-.880	1.530
2	2.180	-1.680	-.721	1.210
3	1.840	-3.240	-1.010	1.150
4	1.970	-2.070	-.755	1.440
5	1.870	-3.090	-1.420	1.810
6	2.750	-1.920	-.765	1.380
7	2.130	-2.480	-.950	1.130
8	2.390	-2.720	-.996	.915
9	3.190	-1.760	-.723	.891
10	1.370	-1.890	-.177	2.140
11	3.970	-2.260	-1.340	1.010

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.230	-2.950	-1.080	1.030
2	2.230	-2.090	-1.200	.550
3	1.230	-3.560	-1.600	.854
4	1.470	-2.950	-1.340	1.400
5	2.210	-7.160	-1.750	1.090
6	2.300	-7.130	-1.430	.944
7	2.670	-2.510	-1.440	.847
8	1.500	-3.520	-1.830	.776
9	8.060	-3.010	-1.450	.525
10	1.160	-3.400	-1.190	2.250
11	8.550	-3.010	-1.520	.710

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.554	-2.136	-.504	1.338
2	2.554	-1.386	-.609	.919
3	1.409	-2.669	-.958	1.185
4	1.684	-2.136	-.731	1.661
5	2.532	-5.812	-1.089	1.391
6	2.635	-5.785	-.809	1.263
7	3.058	-1.752	-.818	1.178
8	1.718	-2.634	-1.159	1.116
9	9.233	-2.189	-.827	.897
10	1.329	-2.529	-.600	2.403
11	9.794	-2.189	-.888	1.059

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .873, B = .439

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.062	.121	.108	.083	.025	.028	.019	123.81	.0345
2	-.013	.127	.109	.067	.024	.024	.016	99.03	.4236
3	.051	.023	.051	.023	-.001	.001	.003	595.66	.0000
4	.048	.037	.054	.028	-.008	-.006	.004	270.63	.0000
5	-.021	.102	.075	.072	.026	.025	.011	102.07	.3425
6	-.077	.096	.077	.096	-.006	-.010	.015	161.65	.0000
7	.073	.117	.085	.108	.022	.025	.019	136.63	.0050
8	.037	.061	.055	.046	-.015	-.013	.005	134.70	.0068
9	-.075	.174	.155	.110	.027	.024	.036	116.18	.0897
10	-.124	.096	.135	.080	-.018	-.024	.025	262.97	.0000
11	.083	.161	.114	.141	.056	.060	.033	123.72	.0349

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	32.250	32.205	.04504	.01218	.27212
VARIANCE	28.327	30.535	.13191	.00054	.05989
STD. DEV.	5.322	5.526	.36320	.02331	.24473

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99847

DIFFERENTIAL TEST FUNCTIONING (DTF): .13394
SQURE-ROOT OF DTF: .36598
SD OF D**2: .22873

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                    CHI-SQUARE VALUE:    99.51
                                PROB:    .4105
          DEGREES OF FREEDOM CHI-SQAURE:      97


                             ITEM DELETION PROCEDURE: A

RUN      ITEM REMOVED      DTF   CHI-SQUARE   PROB    MEAN D  MEAN lDl
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  1         NONE         .13394       99.51   .411    .04504    .27212
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Building/Mending Relationships, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.470	-2.700	-.625	1.620
2	1.800	-1.940	-.576	1.300
3	1.530	-2.430	-.638	1.320
4	1.840	-1.920	-.478	1.640
5	1.800	-2.850	-.980	1.590
6	1.910	-2.440	-.577	1.760
7	2.520	-1.830	-.528	1.390
8	2.000	-2.100	-.683	1.380
9	2.730	-1.560	-.473	1.110
10	1.280	-2.510	-.405	2.450
11	2.270	-2.150	-.864	1.440

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.610	-2.660	-.949	1.590
2	1.960	-2.210	-.902	1.060
3	1.540	-2.770	-1.110	1.250
4	1.680	-2.220	-.879	1.580
5	1.580	-3.300	-1.530	1.290
6	2.310	-2.360	-.840	1.290
7	2.780	-2.260	-.776	1.350
8	2.600	-2.480	-1.090	1.140
9	2.270	-2.420	-.983	1.130
10	1.940	-2.190	-.611	1.780
11	2.740	-2.830	-1.210	1.140

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.631	-2.334	-.646	1.860
2	1.986	-1.890	-.599	1.337
3	1.560	-2.443	-.805	1.525
4	1.702	-1.900	-.577	1.850
5	1.601	-2.966	-1.219	1.564
6	2.340	-2.038	-.538	1.564
7	2.817	-1.940	-.475	1.623
8	2.634	-2.157	-.785	1.416
9	2.300	-2.098	-.679	1.406
10	1.966	-1.871	-.312	2.048
11	2.776	-2.502	-.903	1.416

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = .987, B = .291

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.046	.031	.046	.031	.004	.002	.003	1257.65	.0000
2	.001	.015	.011	.009	.002	.001	.000	387.00	.4475
3	-.004	.043	.038	.019	.010	.010	.002	387.73	.4372
4	.011	.037	.030	.024	.008	.007	.002	415.65	.1280
5	-.049	.030	.050	.027	.004	.007	.003	1404.01	.0000
6	.003	.076	.056	.051	-.009	-.009	.006	385.55	.4682
7	.039	.054	.050	.044	.011	.009	.004	582.76	.0000
8	-.034	.046	.048	.030	.011	.013	.003	591.94	.0000
9	-.045	.160	.134	.099	.031	.033	.028	415.44	.1295
10	.020	.116	.089	.077	-.014	-.015	.014	396.08	.3244
11	-.040	.051	.047	.044	.007	.009	.004	624.99	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	30.633	30.685	-.05136	.00613	.22900
VARIANCE	32.284	30.608	.06483	.00014	.01502
STD. DEV.	5.682	5.532	.25461	.01189	.12257

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99933

DIFFERENTIAL TEST FUNCTIONING (DTF): .06746
SQURE-ROOT OF DTF: .25974
SD OF D**2: .05403

CHI-SQUARE VALUE: 400.66
PROB: .2687
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.06746	400.66	.269	-.05136	.22900

Building/Mending Relationships, Direct Reports (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.270	-2.270	-.445	2.020
2	1.680	-1.640	-.471	1.310
3	1.390	-1.660	-.210	1.450
4	1.640	-1.910	-.432	1.510
5	1.530	-2.390	-.666	1.320
6	2.150	-2.140	-.353	1.690
7	2.920	-1.550	-.325	1.280
8	2.290	-1.900	-.467	1.110
9	2.680	-1.440	-.476	1.100
10	1.440	-1.980	-.396	1.850
11	2.140	-2.150	-.714	1.370

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.660	-1.880	-.411	1.670
2	2.120	-1.550	-.422	1.070
3	1.980	-1.410	-.479	1.390
4	2.460	-1.510	-.403	1.420
5	2.170	-1.900	-.966	1.250
6	2.100	-2.180	-.490	1.440
7	2.460	-1.870	-.418	1.410
8	2.810	-1.680	-.504	1.300
9	2.970	-1.650	-.467	1.280
10	1.850	-1.680	-.328	1.730
11	2.830	-1.760	-.682	1.290

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.505	-2.051	-.430	1.865
2	1.922	-1.687	-.442	1.203
3	1.795	-1.532	-.505	1.556
4	2.230	-1.643	-.422	1.589
5	1.967	-2.073	-1.042	1.402
6	1.904	-2.382	-.517	1.611
7	2.230	-2.040	-.438	1.578
8	2.548	-1.830	-.533	1.457
9	2.693	-1.797	-.492	1.435
10	1.677	-1.830	-.339	1.931
11	2.566	-1.918	-.729	1.446

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.103, B = .023

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.006	.042	.034	.026	-.005	-.004	.002	324.77	.3848
2	-.027	.025	.030	.021	-.005	-.002	.001	711.52	.0000
3	-.060	.052	.072	.032	.010	.016	.006	734.20	.0000
4	.027	.053	.038	.046	.002	-.001	.004	398.22	.0015
5	-.067	.069	.078	.056	.020	.028	.009	615.59	.0000
6	-.070	.028	.070	.028	.004	.012	.006	2276.29	.0000
7	-.022	.132	.104	.084	.025	.028	.018	328.05	.3370
8	.047	.073	.062	.061	.023	.018	.008	448.24	.0000
9	.019	.116	.093	.072	.026	.024	.014	327.26	.3483
10	.032	.022	.032	.022	-.000	-.004	.001	982.48	.0000
11	.015	.042	.032	.031	.009	.007	.002	361.06	.0482

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	30.009	30.121	-.11217	.01120	.31463
VARIANCE	35.499	33.714	.11061	.00014	.02420
STD. DEV.	5.958	5.806	.33257	.01204	.15556

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99873

DIFFERENTIAL TEST FUNCTIONING (DTF): .12319
SQURE-ROOT OF DTF: .35098
SD OF D**2: .08790

CHI-SQUARE VALUE: 355.29
PROB: .0734
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.12319	355.29	.073	-.11217	.31463

Compassion/Sensitivity, Self (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.430	-2.360	-.315	1.630
2	2.010	-3.070	-1.030	1.310
3	1.940	-2.140	-.209	1.660
4	1.980	-3.100	-2.040	1.030

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.960	-1.880	-.567	1.340
2	1.580	-2.930	-1.270	1.180
3	1.450	-3.140	-.684	2.190
4	1.620	-3.490	-2.480	1.300

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.139	-1.677	-.439	1.360
2	1.676	-2.667	-1.102	1.209
3	1.538	-2.865	-.549	2.161
4	1.718	-3.195	-2.243	1.322

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = .943, B = .096

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.062	.122	.121	.065	.001	.008	.019	105.33	.0496
2	-.017	.021	.020	.018	-.000	.002	.001	137.69	.0002
3	-.078	.115	.119	.073	.006	.015	.019	122.50	.0031
4	.040	.040	.042	.038	.002	-.003	.003	166.76	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.398	11.515	-.11663	.00558	.13183
VARIANCE	1.952	1.860	.00872	.00004	.00495
STD. DEV.	1.397	1.364	.09340	.00655	.07032

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99801

DIFFERENTIAL TEST FUNCTIONING (DTF): .02233
SQURE-ROOT OF DTF: .14942
SD OF D**2: .01893

CHI-SQUARE VALUE: 214.97
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.02233	214.97	.000	-.11663	.13183

Compassion/Sensitivity, Superiors (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	2.350	-2.680	-.613	1.380
2	2.060	-3.220	-1.450	1.140
3	2.050	-2.730	-.704	2.010
4	5.760	-2.010	-1.500	.867

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.710	-2.150	-.522	1.600
2	2.160	-2.580	-1.090	1.010
3	.982	-3.760	-1.390	2.860
4	2.360	-2.890	-1.890	1.370

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.119	-1.972	-.558	1.286
2	2.486	-2.346	-1.051	.774
3	1.130	-3.371	-1.312	2.381
4	2.716	-2.615	-1.746	1.087

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .869, B = -.104

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.029	.103	.064	.085	.004	.003	.011	105.77	.2549
2	.003	.171	.140	.098	.009	.008	.029	98.03	.4515
3	-.077	.097	.086	.090	-.007	-.004	.015	159.77	.0001
4	.011	.178	.118	.134	.006	.006	.032	98.37	.4421

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.721	11.755	-.03427	.00338	.09746
VARIANCE	2.910	3.015	.01235	.00002	.00402
STD. DEV.	1.706	1.736	.11111	.00459	.06342

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99809

DIFFERENTIAL TEST FUNCTIONING (DTF): .01352
SQURE-ROOT OF DTF: .11628
SD OF D**2: .01159

CHI-SQUARE VALUE: 107.33
PROB: .2224
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.01352	107.33	.222	-.03427	.09746

Compassion/Sensitivity, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	2.360	-1.720	-.273	1.410
2	1.770	-2.400	-.666	1.270
3	2.760	-1.660	.048	1.730
4	2.210	-2.430	-.935	1.310

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.690	-1.670	-.477	1.180
2	2.600	-2.130	-.719	1.100
3	2.260	-1.800	-.448	1.650
4	2.360	-2.430	-1.200	1.110

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.414	-1.623	-.334	1.458
2	2.405	-2.121	-.595	1.371
3	2.091	-1.764	-.302	1.966
4	2.183	-2.445	-1.115	1.382

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.081, B = .182

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.011	.055	.048	.030	.006	.007	.003	399.39	.2836
2	.044	.037	.047	.034	.002	-.002	.003	933.34	.0000
3	-.100	.086	.117	.061	.012	.021	.017	896.27	.0000
4	-.027	.043	.040	.031	.004	.006	.003	531.77	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.864	10.956	-.09279	.00819	.15904
VARIANCE	3.888	3.705	.02417	.00007	.00748
STD. DEV.	1.972	1.925	.15546	.00812	.08651

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99709

DIFFERENTIAL TEST FUNCTIONING (DTF): .03278
SQURE-ROOT OF DTF: .18105
SD OF D**2: .03017

CHI-SQUARE VALUE: 522.14
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.03278	522.14	.000	-.09279	.15904

Compassion/Sensitivity, Direct Reports (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.910	-1.500	-.267	1.320
2	1.650	-2.090	-.560	1.140
3	1.770	-.996	.039	2.090
4	1.990	-2.120	-.954	1.050

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.390	-1.520	-.402	1.190
2	2.180	-1.640	-.501	1.030
3	2.030	-1.240	.051	1.890
4	2.140	-1.890	-1.150	1.020

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.167	-1.610	-.376	1.380
2	1.976	-1.742	-.486	1.203
3	1.840	-1.301	.123	2.152
4	1.940	-2.018	-1.201	1.192

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.103, B = .067

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.046	.031	.048	.028	.003	.004	.003	1002.38	.0000
2	.058	.048	.060	.045	-.002	-.004	.006	778.50	.0000
3	-.032	.046	.043	.037	.004	.005	.003	475.30	.0000
4	-.015	.053	.048	.027	.005	.005	.003	343.06	.1599

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.662	10.697	-.03456	.00252	.08932
VARIANCE	4.177	3.930	.00890	.00002	.00212
STD. DEV.	2.044	1.982	.09433	.00392	.04599

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99935

DIFFERENTIAL TEST FUNCTIONING (DTF): .01009
SQURE-ROOT OF DTF: .10046
SD OF D**2: .00783

CHI-SQUARE VALUE: 361.80
PROB: .0456
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.01009	361.80	.046	-.03456	.08932

Straightforwardness & Composure, Self (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.090	-2.950	-.551	2.570
2	1.930	-2.250	-1.240	.179
3	1.950	-2.130	-1.340	-.100
4	1.210	-2.930	-1.110	.806
5	.554	-4.310	-.544	4.260
6	2.070	-2.980	-2.040	-.187

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.340	-2.310	-.713	1.550
2	1.070	-3.220	-1.740	.341
3	1.920	-2.290	-1.480	.013
4	1.210	-3.590	-1.150	.607
5	.756	-2.800	-.765	2.610
6	3.480	-2.550	-2.060	-.313

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.254	-2.273	-.566	1.853
2	1.001	-3.246	-1.664	.561
3	1.796	-2.252	-1.386	.210
4	1.132	-3.642	-1.033	.845
5	.707	-2.797	-.622	2.986
6	3.255	-2.530	-2.006	-.139

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = 1.069, B = .196

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.031	.082	.072	.050	-.003	-.008	.008	96.23	.1519
2	.101	.176	.173	.107	.010	.025	.041	111.75	.0194
3	.097	.053	.102	.043	.005	.020	.012	367.43	.0000
4	.004	.029	.022	.019	.002	.003	.001	86.01	.3889
5	-.009	.074	.063	.040	-.003	-.004	.006	85.27	.4105
6	-.013	.062	.057	.027	.001	-.001	.004	87.86	.3366

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	18.260	18.110	.14925	.00575	.17412
VARIANCE	4.927	4.758	.01221	.00015	.00417
STD. DEV.	2.220	2.181	.11048	.01212	.06455

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99888

DIFFERENTIAL TEST FUNCTIONING (DTF): .03448
SQURE-ROOT OF DTF: .18570
SD OF D**2: .01952

CHI-SQUARE VALUE: 237.29
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.03448	237.29	.000	.14925	.17412

Straightforwardness & Composure, Superiors (Run 2 [Run 1 used 1.156 .320])

FOCAL GROUP ITEM PARAMETERS

1	.800	-3.670	-1.310	1.480
2	1.200	-2.880	-1.890	.160
3	1.200	-3.690	-2.320	-.413
4	2.620	-2.360	-1.020	.110
5	.964	-2.720	-.849	2.170
6	7.760	-2.180	-1.530	-.447

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.690	-2.080	-1.110	.396
2	1.900	-2.110	-1.460	-.049
3	2.160	-2.540	-1.720	-.823
4	1.070	-2.970	-1.990	.256
5	.946	-2.620	-1.400	1.470
6	1.860	-3.200	-2.350	-.624

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.057	-2.750	-1.199	1.209
2	1.188	-2.798	-1.759	.497
3	1.351	-3.485	-2.174	-.740
4	.669	-4.173	-2.606	.985
5	.592	-3.613	-1.663	2.927
6	1.163	-4.541	-3.182	-.422

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = 1.599, B = .576

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.009	.072	.059	.042	-.045	-.047	.005	99.39	.4138
2	.104	.012	.104	.012	.003	.017	.011	7683.49	.0000
3	-.094	.030	.095	.027	-.009	-.022	.010	1080.45	.0000
4	.130	.349	.326	.181	.226	.244	.139	111.46	.1497
5	-.051	.096	.087	.065	.059	.053	.012	125.61	.0269
6	.055	.338	.288	.186	.213	.221	.118	100.61	.3806

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	19.170	19.035	.13530	.07763	.61396
VARIANCE	5.564	2.952	.44749	.01294	.08885
STD. DEV.	2.359	1.718	.66895	.11376	.29808

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99548

DIFFERENTIAL TEST FUNCTIONING (DTF): .46580
SQURE-ROOT OF DTF: .68250
SD OF D**2: .64236

CHI-SQUARE VALUE: 102.01
PROB: .3441
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.46580	102.01	.344	.13530	.61396

Straightforwardness & Composure, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	.932	-2.860	-.853	1.680
2	1.490	-2.230	-1.110	.298
3	2.480	-2.040	-1.360	-.298
4	1.740	-2.110	-1.070	.234
5	1.270	-1.690	-.101	1.820
6	2.530	-2.060	-1.390	-.292

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.440	-2.220	-.810	1.070
2	2.210	-2.000	-.976	.193
3	2.100	-2.360	-1.550	-.353
4	1.630	-2.280	-1.160	.274
5	1.120	-2.080	-.498	1.460
6	2.870	-1.910	-1.400	-.342

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.317	-2.259	-.718	1.337
2	2.022	-2.019	-.900	.378
3	1.921	-2.412	-1.527	-.219
4	1.491	-2.325	-1.101	.466
5	1.025	-2.106	-.377	1.763
6	2.626	-1.921	-1.363	-.207

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.093, B = .167

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.010	.091	.075	.052	.002	.001	.008	389.44	.4131
2	.038	.078	.072	.049	.002	.003	.008	474.87	.0011
3	.027	.087	.074	.053	.003	.004	.008	421.25	.0923
4	.069	.061	.084	.040	.001	.004	.009	876.70	.0000
5	-.116	.055	.116	.055	-.002	-.007	.016	2090.51	.0000
6	.038	.027	.038	.027	.001	.002	.002	1180.86	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	18.439	18.393	.04665	.00136	.08055
VARIANCE	8.128	8.196	.00599	.00002	.00168
STD. DEV.	2.851	2.863	.07742	.00388	.04100

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99964

DIFFERENTIAL TEST FUNCTIONING (DTF): .00817
SQURE-ROOT OF DTF: .09039
SD OF D**2: .00622

CHI-SQUARE VALUE: 524.81
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00817	524.81	.000	.04665	.08055

Straightforwardness & Composure, Direct Reports (Run 2 [Run 1 used 1.341 .246])

FOCAL GROUP ITEM PARAMETERS

1	.711	-2.930	-.624	2.000
2	.863	-3.550	-1.600	.702
3	1.560	-2.210	-1.410	-.103
4	1.560	-2.180	-1.290	-.019
5	.755	-2.860	-1.050	1.540
6	26.200	-1.590	-1.490	-.501

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.020	-2.380	-.684	1.390
2	1.640	-2.270	-1.050	.136
3	2.120	-1.800	-1.340	-.433
4	2.020	-1.660	-1.080	.110
5	1.140	-2.460	-.987	.973
6	3.310	-1.800	-1.390	-.486

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	.707	-3.153	-.706	2.287
2	1.137	-2.995	-1.234	.477
3	1.469	-2.316	-1.653	-.344
4	1.400	-2.114	-1.277	.440
5	.790	-3.269	-1.143	1.685
6	2.294	-2.316	-1.725	-.420

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.443, B = .281

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.000	.018	.015	.010	.003	.003	.000	319.03	.4731
2	-.012	.081	.068	.045	-.016	-.016	.007	325.75	.3702
3	-.100	.044	.100	.044	.005	-.002	.012	1933.76	.0000
4	.161	.044	.161	.044	.012	.024	.028	4520.77	.0000
5	-.030	.018	.030	.018	.003	.001	.001	1233.02	.0000
6	.058	.334	.258	.221	.119	.123	.115	328.73	.3274

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	18.556	18.478	.07765	.02209	.28898
VARIANCE	6.184	5.147	.12651	.00219	.04903
STD. DEV.	2.487	2.269	.35568	.04676	.22143

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99299

DIFFERENTIAL TEST FUNCTIONING (DTF): .13254
SQURE-ROOT OF DTF: .36406
SD OF D**2: .26343

CHI-SQUARE VALUE: 334.21
PROB: .2552
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.13254	334.21	.255	.07765	.28898

Work-Life Balance, Self (Run 2 [Run 1 used .885 .246])

FOCAL GROUP ITEM PARAMETERS

1	2.030	-1.560	-.388	1.120
2	3.040	-1.300	-.116	1.040
3	5.150	-.970	-.159	1.090
4	1.790	-2.790	-.966	.647

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.400	-2.370	-1.040	1.240
2	4.890	-1.620	-.568	.818
3	2.190	-1.820	-.656	1.460
4	3.640	-2.330	-.947	.452

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.388	-2.112	-.770	1.530
2	4.846	-1.356	-.294	1.104
3	2.170	-1.557	-.383	1.752
4	3.608	-2.072	-.677	.735

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = 1.009, B = .279

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.074	.171	.154	.105	.063	.072	.035	99.52	.1044
2	-.062	.086	.092	.053	.009	.016	.011	127.52	.0012
3	-.075	.310	.264	.179	.114	.123	.102	88.98	.3067
4	.097	.120	.134	.077	-.041	-.052	.024	138.92	.0001

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.770	10.885	-.11438	.03977	.36249
VARIANCE	6.640	4.916	.14598	.00424	.02766
STD. DEV.	2.577	2.217	.38207	.06510	.16633

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99854

DIFFERENTIAL TEST FUNCTIONING (DTF): .15906
SQURE-ROOT OF DTF: .39883
SD OF D**2: .12053

CHI-SQUARE VALUE: 91.53
PROB: .2445
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.15906	91.53	.245	-.11438	.36249

Work-Life Balance, Superiors (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.050	-3.460	-1.790	1.490
2	2.400	-1.960	-.504	1.120
3	2.010	-2.260	-.665	1.580
4	2.450	-2.870	-1.600	.746

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.010	-2.920	-1.370	1.540
2	1.920	-2.250	-1.380	.561
3	2.990	-2.050	-1.050	1.290
4	2.250	-3.060	-2.060	.175

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	.938	-2.831	-1.161	1.973
2	1.783	-2.109	-1.172	.918
3	2.776	-1.894	-.817	1.703
4	2.089	-2.982	-1.905	.502

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = 1.077, B = .314

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.203	.030	.203	.030	-.001	-.029	.042	4714.03	.0000
2	-.204	.087	.205	.085	.010	.037	.049	638.64	.0000
3	-.030	.083	.079	.041	.010	.014	.008	111.09	.1553
4	-.104	.038	.104	.038	.002	.016	.012	832.48	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.769	11.904	-.13472	.00969	.18494
VARIANCE	2.354	2.153	.02059	.00057	.00454
STD. DEV.	1.534	1.467	.14351	.02396	.06739

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99643

DIFFERENTIAL TEST FUNCTIONING (DTF): .03874
SQURE-ROOT OF DTF: .19683
SD OF D**2: .02076

CHI-SQUARE VALUE: 184.36
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.03874	184.36	.000	-.13472	.18494

Work-Life Balance, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.700	-2.050	-.756	1.010
2	2.380	-1.920	-.699	.743
3	2.210	-1.750	-.536	1.080
4	2.410	-2.540	-1.080	.334

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.770	-2.220	-.895	.849
2	2.500	-1.930	-.649	.598
3	2.400	-1.760	-.540	1.090
4	2.120	-2.360	-1.400	.140

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.727	-2.178	-.820	.967
2	2.439	-1.881	-.568	.710
3	2.341	-1.707	-.456	1.214
4	2.068	-2.322	-1.338	.241

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.025, B = .097

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.038	.012	.038	.012	.000	.000	.002	4334.29	.0000
2	.031	.035	.039	.026	-.001	-.001	.002	689.87	.0000
3	.056	.011	.056	.011	.000	-.000	.003	11088.30	.0000
4	-.055	.045	.060	.038	.001	.002	.005	969.36	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.703	11.709	-.00638	.00023	.02618
VARIANCE	5.012	4.927	.00089	.00000	.00025
STD. DEV.	2.239	2.220	.02986	.00093	.01571

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99993

DIFFERENTIAL TEST FUNCTIONING (DTF): .00093
SQURE-ROOT OF DTF: .03053
SD OF D**2: .00107

CHI-SQUARE VALUE: 402.55
PROB: .2473
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00093	402.55	.247	-.00638	.02618

Work-Life Balance, Direct Reports (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.360	-2.020	-.593	1.280
2	2.750	-1.530	-.469	.676
3	2.120	-1.490	-.375	1.370
4	1.850	-2.160	-1.190	.156

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.050	-2.640	-.862	1.560
2	2.860	-1.720	-.704	.622
3	2.090	-1.840	-.545	1.130
4	2.700	-2.560	-1.320	-.039

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.125	-2.293	-.634	1.625
2	3.065	-1.435	-.487	.750
3	2.240	-1.547	-.338	1.224
4	2.894	-2.218	-1.062	.134

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = .933, B = .170

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.035	.069	.065	.042	-.001	-.002	.006	400.47	.0011
2	.023	.021	.024	.020	.000	-.000	.001	698.40	.0000
3	-.026	.027	.026	.027	.000	.001	.001	615.39	.0000
4	-.046	.062	.063	.044	.001	.002	.006	490.88	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.460	11.474	-.01370	.00018	.02011
VARIANCE	4.991	5.073	.00052	.00000	.00031
STD. DEV.	2.234	2.252	.02288	.00137	.01752

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: 1.00002

DIFFERENTIAL TEST FUNCTIONING (DTF): .00071
SQURE-ROOT OF DTF: .02667
SD OF D**2: .00086

CHI-SQUARE VALUE: 433.29
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00071	433.29	.000	-.01370	.02011

Self-awareness, Self (Run 2 [Run 1 used .941 .214])

FOCAL GROUP ITEM PARAMETERS

1	2.700	-2.640	-.736	1.220
2	2.750	-2.630	-.657	1.780
3	1.100	-2.060	.505	2.770
4	1.390	-3.770	-.786	1.530

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.520	-3.560	-1.270	1.350
2	19.400	-2.360	-.538	1.480
3	.896	-4.450	-.317	2.510
4	1.570	-2.910	-.915	1.560

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.629	-3.254	-1.118	1.327
2	20.793	-2.135	-.435	1.448
3	.960	-4.085	-.229	2.409
4	1.683	-2.648	-.787	1.522

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = .933, B = .067

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.070	.094	.097	.066	-.004	.016	.014	131.18	.0006
2	.074	.261	.217	.163	.050	.029	.074	90.81	.2613
3	-.308	.060	.308	.060	-.001	.086	.098	2318.58	.0000
4	.019	.044	.025	.041	.001	-.004	.002	100.21	.0960

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.829	11.113	-.28430	.03154	.29374
VARIANCE	2.157	2.302	.04534	.00113	.03989
STD. DEV.	1.469	1.517	.21294	.03355	.19972

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99038

DIFFERENTIAL TEST FUNCTIONING (DTF): .12617
SQURE-ROOT OF DTF: .35520
SD OF D**2: .12338

CHI-SQUARE VALUE: 233.74
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.12617	233.74	.000	-.28430	.29374
2	3	.05218	84.88	.422	.02322	.19334

Self-awareness, Superiors (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	2.300	-2.320	-.805	1.160
2	2.420	-2.440	-.648	1.800
3	1.550	-1.950	.047	1.870
4	3.170	-1.870	-.687	1.420

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.680	-3.240	-.901	1.630
2	1.770	-2.620	-1.010	1.730
3	1.650	-2.200	-.055	2.130
4	3.420	-1.660	-.635	1.470

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.881	-2.882	-.794	1.467
2	1.982	-2.329	-.891	1.556
3	1.848	-1.954	-.038	1.913
4	3.830	-1.471	-.556	1.324

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .893, B = .011

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.040	.086	.079	.053	-.003	-.003	.009	119.32	.0617
2	-.075	.036	.076	.033	.001	.000	.007	531.23	.0000
3	-.021	.015	.023	.011	.000	.000	.001	294.02	.0000
4	.060	.109	.076	.099	.006	.006	.016	127.62	.0202

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.892	10.887	.00438	.00083	.03626
VARIANCE	3.554	3.702	.00329	.00001	.00199
STD. DEV.	1.885	1.924	.05734	.00318	.04463

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99975

DIFFERENTIAL TEST FUNCTIONING (DTF): .00331
SQURE-ROOT OF DTF: .05750
SD OF D**2: .00900

CHI-SQUARE VALUE: 98.57
PROB: .4364
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00331	98.57	.436	.00438	.03626

Self-awareness, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	2.170	-2.030	-.593	1.240
2	2.420	-1.960	-.447	1.430
3	1.650	-1.340	.089	2.350
4	2.680	-1.820	-.408	1.670

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.620	-2.040	-.569	1.280
2	2.860	-2.090	-.799	1.310
3	1.730	-1.980	-.148	1.850
4	2.420	-2.210	-.820	1.380

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.628	-1.788	-.321	1.522
2	2.869	-1.838	-.551	1.552
3	1.735	-1.728	.098	2.090
4	2.427	-1.957	-.572	1.622

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = .997, B = .246

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.147	.030	.147	.030	-.000	-.001	.022	9538.47	.0000
2	-.011	.053	.046	.030	.003	.003	.003	401.36	.2607
3	-.074	.034	.074	.034	.001	.001	.007	2265.93	.0000
4	-.065	.033	.065	.033	.002	.002	.005	1853.77	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.534	10.536	-.00286	.00148	.06842
VARIANCE	3.931	3.769	.00590	.00000	.00123
STD. DEV.	1.983	1.941	.07683	.00145	.03508

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99941

DIFFERENTIAL TEST FUNCTIONING (DTF): .00591
SQURE-ROOT OF DTF: .07689
SD OF D**2: .00595

CHI-SQUARE VALUE: 385.53
PROB: .4684
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00591	385.53	.468	-.00286	.06842

Self-awareness, Direct Reports (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	2.230	-1.830	-.465	1.260
2	2.030	-1.830	-.431	1.730
3	1.160	-1.050	.331	2.590
4	2.210	-1.680	-.057	1.720

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.640	-1.320	-.505	.903
2	2.540	-1.600	-.428	1.330
3	1.370	-1.260	-.043	1.730
4	2.470	-1.430	-.167	1.400

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.887	-1.499	-.471	1.305
2	2.014	-1.852	-.374	1.843
3	1.086	-1.423	.112	2.348
4	1.959	-1.637	-.045	1.931

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.261, B = .166

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.038	.070	.051	.061	.003	.002	.006	410.86	.0003
2	.028	.012	.028	.011	-.000	-.001	.001	1920.82	.0000
3	-.136	.020	.136	.020	.001	.006	.019	14677.64	.0000
4	.033	.025	.034	.024	.001	-.001	.002	905.70	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.133	10.170	-.03731	.00136	.06359
VARIANCE	3.682	3.692	.00405	.00001	.00140
STD. DEV.	1.919	1.922	.06367	.00269	.03745

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99946

DIFFERENTIAL TEST FUNCTIONING (DTF): .00545
SQURE-ROOT OF DTF: .07380
SD OF D**2: .00512

CHI-SQUARE VALUE: 428.55
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00545	428.55	.000	-.03731	.06359

Putting People at Ease, Self (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	4.980	-1.700	.042	1.580
2	1.020	-2.950	-.614	2.310
3	2.410	-1.980	-.658	1.630
4	3.670	-1.680	-.166	1.840

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.190	-2.330	-.401	1.510
2	1.480	-2.990	-.759	1.630
3	3.500	-2.850	-.913	.881
4	9.440	-1.620	-.411	1.220

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.092	-2.029	-.009	1.992
2	1.414	-2.720	-.384	2.118
3	3.343	-2.573	-.545	1.333
4	9.016	-1.285	-.019	1.688

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = 1.047, B = .411

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.001	.151	.129	.079	-.003	-.002	.023	84.00	.4485
2	.032	.045	.043	.035	.002	.004	.003	128.66	.0010
3	-.047	.098	.070	.083	.008	.005	.012	103.66	.0621
4	.078	.160	.133	.118	.011	.016	.032	103.91	.0601

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	10.502	10.438	.06408	.00562	.10649
VARIANCE	3.715	3.838	.01837	.00004	.01114
STD. DEV.	1.927	1.959	.13555	.00648	.10555

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99770

DIFFERENTIAL TEST FUNCTIONING (DTF): .02248
SQURE-ROOT OF DTF: .14993
SD OF D**2: .05047

CHI-SQUARE VALUE: 102.77
PROB: .0697
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.02248	102.77	.070	.06408	.10649

Putting People at Ease, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	3.470	-1.980	-.836	.529
2	1.730	-2.910	-1.310	.734
3	3.730	-2.610	-1.400	.191
4	7.200	-1.610	-.622	.497

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.690	-2.080	-.944	.591
2	1.790	-3.060	-1.330	.844
3	3.530	-2.590	-1.440	.346
4	4.750	-1.830	-.829	.625

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.968	-1.960	-.904	.524
2	1.925	-2.872	-1.263	.759
3	3.796	-2.435	-1.365	.296
4	5.108	-1.728	-.797	.555

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = .930, B = -.026

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.025	.026	.030	.020	.003	.003	.001	733.06	.0000
2	.010	.011	.013	.006	.000	-.000	.000	742.02	.0000
3	.049	.031	.049	.031	.002	.002	.003	1359.26	.0000
4	-.043	.108	.087	.077	.013	.013	.013	445.28	.0167

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	12.006	12.015	-.00880	.00454	.10132
VARIANCE	6.708	6.445	.01809	.00003	.00790
STD. DEV.	2.590	2.539	.13449	.00522	.08888

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99884

DIFFERENTIAL TEST FUNCTIONING (DTF): .01817
SQURE-ROOT OF DTF: .13478
SD OF D**2: .02683

CHI-SQUARE VALUE: 386.65
PROB: .4525
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.01817	386.65	.452	-.00880	.10132

Putting People at Ease, Direct Reports (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	3.150	-1.700	-.525	.818
2	2.150	-1.900	-.901	.785
3	2.530	-2.440	-1.100	.486
4	4.650	-1.390	-.462	.737

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	3.450	-1.820	-.843	.407
2	2.550	-2.240	-1.050	.401
3	4.120	-2.120	-1.330	.086
4	4.430	-1.590	-.745	.421

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	3.029	-1.703	-.590	.834
2	2.239	-2.181	-.826	.827
3	3.617	-2.045	-1.145	.468
4	3.889	-1.441	-.479	.850

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.139, B = .370

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.013	.021	.021	.014	.001	.001	.001	445.85	.0000
2	-.000	.039	.027	.029	.001	.001	.002	319.02	.4734
3	-.010	.081	.059	.057	.001	.001	.007	323.74	.4002
4	.024	.058	.052	.035	.003	.003	.004	373.54	.0173

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	11.673	11.672	.00063	.00157	.06893
VARIANCE	7.632	7.417	.00628	.00000	.00153
STD. DEV.	2.763	2.723	.07922	.00096	.03906

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99969

DIFFERENTIAL TEST FUNCTIONING (DTF): .00628
SQURE-ROOT OF DTF: .07922
SD OF D**2: .00724

CHI-SQUARE VALUE: 319.02
PROB: .4733
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.00628	319.02	.473	.00063	.06893

Acting with Flexibility, Self (Run 2 [Run 1 used 1.057 .263])

FOCAL GROUP ITEM PARAMETERS

1	1.470	-3.710	-1.560	1.440
2	1.840	-1.810	.252	2.540
3	1.480	-2.640	-.890	2.010
4	2.070	-2.370	-.092	1.920
5	.968	-5.000	-1.230	3.250

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.160	-4.230	-2.750	1.570
2	10.700	-1.500	.406	2.150
3	2.060	-2.950	-1.250	1.380
4	1.490	-3.120	-.952	2.440
5	2.250	-2.910	-1.030	1.870

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.110	-4.069	-2.523	1.992
2	10.239	-1.216	.775	2.598
3	1.971	-2.732	-.955	1.793
4	1.426	-2.909	-.644	2.901
5	2.153	-2.690	-.725	2.305

NUMBER OF CASES: 84, D = 1.0, CRT = .054, A = 1.045, B = .351

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	-.024	.099	.078	.065	.009	.006	.010	88.93	.3080
2	.299	.213	.308	.200	.043	.085	.134	249.26	.0000
3	-.059	.021	.059	.021	.003	-.005	.004	782.20	.0000
4	-.108	.135	.147	.090	.019	.003	.030	137.64	.0002
5	.034	.130	.093	.097	-.010	-.005	.018	89.86	.2843

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	13.522	13.380	.14216	.01685	.25268
VARIANCE	2.476	2.210	.06406	.00120	.02042
STD. DEV.	1.573	1.486	.25310	.03457	.14291

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .98791

DIFFERENTIAL TEST FUNCTIONING (DTF): .08427
SQURE-ROOT OF DTF: .29029
SD OF D**2: .08043

CHI-SQUARE VALUE: 110.50
PROB: .0235
DEGREES OF FREEDOM CHI-SQAURE: 83

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.08427	110.50	.024	.14216	.25268

Acting with Flexibility, Superiors (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	1.700	-3.380	-1.640	1.080
2	4.690	-1.550	.128	2.140
3	2.980	-2.030	-.724	1.190
4	2.060	-2.430	-.698	1.570
5	2.690	-2.400	-.545	2.220

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	1.500	-3.190	-2.030	1.100
2	1.550	-2.630	-.308	2.570
3	3.160	-1.990	-1.230	1.610
4	1.870	-2.580	-1.430	1.500
5	2.760	-2.250	-.867	1.760

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.630	-2.758	-1.691	1.189
2	1.685	-2.243	-.106	2.541
3	3.435	-1.654	-.955	1.658
4	2.033	-2.197	-1.139	1.557
5	3.000	-1.893	-.621	1.796

NUMBER OF CASES: 98, D = 1.0, CRT = .054, A = .920, B = .177

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.035	.019	.035	.019	.003	.000	.002	442.59	.0000
2	-.058	.169	.144	.106	.033	.037	.032	109.71	.1780
3	.057	.146	.125	.094	.039	.035	.025	113.02	.1273
4	-.083	.064	.084	.062	.018	.024	.011	260.57	.0000
5	-.026	.091	.069	.066	-.001	.001	.009	105.72	.2561

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	14.058	14.132	-.07432	.01934	.25347
VARIANCE	4.991	4.379	.09115	.00026	.03243
STD. DEV.	2.234	2.093	.30192	.01611	.18008

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99238

DIFFERENTIAL TEST FUNCTIONING (DTF): .09668
SQURE-ROOT OF DTF: .31093
SD OF D**2: .11733

CHI-SQUARE VALUE: 103.94
PROB: .2966
DEGREES OF FREEDOM CHI-SQAURE: 97

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.09668	103.94	.297	-.07432	.25347

Acting with Flexibility, Peers (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	2.230	-2.540	-1.170	1.070
2	1.470	-1.780	.265	2.490
3	2.350	-1.870	-.561	1.470
4	2.020	-1.900	-.566	1.510
5	1.970	-2.040	-.399	1.830

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.150	-2.400	-1.310	.807
2	1.890	-1.800	-.041	2.230
3	3.230	-1.980	-.757	1.150
4	2.580	-1.970	-.776	1.250
5	3.130	-2.210	-.625	1.350

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	1.946	-2.404	-1.200	1.140
2	1.710	-1.741	.202	2.712
3	2.923	-1.940	-.588	1.519
4	2.335	-1.929	-.609	1.629
5	2.833	-2.194	-.443	1.740

NUMBER OF CASES: 385, D = 1.0, CRT = .054, A = 1.105, B = .248

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.021	.013	.021	.013	.001	-.000	.001	1410.15	.0000
2	-.003	.022	.017	.014	.001	.001	.000	391.84	.3802
3	-.020	.032	.034	.017	.003	.004	.001	530.03	.0000
4	-.009	.033	.030	.017	.003	.004	.001	414.92	.1333
5	-.051	.033	.052	.030	.002	.006	.004	1312.06	.0000

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	13.466	13.528	-.06163	.00277	.10486
VARIANCE	5.119	4.959	.01007	.00000	.00288
STD. DEV.	2.263	2.227	.10037	.00216	.05365

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99913

DIFFERENTIAL TEST FUNCTIONING (DTF): .01387
SQURE-ROOT OF DTF: .11778
SD OF D**2: .01126

CHI-SQUARE VALUE: 530.16
PROB: .0000
DEGREES OF FREEDOM CHI-SQAURE: 384

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.01387	530.16	.000	-.06163	.10486

Acting with Flexibility, Direct Reports (Run 1)

FOCAL GROUP ITEM PARAMETERS

1	2.920	-1.990	-.755	.766
2	1.430	-1.630	.417	2.330
3	2.690	-1.680	-.420	1.040
4	1.600	-2.020	-.598	1.540
5	1.550	-2.200	-.534	1.820

REFERENCE GROUP (UNEQUATED) ITEM PARAMETERS

1	2.600	-2.060	-.907	.711
2	1.740	-1.570	.097	1.920
3	2.930	-1.530	-.674	.951
4	1.890	-1.890	-.604	1.390
5	2.400	-1.800	-.629	1.380

REFERENCE GROUP (EQUATED) ITEM PARAMETERS

1	2.305	-2.190	-.889	.936
2	1.543	-1.637	.243	2.300
3	2.598	-1.592	-.626	1.207
4	1.676	-1.998	-.547	1.702
5	2.128	-1.896	-.576	1.691

NUMBER OF CASES: 319, D = 1.0, CRT = .054, A = 1.128, B = .134

ITEM	M-d	SD-d	M-ldl	SD-ldl	C(d,D)	C-DIF	NC-DIF	CHI	PROB
1	.004	.079	.064	.047	.006	.006	.006	319.92	.4593
2	-.048	.020	.049	.018	-.000	.002	.003	2264.98	.0000
3	-.023	.070	.065	.036	.009	.010	.005	352.92	.0864
4	.035	.012	.035	.012	.001	-.000	.001	2974.66	.0000
5	-.021	.059	.052	.034	.001	.002	.004	358.22	.0596

	TRUE-F	TRUE-R	D	C-DIF	lDl
MEAN	13.354	13.407	-.05290	.00402	.12767
VARIANCE	6.180	5.888	.01732	.00001	.00382
STD. DEV.	2.486	2.426	.13162	.00371	.06184

CORRELATION BETWEEN FOCAL AND REFERENCE TRUE SCORES: .99886

DIFFERENTIAL TEST FUNCTIONING (DTF): .02012
SQURE-ROOT OF DTF: .14186
SD OF D**2: .01456

CHI-SQUARE VALUE: 370.53
PROB: .0225
DEGREES OF FREEDOM CHI-SQAURE: 318

ITEM DELETION PROCEDURE: A

RUN	ITEM REMOVED	DTF	CHI-SQUARE	PROB	MEAN D	MEAN lDl
1	NONE	.02012	370.53	.023	-.05290	.12767

Curriculum Vita
Stephen Bartholomew Craig
E-mail: sbcraig@vt.edu

Education

Doctor of Philosophy in Psychology, May 2002
Concentration: Industrial-Organizational Psychology
Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, Virginia
Dissertation: Implicit Theories and Beta Change in Longitudinal Evaluation of Training Effectiveness: An Investigation Using Item Response Theory
Advisor: Robert J. Harvey

Master of Science in Psychology, October 1995
Concentration: Industrial/Organizational Psychology
Virginia Polytechnic Institute and State University (Virginia Tech)
Blacksburg, Virginia

Bachelor of Arts in Psychology, August 1992
University of North Carolina at Greensboro
Graduated *Summa Cum Laude* (3.95 grade average)

Research Interests and Capabilities

- Statistical data analysis in general (software experience includes *SAS, SPSS*)
- Psychological measurement, including classical test theory, item response theory, covariance structure modeling, differential item functioning, electronic test administration, computer adaptive testing (software experience includes *MULTILOG, BILOG, DFITP4, EQUATE*)
- Research and analysis methodologies related to multivariate patterns (software experience includes *SLEIPNER*)
- Leadership effectiveness/development, including multirater (360°) performance appraisal and feedback systems, especially, ethical integrity in leadership
- Evaluation of training, development, and educational activities; research on methods for conducting such evaluations
- Web site development using HTML, including application of technology to research and instruction (software experience includes *Microsoft Front Page*, *AOL Press*)
- 80x86-based personal computers, including hardware assembly/upgrading, operating system installation/configuration (software experience includes Windows 3.x/95/98/NT/2000, IBM OS/2, DOS

Teaching Interests

- Undergraduate courses in industrial/organizational psychology, psychometrics, personality, social psychology, and introductory psychology

- Graduate courses in psychometrics (esp. item response theory), leadership, personnel assessment and selection**,** training**,** and research methods

Honors and Affiliations

- American Psychological Association (APA)
- Society for Industrial/Organizational Psychology (APA Division 14)
- Evaluation, Measurement, and Statistics (APA Division 5)
- Phi Kappa Phi National Honor Society
- Psi Chi National Honor Society
- Phi Beta Kappa Sophomore Book Award
- Reviewer for *Inquiry*, journal of the University of NC Honors Program
- University Marshall, University of NC at Greensboro

Selected Research Experience

Dissertation Research, Robert J. Harvey, Ph.D. (Chair), Virginia Tech
Applied item response theory (IRT) to the measurement of change following development interventions. Using longitudinal, multisource performance assessment data from a leadership development program, developed new method for distinguishing among alpha, beta, and gamma change within an IRT framework. Developed and tested theory relating beta change in measurement instruments to changes in participants' implicit theories induced by exposure to the intervention. (completed April, 2002)

Preliminary Doctoral Examination Research Project, Virginia Tech
Designed and implemented a study to examine the relation between commercial integrity test scores and the dimensions of the Five Factor Model of personality. This study was the first to utilize pattern-oriented analyses to explore nonlinear relations among these variables. Results included the findings that a small number of Big Five profiles, perhaps four or five, is sufficient to classify most people, and that the high-integrity profile hypothesized by previous correlation-based research is virtually nonexistent in the populations sampled. (completed March, 1999)

Thesis Research, Sigrid B. Gustafson, Ph.D. (Chair), Virginia Tech
Designed and implemented a study to examine the relation subordinate perceptions of leader ethical integrity to leadership effectiveness outcomes such as job satisfaction and desire to turnover. Developed the *Perceived Leader Integrity Scale* using both classical psychometric techniques and techniques based on item response theory. (completed October, 1995).

Internship, Ruth Arnegard, Ph.D. (Director), American Telephone and Telegraph (AT&T) Human Resources Information Systems Organization Human Performance Laboratory, Greensboro, NC
Collected, analyzed, and interpreted data related to the role of computer software interface design in human-computer interactions. Co-authored two proprietary software usability reports. (May, 1992 - September, 1992).

Professional History

Assistant Professor, Department of Psychology, NC State University, Raleigh, NC
Responsible for establishment of an independent program of research in industrial-organizational psychology involving NCSU students, faculty, and external collaborators**.** Responsible for teaching graduate and undergraduate courses in psychology and mentoring students. (August, 2002 to present).

Research Scientist, Kaplan DeVries Inc., Greensboro, NC
Conducted research on the measurement and development of leadership effectiveness, primarily at the senior executive level. Applied advanced techniques such as item response theory and structural equations modeling to the development of new multisource (360°) leadership assessment instruments. Collaborated with clients and research partners on a variety of research projects related to organizational leadership. Served as consultant ("coach") to executives in ongoing developmental relationships. Responsible for development and maintenance of corporate web site, including creation of web-based assessment tools for research and client service. (April, 2000 to July, 2002)

Research Intern, Center for Creative Leadership, Greensboro, NC
Conducted research to evaluate the impact of leadership development programs: applied item response theory to the measurement of change through multirater (360 degree) feedback instruments, assisted with the development of new tools and procedures for leadership development program evaluation (including development of an HTML interface for such tools), conducted data analysis and interpretation for client-specific program evaluations. Creator and moderator of the intranet discussion group forum on ethics and integrity in leadership. Served on the Center's Task Force on Alternative Delivery Systems (August, 1997 to April, 2000).

Psychometric Consultant, Joseph Arceri, M.A. (President), Praxis Consulting Group, Framingham, MA
Provided psychometric and statistical expertise to a management development consulting firm related to the development of new ethical sensitivity instrument. Responsible for making recommendations to developers for improvement of the new scale's psychometric properties. Specific activities included input, analysis, and interpretation of psychometric data. (February, 1994 to 1998).

Evaluation / Organization Development Consultant, Vector Research, Inc., Ann Arbor, MI
Along with other members of a four-person team from Virginia Tech, responsible for design and implementation of research to evaluate the effectiveness of telemedicine technology in military settings. Evaluation results were used to devise organization development interventions with the goal of maximizing the positive impact of this new technology on health care quality and cost. Specific activities included data collection/analysis/interpretation, including the design and implementation of electronic data collection methods, library research, setup and maintenance of microcomputers. (June, 1996 to June, 1997)

Graduate Teaching Assistant (multiple positions held; see below)
Virginia Tech Department of Psychology, Blacksburg, VA

Director, Undergraduate Information Center
Responsible for all daily operations of Psychology Department's undergraduate advising office, including providing academic and career counseling to undergraduate psychology majors, desktop publishing of informational materials, planning and conducting commencement ceremonies, planning and conducting Freshman Summer Orientation, representing the Psychology Department at the Virginia Tech Expo recruiting conference, and providing computer technical support to Psychology Department staff. (August, 1994 to May, 1996).

Computer Support Technician
Provided computer-related technical support to faculty, staff, and graduate students of the Department of Psychology. (January, 1996 - May, 1996).

Instructor, Introductory Psychology Recitation
Planned and conducted lectures and discussions for lab section of Introductory Psychology course. Counseled students regarding academic performance. Constructed and graded tests, graded student essays. (August, 1993 - May, 1994).

Collections Associate, Sears Regional Credit Card Operations Center, Greensboro, NC
Responsible for telephone collection of past due accounts, including skip-tracing. (March, 1992 - May, 1993).

TransAmerica Commercial Finance, Dallas, TX
(trading as Magic Rent-to-Own, Kel-Way Rent-to-Own, Metro TV & Appliance Rental).
(August, 1985 - January, 1992).

Account Manager, Greensboro, NC
Responsible for overseeing all phases of operation for 270 rental accounts, especially collection of past due accounts. Repeatedly cited for lowest closing past due percentage at Randleman Road location.

Field Auditor, Dallas, TX
Assisted with nation-wide conversion to new STAR software system. Responsible for installation and setup of personal computer systems, subsequent manual data entry, and audit of rental store records.

Store Manager, Savannah, GA
Special temporary assignment to new rental store acquisition to assist with ownership transition.

Store Manager, Winston-Salem, NC
Supervised all phases of rental store operation including hiring, training, collections, sales, merchandising and local area marketing.

District Manager, Roanoke, VA
Responsible for all phases of operation for three rental store locations. Involved in marketing, collections, recruiting, and personnel motivation strategies at the corporate level.

Store Manager, Roanoke, VA
Served Melrose Ave. location in trouble-shooting capacity. Increased gross sales by 30%, reduced past due accounts from 21% of total to 9%, hired and trained new manager and staff.

Store Manager, Roanoke, VA
Served Franklin Road location in trouble-shooting capacity. Increased gross sales by 50%, reduced past due accounts from 19% of total to 8%, supervised merger with Vinton, VA location.

Store Manager, Charlottesville, VA
Responsible for opening new rental store location from ground up and overseeing all operations, including interior design of new store. Hired and trained new store manager.

Store Manager, Staunton, VA
Supervised all phases of rental store operation including hiring, training, collections, sales, merchandising and local area marketing.

Account Manager, Harrisonburg, VA
Responsible for all delivery, service, and collection activities for 250 rental accounts. Fastest promotion to store manager in company history.

Sales Representative, Great North Mountain Resorts, Basye, VA
Sold resort condominium time shares. (May, 1985 - September, 1985).

Refereed Publications

Facteau, J.D., & Craig, S.B. (2001). Are performance appraisal ratings obtained from different rating sources comparable? *Journal of Applied Psychology, 86*(2), 215-227.

Craig, S.B. & Gustafson, S.B. (1998). Perceived leader integrity scale: An instrument for assessing employee perceptions of leader integrity. *Leadership Quarterly, 9*(2), 127-145.

Craig, S.B. & Kaiser, R.B. (in press). Applying item response theory to multisource performance ratings: Consequences of violating the independent observations assumption. *Organizational Research Methods.*

Presentations (*indicates symposium chaired)

*Kaiser, R.B. & Craig, S.B. (2002, August). Building a better mouse trap: Item characteristics associated with poor measurement properties in multisource assessment instruments. In R. Kaiser & S. Craig (Co-chairs) *Getting beneath the numbers: Factors affecting the measurement*

properties of 360-degree ratings. Symposium presented at the annual conference of the American Psychological Association, Chicago, Illinois.

*Kaiser, R.B. & Craig, S.B. (2002, April). Construct validity and invalidity of the MBTI in management development: A tale of two interpretations. In R. Kaiser & S. Craig (Co-chairs), *360 degree feedback and personality at the crossroads*. Symposium presented at the annual conference of the Society for Industrial-Organizational Psychology, Toronto, Canada.

Kaiser, R.B., Craig, S.B., Kaplan, R.E., & McArthur, C. (2002, April). Practical Science and the Development of Motorola's Leadership Standards and Assessment Instrument. In K. Brookhouse (Chair) *Transforming Leadership at Motorola: A Case Study in Organization Change*. Symposium presented at the annual conference of the Society for Industrial-Organizational Psychology, Toronto, Canada.

Northouse, P., Stech, E., & Craig, S.B. (2001, November). *Development of a Leadership Ethics Questionnaire.* Paper presented at the annual meeting of the Association of Leadership Educators, Miami, FL..

Northouse, P., Stech, E., & Craig, S.B. (2001, July). *Development of a Questionnaire to Measure Leadership Ethics.* Roundtable presentation at the annual conference of the International Leadership Association, Minneapolis, MN.

*Craig, S.B. & Kaiser, R.B. (2001, April). Violating the independent observations assumption in IRT-based analyses of 360° instruments: Can we get away with it? In R.B. Kaiser & S.B. Craig (co-chairs) *Modern Analytic Techniques in the Study of 360° Performance Ratings.* Symposium presented at the annual conference of the Society for Industrial-Organizational Psychology, San Diego, California.

Penny, J., Leslie, J.B., Raju, N.S., & Craig, S.B. (2000, July). *Using DFIT to assess measurement equivalence in a multi-rater survey*. Paper presented at the annual meeting of the Psychometric Society, Vancouver, British Columbia, Canada.

Craig, S.B., Palus, C.J., & Rogolsky, S. (2000, April). Measuring change retrospectively: An examination based on item response theory. In J. Martineau (Chair), *Measuring Behavioral Change: Methodological Considerations.* Symposium presented at the annual conference of the Society for Industrial-Organizational Psychology in New Orleans, LA.

Craig, S.B., & Smith, J.A. (2000, April). Integrity and personality: A person-oriented investigation. In D. Norris (Chair), *Patterns, Patterns Everywhere! Application of Person-oriented Methodology to Problems in Industrial-Organizational Psychology.* Symposium to be presented at the annual conference of the Society for Industrial-Organizational Psychology in New Orleans, LA.

Russell, D.P., & Craig, S.B. (2000, April). Development of a pattern-based selection system: An example using cognitive ability and personality predictors. In D. Norris (Chair), *Patterns, Patterns Everywhere! Application of Person-oriented Methodology to Problems in*

Industrial-Organizational Psychology. Symposium to be presented at the annual conference of the Society for Industrial-Organizational Psychology in New Orleans, LA.

*Craig, S.B., Palus, C.J., & Rogolsky, S. (1999, November). Using item response theory to correct for response shift bias in measurements of training impact. In S. Craig (Chair), *New Strategies for Old Problems in Evaluation: Coping with Missing Data, Scale Compression, and Response Shift Bias.* Symposium presented at the annual conference of the American Evaluation Association, Orlando, FL.

Martineau, J.W., Van Velsor, E., Craig, S.B., & Rogolsky, S. (1999, November). *A Toolkit for Evaluating Leadership Development.* Demonstration presented at the annual conference of the American Evaluation Association, Orlando, FL.

Penny, J., & Craig, S.B. (1999, November). *Using the SAS® System to Examine the Agreement between Two Programs that Score Surveys using Samejima's Graded Response Model.* Paper presented at the annual meeting of the Southeast SAS Users Group, Mobile, AL.

Craig, S.B. & Raju, N.S. (1999, April). Using item response theory to update *BENCHMARKS®*. In D. McDonald-Mann (Chair), *Revising a 360 Degree Feedback Instrument: Integrating Quantitative and Qualitative Data*. Symposium presented at the annual conference of the Society for Industrial-Organizational Psychology, Atlanta, GA.

Craig, S.B., Raju, N.S., Zieleskiewicz, J.R., & Fromen, A. (1999, April). Measurement equivalence of the *BENCHMARKS®* ratings across four rating sources. In N. Raju (Chair), *IRT-Based Evaluation of 360° Feedback Assessments: The* BENCHMARKS® *Story*. Symposium presented at the annual conference of the Society for Industrial-Organizational Psychology, Atlanta, GA.

Martineau, J.W., Rogolsky, S., Palus, C., Craig, S.B., & Preskill, H. (1998, November). *A Toolkit for Evaluating Leadership Development*. Demonstration presented at the annual conference of the American Evaluation Association, Chicago, IL.

Martineau, J.W., Howland, B., Craig, S.B. (1998, May). *The Promises and Pitfalls of Using 360 Degree Surveys to Assess Change.* Paper presented at the 360 Degree Assessment: Global USA Conference, Orlando, FL.

Craig, S.B. & Gustafson, S.B. (1996, April). *Assessing Subordinate Perceptions of Leader Integrity: A New Instrument.* Poster session presented at the annual conference of the Society for Industrial-Organizational Psychology, San Diego, CA.

Relevant Coursework

- Advanced Psychometric Theory: Item Response Theory
- Advanced Statistics for Education
- Advanced Topics in Applied Psychology: Job Analysis and Classification
- Advanced Topics in Applied Psychology: Psychology of Leadership

- Industrial Psychology I and II
- Organizational Psychology I and II
- Quantitative Topics in Applied Psychology
- Contemporary Literature in Applied Psychology: Pattern-oriented Methodology
- Psychological Measurement
- Personality Processes
- Psychological Perspectives in Social Psychology
- Research Methods
- Statistics for Social Science Research I and II