Spring 1997

Structural Equation Modeling of Attitudes Toward Employment Testing

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by

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A Dissertation Submitted to the Faculty of Old Dominion University in Partial Fulfillment of Requirements for the Degree of

DOCTOR OF PHILOSOPHY

INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY

OLD DOMINION UNIVERSITY
May 1997

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ABSTRACT

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This research investigated the relationships among past testing experiences, testing attitudes, perceptions of test performance, race, and gender. In addition, the effects of testing information on testing attitudes were studied. Two hundred and twelve applicants to a variety of positions in a large telecommunications company were asked to complete a series of questionnaires before and after employment testing. The questionnaires included measures of testing experience, general and specific testing attitudes, and perceptions of test performance. Scores on the employment test were also obtained as a measure of cognitive ability. Of the 212 participants, half were given a brochure to read that explained the reasons why the company uses employment testing. The remaining half of the participants did not receive the brochure.

It was hypothesized that general testing attitudes would influence specific testing attitudes and that testing experience, general testing attitudes, and cognitive ability would be related. Testing experience and cognitive ability were expected to influence perceptions of test performance. Further, it was hypothesized that race and gender would be related to perceptions of test performance with whites and males perceiving higher levels of performance than African Americans and females. Race was also expected to be related to cognitive ability, testing experience, and general testing attitudes. Perceptions

of test performance were also hypothesized to influence specific testing attitudes. Finally, it was expected that participants who received information about testing and corporate testing policy would have more positive post-test testing attitudes than those who do not receive the information.

Relationships among the latent variables were tested via structural model analysis. The results of this analysis yielded support for most of the hypotheses. General testing attitudes were found to influence specific testing attitudes. Also, testing experience was related to general testing attitudes and cognitive ability. Testing experience and cognitive ability were also found to influence perceptions of test performance. In addition, perceptions of test performance influenced specific testing attitudes. Finally, participants who read the testing information brochure had more positive ratings on the beliefs about testing scale than those participants who did not receive the brochure.

ACKNOWLEDGMENTS

Many people were of great assistance to me during this dissertation process. Thanks to Dr. Nancy Tippins, Jill Wheeler, and Corinne Kaiser for their help in getting the data collection off of the ground and to Dr. Albert Glickman and Dr. Bob McIntyre and, again, Dr. Nancy Tippins for being on my dissertation committee. Also, thanks to Andrea Berndt and Alexis Fink for their help along the way. Special thanks go to Keith Rettig and Johanna Merritt for their endless support and encouragement. Also, I am grateful to my mother and father for passing on their optimistic and persevering attitudes. And finally, thanks to Dr. Terry Dickinson who pushed me to do my best.

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I. INTRODUCTION

Most organizations use some form of employment testing. A recent survey of 902 U.S. organizations (ranging from 100 to over 5000 employees) indicates the prevalence of employment testing (HRStrategies, 1994). For professional and managerial jobs, approximately 57% use structured interviews, 57% use structured applications, and 12% use skills testing. For production and operations jobs, approximately 52% use structured interviews, 55% use structured applications, and 31% use skills testing. For office and clerical jobs, approximately 54% use structured interviews, 60% use structured applications, and 45% use skills testing.

The prevalence of employment testing is partly due to heightened legal specifications and guidelines (e.g., Griggs v. Duke Power Co., 1971; Albermarle Paper Company v. Moody, 1975; Civil Rights Act of 1991) and the threat of litigation, both of which encourage companies to treat all applicants consistently and legally (Dipboye, Smith, & Howell, 1994; Guion, 1992). Because of these legal concerns, selection decisions are now less likely to be made based on the employer's "gut" feeling about an applicant, which is usually biased and inaccurate (Dipboye et al., 1994). As a result, more employers are using objective, behavioral indicators rather than subjective reactions to applicants.

This dissertation employs the following style manual: American Psychological Association. (1994). Publication manual of the American Psychological Association (4th ed.). Washington, DC: Author.

In addition, organizations are realizing the importance of testing in terms of performance prediction (Rudner, 1992). Employment tests that are systematically developed and are job-related have been shown to be accurate predictors of future job performance (Cascio, 1991). Organizations are also relying on structured hiring procedures that ensure that all applicants receive the same opportunities to share important information about job-related knowledge, skills, and abilities. Because formal, structured selection testing has increased in prevalence and because of the considerable impact selection procedures can have on individuals and organizations, a thorough understanding of all aspects of the selection process is necessary. Obviously, an integral aspect of the selection process is the applicant.

Applicant Reactions

Schuler (1993) proposed that testing procedures influence applicant perceptions of the organization. The selection process is usually the initial source of information that candidates have about an organization. This information is used to form an "assimilation of meaning" or an understanding about the organization (Worchel, Cooper, & Goethals, 1991), and these initial impressions are resistant to change (Nisbett & Ross, 1980).

A series of studies by Smither, Reilly, Millsap, Pearlman, and Stoffey (1993) found that applicants judged simulations, interviews, and cognitive ability tests with concrete item types (such as number computation) to be more job related than personality, biodata, and cognitive ability tests with abstract item types (such as determining the shared concept among a variety of words). Apparently "construct-

irrelevant variance" (i.e., "the assessment is too broad, containing excess as well as method variance such as response sets or guessing propensities that affect responses in a manner irrelevant to the interpreted construct") can play a role in perceptions of test validity (Messick, 1995, p. 742). Furthermore, applicant perceptions of predictive validity were found to be positively related to applicants' willingness to recommend the employer to others.

Selection practices have been found to influence other reactions of applicants and employees. These reactions include applicant attraction to the organization (Murphy, 1986; French, 1987; Rynes, 1993; Smither et al., 1993), information shared with other applicants about the organization (Herriot, 1989), perceptions of fairness, morality, and ethicality (Cascio, 1991; Huffcut, 1990), organizational commitment and intentions to leave (Robertson, Iles, Gratton, & Sharpley, 1991), the propensity to file legal complaints (Cascio, 1991), job acceptance decision making, quality of the applicant pool, psychological well-being of applicants, and post-hire attitudes and behavior (Gilliland, 1993).

As can be seen in the model developed by Thornton (1993; see Figure 1), selection procedures influence applicant perceptions about the interviewer, organizational climate, anticipated commitment to the organization, and the likelihood of accepting a job offer. According to French (1987) and Singer (1993), organizational climate could be influenced by perceptions of the selection process because an organization's values, beliefs, and assumptions can be inferred from personnel policies, practices, and styles. These factors may, in turn, effect an employee's job satisfaction, commitment, turnover,

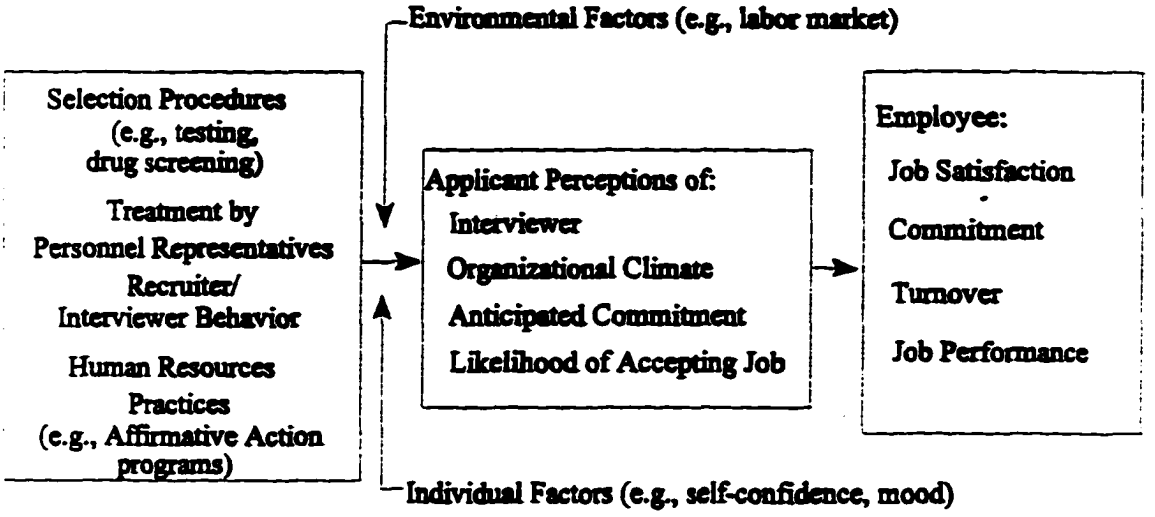

Figure 1. Effect of organization selection practices on applicant perceptions (adapted from Thornton (1993), p. 59).

and job performance and/or productivity. As Thornton's model suggests, the selection procedures and perceptions of selection procedures can have a large impact on organizations and individuals.

Perceptions of the test itself influence recruitment and selection. "If the content of the procedure appears irrelevant, inappropriate, or silly, the result will be poor cooperation, regardless of the technical superiority of the procedure" (Cascio, 1991, p. 134). If a test appears to be valid, it is more likely that the selection process will result in increased satisfaction among test takers, more organizational attraction for the job applicants, and improved public relations (Nevo, 1986). If the selection goal for the organization is to attract and hire the most qualified applicants, then maintaining positive perceptions of the selection process is crucial to the organization. Although an organization would want to be viewed positively by all applicants, this is especially true for top candidates because of the considerable economic loss when top candidates reject employment offers (Murphy, 1986).

Recently, there have been changes in the theoretical conceptualization of the relationships among the test taker, the selection process, and the organization. The previous conceptualization of the employment selection process was similar to that of a sieve; the goal was to find the good candidates and throw out those who were not acceptable, with little regard to how this end was achieved. The new conceptualization views the selection process as more of a "social process" and less of a qualify/not qualify transaction (Herriot, 1989, p. 267). That is, the experience that the applicant has with all aspects of the selection process is more of an interchange, and the applicant forms

perceptions and ideas based on the experience of going through the process. According to Herriot (1989), there is "increasing evidence that candidates have definite attitudes towards selection procedures and that these affect the decisions they make" (p. 267).

Little research has studied the attitudes and perceptions about employment selection processes from the perspective of the applicant. The current research investigates how testing attitudes, past experiences with testing, and cognitive ability influence perceptions of performance and, in turn, how these perceptions influence attitudes about tests. Further, this research attempts to determine if it is possible to change testing attitudes by offering information to the test taker about employment testing and the organization-specific reasons for using the tests.

Factors that Influence Test Performance

If a selection test is developed systematically and thoroughly using proven test development procedures, it can be assumed to be assessing the job relevant knowledge, skills, abilities, and/or other characteristics it was designed to measure (Cascio, 1991). For example, if a cognitive ability test has been developed for use in a selection process, it must be shown through careful research that the job for which the test is designed requires that cognitive ability. Thus, links between the job, the test, and the abilities of the people who take the test can be made. In this example, the majority of the variance in test scores on such a test would be attributable to cognitive ability. However, some of the remaining variance would be due to factors that the test developer did not originally intend to assess.

Intelligence. There are multiple theoretical approaches that are used to explain

intelligence (APA, 1995). Intelligence, or general cognitive ability (g), is considered by many to be the way that information is processed. "Intelligence is processing. Knowledge is gained as the result of assimilation, over time, of information by the intellectual processes" (Fagan, 1992, p. 82). According to this theoretical conceptualization of intelligence, the more intelligent you are, the better you are at processing information.

Intelligence is considered a stable trait which is effective in predicting school performance (the correlation is approximately .50) and total years of education (the correlation is approximately .55). Furthermore, intelligence test scores are negatively associated with the number of juvenile offenses (APA, 1995; Herrnstein & Murray, 1994).

Intelligence has been found to be the best predictor of job performance, relative to other measures of specific aptitudes. "If an employer were to use only intelligence tests and select the highest scoring applicant for each job, training results would be predicted well regardless of the job, and overall performance from the employees selected would be maximized" (Ree & Earles, 1992, p. 88). Typically, correlations between intelligence and job performance range from .30 to .50, but are even higher when corrected for unreliability.

Although good predictors of job performance, intelligence tests are often thought to be assessing "academically learned content" (Ree & Earles, 1992, p. 88). Given that there are different ways of manifesting general cognitive ability, the historical approach to assessing intelligence has been to focus on topics that many people have been exposed

to, such as reading and math, as a means of assessing intellectual processing. Thus, many intelligence tests incorporate academic subject matter in order to assess intellectual processing.

With a given cognitive ability test, the most important determinant of performance on the test would be intelligence. Though a large amount of the variance is explained by intelligence, there is still a substantial amount of variance that remains unexplained. Factors that may account for some of this unexplained variance are attitudes toward testing in general and attitudes toward the specific test.

General testing attitudes. Testing attitudes are likely to be the main factors that influence test performance besides relevant knowledge, skills, and abilities (i.e., intelligence in the cognitive ability test example). Testing attitudes refer to the different beliefs individuals have about testing. Different testing attitudes are manifested when some individuals dislike an employment test, others think that the test is a valid predictor of performance, and other individuals are indifferent to the test. The term testing attitudes is used throughout this paper and shares the same definition proposed by Arvey, Strickland, Drauden, and Martin (1990) of "having to do with the attitudes, opinions, and beliefs associated with the employment test or tests taken, and also with other more general aspects of employment test and testing practices" (p. 697). According to this definition, attitudes are different from emotions or affect. Attitudes are "lasting, general evaluations of people, objects, or issues" (Baron & Byrne, 1987, p. 116). Affect, or the emotions that one feels about people, objects, or issues, helps to determine attitudes, but attitudes tend to be more long lasting and less transient than affect.

Many believe that attitudes toward testing have become increasingly negative, which perhaps is associated with the increased prevalence of testing. According to Glickman (n.d.), "both winners and losers share the conviction that tests will make them look bad more often than they will make them look good (ask any student), and that in seeking access to attractive academic or occupational turf they will most likely be part of the majority--the majority, in each instance, who will not be chosen" (p. 19). Though there has been some study of applicant reactions to different kinds of selection tests (e.g., Smither et al., 1993) and applicant perceptions of test fairness (e.g., Cavanaugh, Wood, & Arvey, 1995), little research has been conducted that investigates the factors that influence the differences in attitudes toward employment testing.

Race/gender differences. Some research indicates that there are race and gender differences in testing attitudes. Arvey et al. (1990) found black applicants to have significantly lower expressed motivation toward pre-employment tests than white applicants, whereas white applicants were found to have significantly higher expressed sentiment that test scores would have a future effect. Black applicants also indicated that they spent significantly more time preparing for the test than did white applicants. As far as test performance is concerned, white applicants scored significantly higher on all three of the tests used in that research. Research by Ogbu (1978) showed that minorities often do not believe that hard work and commitment on their part will actually be rewarded. According to the American Psychological Association (1995), minorities may practice "cultural inversion, deliberately rejecting certain behaviors (such as academic achievement or other forms of 'acting white') that are seen as characteristic of the

dominant group" (p. 33). These results and ideas indicate that there may be a relationship between testing attitudes and motivation and that there may also be some link between these two factors and test performance.

Research by Lounsbury, Bobrow, and Jensen (1989) also found significant differences in testing attitudes by race. Hispanics were found to have significantly more positive attitudes toward testing than whites. No differences were found between males and females, but older groups (40-49 and 50-59) were found to have significantly more negative attitudes about testing than the remaining age groups.

Socio-economic background may explain subgroup differences in attitudes toward testing. According to research by Owens (1971), socio-economic status may be an important biodata factor when studying individual difference variables. Clearly, biodata questions that predict or tap into past experiences with testing can be used to determine the nature of differences between various subgroups. Such differences may be a partial explanation for the historical finding of mean differences in scores on cognitive ability tests for subgroups. However, according to APA (1995), "the sense of belonging to a group with a distinctive culture, one that has long been the target of oppression, and the awareness or anticipation of racial discrimination are profound personal experiences, not just aspects of socio-economic status" (p. 33).

Up to this point there have been no definitive answers as to why there are consistent subgroup differences on cognitive ability tests, though there are many speculations as to the cause (e.g., genetic differences, nutrition, educational opportunities, and socio-economic background). Recent debate on subgroup differences has centered

over The Bell Curve: Intelligence and Class Structure in American Life in which Herrnstein and Murray (1994) examine subgroup differences in cognitive ability and link these differences to social behavior (e.g., poverty, crime, welfare, and dropout rates). They associate the individual differences in cognitive ability with genetic background, but note that because a trait is genetically transmitted in individuals this "does not mean that group differences in that trait are also genetic in origin" (p. 298). In fact, they assert that environmental factors may play a role. Some of these environmental factors may be testing experiences and attitudes, which may shed some light on why subgroups score differently on cognitive ability tests.

Testing experience. According to Adams (1965), individuals use past experiences to form ideas about current or pending experiences. If this is the case, it is likely that past testing experiences (actual and vicarious) will influence individual attitudes about current testing experiences (Gilliland, 1993).

According to Anastasi (1982), individuals who have more experience taking tests are more likely to perform better on tests than those individuals who have less experience. "Part of this advantage stems from having overcome an initial feeling of strangeness, as well as from having developed more self-confidence and better test-taking attitudes" (Anastasi, 1982, p. 42-43). The more tests taken by an individual, the more information individuals have about what to expect from tests. This increased information leads to a deeper understanding about testing, and perhaps less mystery as to what a particular test is measuring.

In addition to the number of testing experiences, knowledge about testing per se is

important in understanding attitudes toward tests. It is likely that those individuals with elaborate testing experiences will have a richer understanding of tests than those who have had fewer testing experiences. Not all knowledge about testing, however, must be acquired from direct experience. Testing information that is obtained during formal and informal conversation with friends, neighbors, coworkers, and others also may provide understanding of tests.

Theoretical Foundations of Testing Attitudes

A schema is defined as "an organized collection of one's beliefs and feelings" about an object, experience, or event (Baron & Byrne, 1987). A schema helps to organize the vast amount of information that an individual may encounter in daily life. A "test" schema is the collection of information that an individual has about tests and is constructed from information that was obtained directly (i.e., actual experiences with testing) and indirectly (i.e., vicarious experiences with testing). The individual's performance (doing poorly or succeeding) on past tests is likely to be incorporated into the test schema. Further, the overall testing experience (including the test scheduling, test administration, and test feedback) will also help form the test schema. New information that is relevant to the test schema will be added each time a new test is taken or other new test information is acquired.

A test schema influences how an individual feels about tests in general (general testing attitudes) and about a specific testing instance (specific testing attitudes). For example, if an individual has a negative testing experience, this experience will influence his or her emotional state regarding the next testing experience. This emotional state will

be coded in the individual's "test" schema as a negative event and will be additional information that will help shape the testing attitudes of that individual. Negative attitudes toward testing may result in decreased test preparation and decreased motivation to do well on the next test. These experiences may cumulate into a self-defeating loop with regard to testing attitudes and performance (Quinn, 1992).

Attitudes do not always influence behavior. If an individual has had negative experiences with tests in the past and, as a result, has negative attitudes about tests, that does not necessarily mean that he or she is going to perform poorly on the next test or exhibit any other behavior that is congruent with the negative experience. According to social psychology literature, attitudes do not always lead to behavior (Baron & Byrne, 1987; Worchel, Cooper, & Goethals, 1991).

Accurate prediction of behavior from attitudes is most likely when the attitudes are very specific versus when attitudes are more general. For example, an individual's dislike for hockey suggests that the person is likely not to attend hockey games. This attitude/behavior link is less strong when the attitude is more general (e.g., dislikes sports). This idea can easily be applied to the selection test context. If there are specific attitudes about a test (e.g., attitudes immediately following a test), it is more likely that the specific attitudes will predict behavior better than general attitudes. For example, if an individual has a specific attitude about a test (e.g., dislikes the employment test just taken) then the person is more likely to exhibit behaviors that are consistent with the idea of disliking that employment test (e.g., responding negatively on a questionnaire about the test) compared to a more general negative attitude about tests (e.g., dislikes

employment tests).

Specific testing attitudes. Clearly, testing attitudes that are formed immediately after a specific testing experience may be somewhat different from the more general attitudes held about tests and testing, though it is likely that the general attitudes would be strongly related to the specific attitudes. After a test, the perceptions of performance may be the main determinant of whether the specific attitudes are positive or negative. For example, if a test taker had just performed poorly on a test, it is likely that the person's attitudes about testing would be different from the attitudes about testing of a test taker who had just performed well (given that they began the test with the same general attitude).

Past research has found little relationship between perceptions of test performance and testing attitudes (Macan, Avedon, Paese, & Smith, 1994). This research is usually based on survey data collected immediately after participants have taken the selection test and assumes that participants are capable of correctly estimating their own performance. For example, Macan et al. (1994) state "to the extent that applicants can estimate their actual performance, we predicted that there would be a positive relationship between applicants' perceptions of the selection technique and their actual performance" (p. 718). Those individuals who are not able to estimate their own performance accurately on a test may blur the relationship between perceptions of test performance and testing attitudes. Individuals who are good estimators of their own performance may elicit a more direct relationship between perceptions of performance and testing attitudes.

Thus, it seems that the ability to estimate test performance accurately and the

attributions (internal and external) that are made about test performance would influence the general attitude toward testing. For example, a test taker may believe that the test was too difficult and that's why he/she didn't do well (external attribution). On the contrary, a test taker may believe that he/she wasn't prepared (or didn't try hard enough) and that's why he/she didn't do well (internal attribution).

Self-Assessment

The ability to estimate test performance accurately is related to the concept of self-assessment. Self-assessment involves an individual's ability to determine his or her "true" extent of knowledge, skills, or abilities in a given area. Research on self-assessment in the selection context has been sparse, with little information about what factors influence self-assessment and what effects self-assessment has on subsequent behavior (Heneman, 1980), though self-assessments of assessment center performance have been investigated. In one study, participants completed self-assessments of assessment center performance immediately before, immediately after, and six months after the assessment center (Fletcher & Kerslake, 1992). Results indicated a difference between successful and unsuccessful candidates in the ability to assess their own performance. Generally, those candidates who did well at the assessment center were more likely to assess their own abilities accurately, whereas those candidates who did not do well at the assessment center were less likely to assess their own abilities accurately. This lack of self-awareness may be related to why the candidates did not do well at the assessment center in the first place. "Failure to monitor accurately one's behavior, or to appraise it accurately in comparison with relevant others is likely to lead to an inability to

adapt and modify behavior and to make the most of the learning experience available" (Fletcher & Kerslake, 1992, p. 287).

According to a meta-analysis of the self-evaluation of ability, there are individual differences in the capacity for accurate self-assessment (Mabe & West, 1982). One of the most consistent individual differences in explaining why some people are accurate self-assessors is intelligence. Intelligent people are more accurate assessors of their own abilities than less intelligent people. Thus, if the test in question is an intelligence test, it is likely that the accuracy of self-assessments will be related to actual performance on that test.

Why is intelligence such a good predictor of accuracy in self-assessment? Perhaps those individuals who are more intelligent may have more experience in making self-assessments and taking part in activities that assess their abilities (i.e., more elaborate testing experiences). Another explanation may be that those who are more intelligent apply their intelligence to the situation of self-assessment, examining the situation, and determining the answer to "How well did I do?" by contemplating the possible alternative options. Yet another explanation is that those who are less intelligent do not identify with failing or doing poorly. Less intelligent individuals may overestimate their own ability in order to maintain their self-esteem.

This research on self-assessment is directly related to perceptions of test performance. In order to estimate performance on a test, applicants use their self-assessment skills to estimate how well their abilities and perceived performance match the testing requirements. It is likely that the outcome of this matching process and the

attributions about that outcome will subsequently influence attitudes about the test.

Attribution Theory

The idea that individuals who succeed are better at assessing their own ability than those individuals who do not succeed is consistent with attribution theory (Weiner, 1985), which suggests that when individuals do succeed, they attribute their success to their own ability. However, when individuals do not succeed, they do not attribute their failure to their lack of ability. Instead, they attribute their failure to environmental factors (e.g., the process was too difficult or the goal was unobtainable) or internal factors outside of their own ability (e.g., lack of effort).

Applying attribution theory to the selection process, if a test taker performs poorly on a test, then the person will not attribute the poor performance to a lack of ability. Instead, the test taker is likely to perceive the test to be unfair or exhibit other negative attitudes about the test and testing processes. However, if an individual does perform well on a test, it is likely that the person will believe the test to be fair and will have more positive testing attitudes. The test taker will attribute successful performance to ability and judge that the test is fair because it is measuring "important" abilities that the person possesses.

Summary of Relationships Between Constructs

Testing experience, including the reactions toward each new test (which is influenced by intelligence), drives the attitudes an individual holds about a specific employment test and employment testing in general. Given these relationships, it is likely that individuals with more intelligence will 1) have more testing experiences

(because test taking will be positively reinforcing), 2) do better on the tests (because of more intelligence), and 3) have more positive general and specific testing attitudes (because they have done and do well on tests). It is likely that individuals who do not perform as well on employment tests will not pursue new opportunities (i.e., new/better jobs) that require testing because of their past testing experiences and attitudes, further decreasing the possibility of "catching up" to those who begin with more intelligence. Because more intelligence is likely to lead to more accurate self-assessment and more intelligence is also likely to yield higher scores on tests, more intelligent people would likely have more positive testing attitudes. The individuals who start with more intelligence may have an ever-increasing, upward spiraling advantage over others with less intelligence.

Changing Attitudes with Information

If there are differences in testing attitudes for subgroups and for those with different testing experiences, and if these differences could potentially influence test performance, how could these attitudes be changed? According to Lounsbury et al. (1989), information changes attitudes. That is, offering information about a topic that is not fully understood or that people hold misperceptions about can influence their subsequent attitudes about that topic. How would being told about the relation of a test to the job (e.g., test validity) and other information about the test change attitudes? According to Schuler (1993), the degree to which a selection procedure's purpose and relevance are obvious to the applicant is one aspect of the selection process that influences reactions.

But how does the perception of the rationale for testing influence or moderate the test taking attitude/test performance link? According to Lounsbury et al. (1989), when participants were told that a test was related to future job performance, they were more likely to make favorable ratings about the test. The more information that is given informing the test taker about the reasons why a test is being used (given that the reasons are true and based on sound, scientific research), the more fully the test taker will understand the selection process. Further, the more thorough the understanding, the greater the likelihood that there will be more positive perceptions of the test.

Elaboration Likelihood Model. Attitudes are shaped by affect, behaviors, and cognitions (i.e., what we feel, what we do, and what we think). In turn, our attitudes can result in behavioral, affective, and cognitive responses. Our specific attitudes are often influenced by our feelings associated with objects, people, or issues. Research has supported the idea that positive feelings are usually associated with positive attitudes and greater possibility of attitude change, whereas negative feelings are usually associated with negative attitudes and decreased likelihood of attitude change (Petty, Cacioppo, Sedikides, & Strathman, 1988). Therefore, in the employment testing context, it seems reasonable that the past positive and negative experiences, both direct and vicarious, will influence testing attitudes.

According to the Elaboration Likelihood Model, there are two basic methods for attitude change (Petty & Cacioppo, 1986). The first method is through the central route, which involves careful and thoughtful consideration of an issue. The second method is through the peripheral route, which results in a change in attitudes without careful and

thoughtful consideration of an issue. Elaboration, the extent of scrutinizing and thinking about the arguments in a message, is high when the central route is used and low when the peripheral route is used. Therefore, if the persuader has an argument that is convincing, the central route is the most effective. When the persuader's argument is not inherently convincing, the peripheral route is more effective (Baron & Byrne, 1987). Attitudes that are changed through the peripheral route are less resistant and predictive of behavior compared to those attitudes that are changed via the central route (Petty et al., 1988).

Based on Petty and Cacioppo's (1986) model, it is proposed that giving test takers information about aspects of the development of the test, linkages between the job and the test, and other aspects of the selection process will enhance the understanding of the testing procedures and subsequently change attitudes about the test and the selection process. Because these "arguments" are logical, believable, and convincing, the approach will follow the "central route" of persuasion. Changing testing attitudes with these logical arguments may lead to an increased belief that the test is fair. In that case, "internal attributions of ability are more likely" (Gilliland, 1994, p. 693) and there would be less of a tendency to "blame" the test. Further, offering this sort of test information may be specifically beneficial for cognitive ability tests which are known for their low face validity (Huffcutt, 1990). According to Gilliland (1993), offering such information "may be one relatively cost-free method for improving the acceptance of such testing" (p. 707).

As can be seen, there are many unanswered questions with regard to the relation

between testing attitudes and performance. However, seeking to understand this relation is important to both individuals and organizations. "Although little empirical research bears directly on this question, related research (Arvey et al., 1990; Schmit & Ryan, 1992) indicates that applicant performance on selection procedures is influenced by motivational components" (Smither et al., 1993, p. 51). Furthermore, Lounsbury et al. (1989) state that "despite the salience of testing as a public and professional topic and the widespread use of tests in the employment process, there has been very little research on psychological responses to testing, either as a general activity or in the form of employment testing" (p. 341).

Hypotheses

One purpose of the current research was to develop and evaluate a structural model of employment testing attitudes. Due to the nature of the questions that were being investigated in this research, two related studies are reported. Study 1 involves the development and validation of a measure of testing attitudes. Study 2 evaluates the theoretical model using questionnaire measures for the different factors that influence and are influenced by testing attitudes. The research variables and their proposed relationships can be seen in Figure 2. Lines between constructs indicate structural relationships and the arrowheads indicate the direction of the relationships (with arrowheads on both ends indicating a correlational relationship).

Based on the literature, it was expected that general testing attitudes would influence specific testing attitudes. That is, general test motivation would influence specific test motivation, general test anxiety would influence specific test anxiety, and

general beliefs about testing would influence specific beliefs about testing. Also, it was hypothesized that testing experience would be related to general testing attitudes and cognitive ability (e.g., the more testing experiences, the more positive the general testing attitudes, and the higher the cognitive ability). Cognitive ability was expected to be related to general testing attitudes, indicating that those who scored higher on the cognitive ability test would also have more positive scores on the general test motivation, general test anxiety, and general beliefs about testing scales.

Testing experience and cognitive ability were expected to influence perceptions of test performance, indicating that those with more experiences with testing and higher cognitive ability would perceive that they performed better on the test compared to those who had fewer experiences and lower cognitive ability. In addition, it was expected that perceptions of test performance would influence specific testing attitudes (e.g., positive perceptions of performance lead to positive post-testing attitudes about testing).

It was also hypothesized that race and gender would predict perceptions of test performance with whites and males perceiving that they performed at a higher level than African Americans and females. Race was also expected to be related to cognitive ability, testing experience, and general testing attitudes, with whites scoring higher on the cognitive ability test, having more testing experiences, and more positive testing attitudes than African Americans. Because the sample had unequal number of whites and African Americans and males and females, correlations between race and gender and other independent variables were expected.

A second purpose of this research was to understand how attitudes about testing

can be changed. In other words, because it was expected that some people have negative attitudes about testing, how could those attitudes be changed so that they are more positive? Thus, it was hypothesized that participants who received information about testing and corporate testing policy would have more positive post-test (specific) testing attitudes than those who did not receive the information.

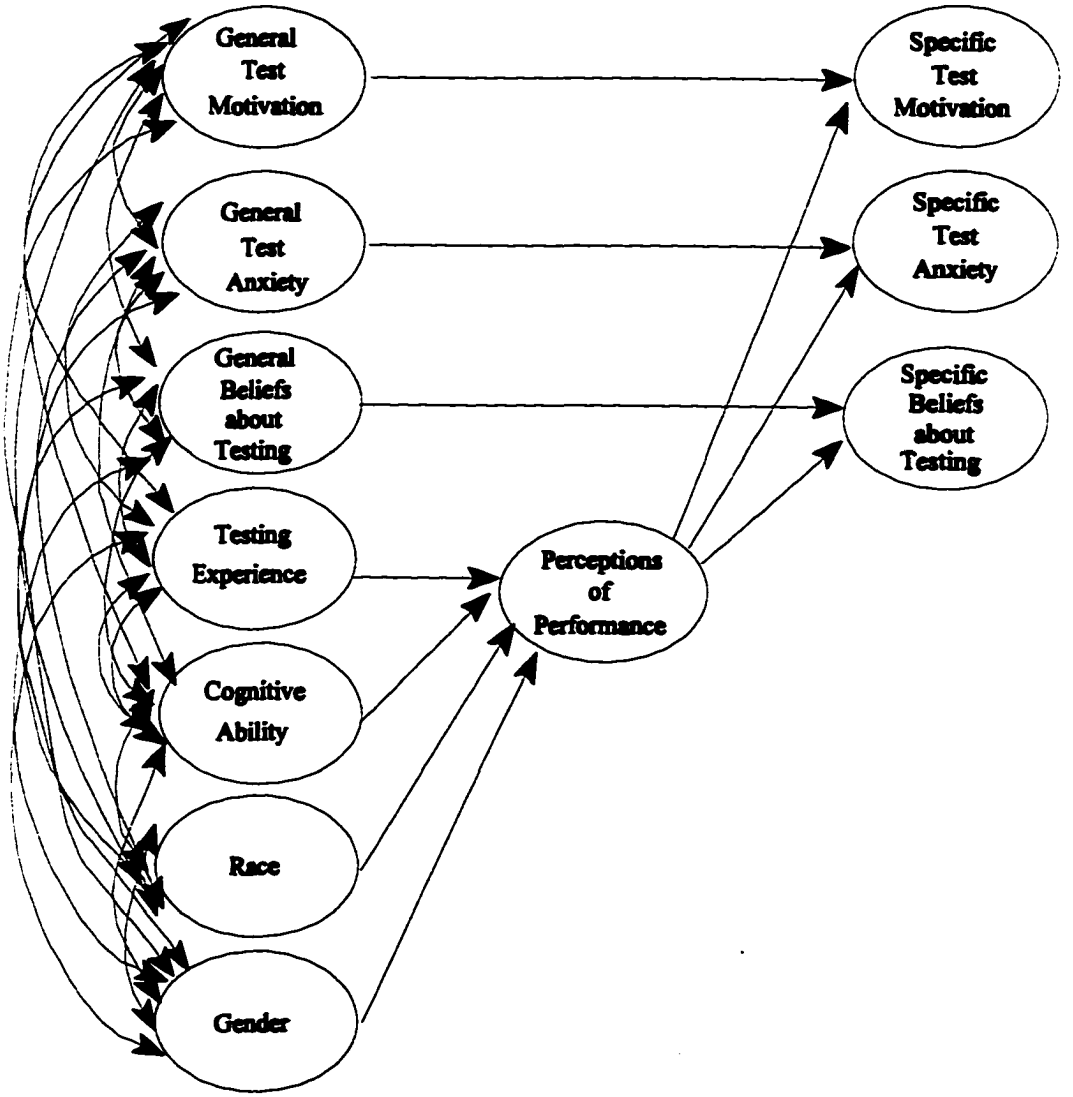

Figure 2. Testing attitudes model.

II. METHOD

Overview

This research project involved two studies. The first study was the development and evaluation of the measures. The second study was an investigation of the hypothesized relationships via a structural model and an investigation of the brochure manipulation for changing testing attitudes.

Study 1: Measure Development

The development of the measures included two phases. Phase 1 was the development and validation of the General Testing Attitude Survey. Phase 2 involved confirmatory factor analyses of the measure of general testing attitudes to evaluate its measurement properties. During Phase 2, data were also gathered with regard to the testing information brochure to ensure the effectiveness of this intervention.

Phase 1

A thorough literature review on testing attitudes was conducted to develop preliminary items for the General Testing Attitude Survey. Only one survey (the Test Attitudes Survey developed by Arvey et. al, 1990) was identified that measured general testing attitudes. Three subscales from this survey (i.e., Motivation, Belief in Tests, and Comparative Anxiety) were selected for further item development. The 24 items on these three subscales were carefully scrutinized and modified, and six additional items were written to ensure that the hypothesized constructs were measured reliably. The modification and addition of items was required because of the unreliable factor

structure that has been found with the Test Attitudes Survey in some studies, perhaps because the Test Attitudes Survey was "rationally constructed with the aid of empirical evidence" (Arvey et al., 1990, p. 700).

Next, subject matter experts (n=28) in testing were asked to participate in the refinement of the testing attitudes measure. These experts were primarily psychologists who work for large corporations throughout the United States. Of these 28 subject matter experts, 53.6% (n=15) have Ph.D.s, 21.4% (n=6) have Master's degrees, and all of the remaining have at least some college experience. Overall, the subject matter experts had an average of 10.59 years of experience in human resource departments, 10.30 years of experience in personnel testing, and 6.14 years of experience in staffing.

The subject matter experts were first asked to sort the 30 preliminary items into one of three dimensions: 1) test motivation, 2) test anxiety, or 3) beliefs about testing (the subscale titles were slightly modified from those in the Test Attitudes Survey for clarity and consistency). This exercise was conducted to ensure that each item was tapping into the intended construct. Modifications were made to items with less than 90% agreement as to the dimension being assessed.

Next, the subject matter experts were asked to rate the extent to which they believed that the three dimensions combined were tapping into the entire domain of general testing attitudes. In answering the question, the subject matter experts were asked to make a rating from 1 (Not at All) to 5 (To a Great Extent). If the subject matter expert circled a 1, 2, or 3 rating (i.e., a low rating), he or she was then asked to offer suggestions for other relevant dimensions that would allow the researcher to

better assess general testing attitudes. In response to the rating question, 89% of the subject matter experts believed that the three dimensions combined were tapping into the entire domain of general testing attitudes. The recommendations made by the remaining 11% were evaluated and, because there were no distinct patterns in their suggestions and most of the suggestions were not applicable to the current research context, no additional dimensions were added. (See Appendix B for a list of the recommendations for changing the measure.)

Finally, the subject matter experts were asked to generate positive and negative critical incidents they had experienced regarding attitudes toward employment testing. The information obtained from the above exercises allowed the researcher to make any modifications necessary to ensure that the items were clear and were tapping into the intended constructs. (See Appendix C for the measures administered to the subject matter experts.)

Based on the literature review, evaluation of an existing measure, and subject matter experts' feedback, the General Testing Attitude Survey was developed. (See Appendix D for a description of all steps leading to the final set of items included in the General Testing Attitude Survey.) The survey is comprised of three scales (test motivation, test anxiety, and beliefs about testing) that assess the domain of the testing attitudes. Because multiple items increase construct validity and reliability, each of the three scales has at least nine items (Nunnally, 1978).

Phase 2

Participants. The survey was administered to 172 students in introductory

psychology courses either before or after their class session. Of the 172 students, 93 were female, 72 were male, and 7 did not indicate their gender. The majority of the students (73%) was under 20 years of age and was white (62%). Because the General Testing Attitude Survey is a measure of general testing attitudes, college students were considered to be an adequate sample for investigating the psychometric properties of the General Testing Attitude Survey. Human Subjects Committee approval was obtained from Old Dominion University before conducting this research.

Brochure. In addition to the General Testing Attitude Survey, a brochure about the organization's testing policy and general information about testing was given to half of the participants. This information included the organization's rationale for testing, information about test validity, and the usefulness/utility of testing.

All participants were asked to complete a manipulation check. The manipulation check was a multiple-choice knowledge test that assesses the participants' awareness and understanding of specific information that was presented in the brochure. The manipulation check was used to assess whether the brochure was effective by determining whether the participants understood the basic concepts regarding the rationale for testing that were presented in the brochure. (See Appendix E for the measures used in Phase 2.)

Analyses. Alpha coefficients were computed for each scale of the General Testing Attitude Survey. These alpha coefficients indicate whether the items for each of the subscales are relatively consistent with other items on the same scale. These values were .87 for the test motivation scale, .86 for the test anxiety scale, and .80 for

the beliefs about testing scale. These alpha coefficients indicate good internal consistency for the scales.

Confirmatory factor analyses were conducted, using LISREL VIII (Jöreskog & Sörbom, 1993), to investigate how well the items of the General Testing Attitude Survey were measuring their intended latent variable. The results of the factor analyses indicated that the items on each scale are good measures of their latent variables. As shown in Appendix F, the factor loadings for the general test motivation items range from .40 to .63; the factor loadings for the general test anxiety items range from .44 to .93; and the factor loadings for the general beliefs about testing items range from .12 to .75.

Finally, it was expected that those individuals who did not receive the brochure would have significantly lower scores on the manipulation check compared to those individuals who did receive the brochure. As expected, there were significant differences between brochure/no brochure groups on the number of correct items on the manipulation check ($F = 38.07$, $p < .01$; M for the brochure group = 4.97, M for the no-brochure group = 2.30). This result indicates that participants who were given the brochure processed more/different information about the brochure than those who were not given the brochure. Further, this result suggested that the brochure could be used in Study 2 to investigate whether giving information about tests and why a company uses tests would change attitudes about that test.

Study 2: Model Testing

Study 2 investigated the relationships among testing attitudes, testing experiences, perceptions of test performance, race, and gender. Before beginning Study 2, all of the

measures were pilot tested with eight employees of the company where the study was to be conducted. These employees offered suggestions for making the instructions and survey more understandable and easier to use.

Participants

Two-hundred twelve applicants (145 males, 67 females) to a variety of jobs in a large telecommunications company participated in this research. As shown in Table 1, 43% of the sample was white, 50% was African-American, 5% was Hispanic, and 2% did not specify their race. For the majority of the sample (58%), the highest degree achieved was high school. Also, the majority of the sample (68%) was between 21 to 40 years of age.

The participants were external applicants (i.e., not currently employed by the organization) who were scheduled to take the Universal Test Battery (UTB). This battery of tests evaluates cognitive abilities and personality/work preferences and is given to all non-management applicants, who must pass the battery to be considered for the next stage of the selection process.

Specific locations for data collection were chosen for the study due to testing volumes, logistics, and research room availability. The locations for the study included: Washington, DC; Newark, NJ; Baltimore, MD; Philadelphia, PA; Pittsburgh, PA; and Roanoke, VA. After locations and dates for the research were chosen, all applicants who were to be tested were called and asked to volunteer to participate in the study (see Appendix G for the script used to obtain participation).

Table 1

Demographic Information About Participants in Study 2

Demographic Variable	Number	Percentage
Gender		
Male	145	68%
Female	67	32%
Age		
20 and under	17	8%
21 - 30	82	39%
31 - 40	62	29%
41 - 50	40	19%
51 +	11	5%
Race		
White	92	43%
Hispanic	10	5%
African-American	106	50%
Not Specified	4	2%
Highest Degree Achieved		
Elementary School Graduate	10	5%
High School Graduate	122	58%
Associate's Degree or Technical/Trade School Degree	48	23%
Bachelor's Degree	26	12%
Master's Degree	3	1%
Doctoral Degree or Other Professional Degree e.g., Law School	1	.50%
Professional Certificate/License	1	.50%

Table 1 (continued)

Mother's Highest Degree Achieved		
Elementary School Graduate	24	11%
High School Graduate	127	60%
Associate's Degree or Technical/Trade School Degree	18	9%
Bachelor's Degree	16	8%
Master's Degree	8	4%
Doctoral Degree or Other Professional Degree e.g., Law School	3	1%
Professional Certificate/License	2	1%
Unknown/Not Applicable	13	6%
Father's Highest Degree Achieved		
Elementary School Graduate	32	15%
High School Graduate	93	44%
Associate's Degree or Technical/Trade School Degree	27	13%
Bachelor's Degree	21	10%
Master's Degree	6	3%
Doctoral Degree or Other Professional Degree e.g., Law School	1	.50%
Professional Certificate/License	0	-----
Unknown/Not Applicable	25	12%
Income Level During High School		
Lower Class	22	10%
Lower Middle Class	66	31%
Middle Class	102	48%
Upper Middle Class	19	9%
Upper Class	1	.05%

During the calls, the researcher told the potential participants what the research entailed, what was required of them, and that they would be paid ten dollars for their participation. The researcher also emphasized confidentiality, voluntary participation, and that participation would not affect their employment opportunities in any manner. When an individual decided to participate, the researcher asked him/her to arrive at the testing session 45 minutes before the employment test. All but four applicants (all of whom were not able to participate due to scheduling conflicts) agreed to participate. Because all external candidates were contacted and because of the very low decline rate, participants were considered to be representative of the entire testing population during the period that this research was conducted.

Measures

The following is a description of the measures that were included in Study 2 research (see Appendix H).

Demographic information. The first questionnaire was a demographic measure that asked the participant about age, gender, race, previous types of jobs held, and socio-economic background. The questionnaire also included the informed consent and statement requesting permission to obtain the participants' scores on the Universal Test Battery.

Testing experience. The testing experience measure surveyed the number of tests taken, kinds of tests taken, recency of tests taken, perceptions of performance on tests, vicarious testing information, and whether participants have taken test preparation and/or psychology courses. In addition, a short knowledge test was included which was

designed to tap into the depth of the testing experiences (e.g., mechanics of a multiple choice test).

General Testing Attitude Survey. The General Testing Attitude Survey that was used in this research was developed in Study 1 and is comprised of items about general test motivation, general test anxiety, and general beliefs about testing.

Specific Testing Attitude Survey. The Specific Testing Attitude Survey assesses testing attitudes which are more specific to the selection test just taken (i.e., the Universal Test Battery). Items from the General Testing Attitude Survey were modified so that the wording referred only to the Universal Test Battery. Additional items that tap into attitudes toward academic subject matter (e.g., spelling and number computation; the majority of the subtests of the Universal Test Battery), cognitive ability tests, personality tests, and computerized testing were developed and included in the Specific Testing Attitude Survey. Furthermore, self-assessments of performance were included in the Specific Testing Attitude Survey.

Universal Test Battery. The Universal Test Battery (Hough, Carter, Dohm, Nelson, & Dunnette, 1993) is a computerized measure of cognitive ability that takes approximately two hours to complete. There are 10 subtests in the Universal Test Battery: Spelling, Concept Formation, Clerical Speed and Accuracy, Reading Comprehension, Spatial Visualization, Vocabulary, Mechanical Comprehension, Number Computation, Number Series, and the Candidate Assessment of Background and Life Experiences (CABLE). The CABLE is a personality/work preferences test with six subscales: Persuasiveness, Ambition, Energy, Reliability, People Orientation, Social

Adjustment, and Unlikely Virtues. The Universal Test Battery was the test that participants were asked to refer to when completing the Specific Testing Attitude Survey.

Testing information brochure. The brochure about the organization's testing policy and general information about testing included the organization's rationale for testing, information about test validity, and the usefulness/utility of testing. Because of the possibility of reading level inhibiting the effectiveness of the brochure, the brochure was assessed using Microsoft Word™. The Flesch-Kincaid Grade Level statistic for the brochure was 10.3, indicating that a tenth grader would be able to understand the document. This rating was deemed acceptable because the majority of the participants had at least a high school degree (see Table 1).

Manipulation check for the testing information. Although the brochure was shown to be effective in Study 1, it was important to ensure that the brochure was effective in providing information to Group 2 participants. The manipulation check assessed whether the participants understood the basic concepts regarding the rationale for testing that were presented in the brochure.

Procedure

After arriving at the testing session, participants were randomly assigned to one of two groups. Participants assigned to the no brochure condition were asked to complete the informed consent, demographics/testing experience measure, General Testing Attitude Survey, and manipulation check before the pre-employment test. Participants assigned to the brochure condition were asked to complete the same surveys and questionnaires, but in addition, read the testing information brochure, before completing

Table 2

Research Steps for Groups 1 and 2

Step	Group 1	Group 2
1	Informed Consent	Informed Consent
2	Demographic/Testing Experience Survey	Demographic/Testing Experience Survey
3	General Testing Attitude Survey	General Testing Attitude Survey
4	----------	Testing Information Brochure
5	Manipulation Check	Manipulation Check
6	Employment Test (UTB)	Employment Test (UTB)
7	Specific Testing Attitude Survey	Specific Testing Attitude Survey
8	Debriefing/Payment	Debriefing/Payment

the manipulation check. (Refer to Table 2 for the research steps involved in Study 2.)

After the testing session, the participants were asked to complete the Specific Testing Attitude Survey. The participants were then debriefed and paid for their participation (see Appendix I for the debriefing information).

The measures in this study were completed individually, but in a group setting. To maintain consistency in administration and because participants arrived to the study at different times, all instructions were provided in a written format. Participants were encouraged to ask questions if they did not understand the written instructions.

This research was conducted in testing rooms that were designed solely for testing situations. The testing experience and conditions were standardized for all participants.

Analytical Strategy

Structural equation modeling has two components--measurement models and a structural model. The measurement models describe how the latent variables are measured by the indicators, whereas the structural equation model describes the causal relationships among the latent variables. A method for analyzing the measurement and structural equation models is LISREL (Jöreskog & Sörbom, 1988). In order to analyze the structural model, the latent variables are separated by LISREL into independent and dependent latent variables. The structural model, which investigates the relation between independent and dependent latent variables, was assessed by examining structural coefficients (or weights) associated with the relationships among the independent and dependent latent variables.

The LISREL approach utilizes the maximum likelihood technique which is based

on a search for parameter estimates most likely to have generated the observed data. The estimated parameters that do the best at explaining the observed data are the maximum likelihood estimators of the population parameters. These estimates are known to have highly desirable statistical properties (Pedhazur & Schmelkin, 1991).

Scale construction. LISREL VIII (Jöreskog & Sörbom, 1993) was used to conduct a confirmatory factor analysis on the items that reflected each attitudinal measure (i.e., three measures for the General Testing Attitude Survey and three measures for the Specific Testing Attitude Survey) for the data collected in Study 2. For each analysis, a single factor was specified for that construct. Based on these analyses, all items with factor loadings of at least .30 were included in future analyses. This level has been used in previous attitudinal research as an indication of an item that measures the construct adequately (Berndt, 1994; Rosenstein, 1994).

The factor loadings for each of the measures indicated the extent to which the items were tapping the intended attitude. The factor loadings for the general test motivation scale ranged from .31 to .51; the factor loadings for the general test anxiety scale ranged from .51 to .91; the factor loadings for the general beliefs about testing scale ranged from .45 to .88; the factor loadings for the specific test motivation scale ranged from .34 to .65; the factor loadings for the specific test anxiety scale ranged from .42 to .88; and the factor loadings for the specific beliefs about testing scale ranged from .56 to .83. The T-values for all loadings were greater than 2.0, indicating that every item significantly loaded on its intended factor. (See Appendix J for the results of the confirmatory factor analysis for the General Testing Attitude Survey and Specific Testing

Attitude Survey measures.)

Because of possible non-normality problems due to the use of polychotomous rating scales, items for each of the attitudinal scales (the test motivation, test anxiety, and beliefs about testing scales on the General Testing Attitude Survey) were categorized into three parallel subscales (Mathieu, 1991). The first subscale included the item with the highest loading and the item with the lowest loading. The second subscale included the item with the second highest loading and the item with the second lowest loading. The third subscale included the item with the third highest loading and the item with the third lowest loading. Any remaining items were randomly assigned to the subscales. If more than three items were assigned to a subscale, the item with the lowest loading was excluded so that all subscales had a total of three items. As a result of this algorithm, nine subscales were created for the General Testing Attitude Survey with three subscales for each of the three scales. The nine subscales of the Specific Testing Attitude Survey included the same items on each subscale as the General Testing Attitude Survey. The comparable number of items for each subscale allowed similar interpretations of the latent variables for the two measures.

A confirmatory factor analysis was also conducted with the 11 items of the testing experience scale. The testing experience construct had not been previously studied, so there was no research on which to base the development of items. Unfortunately, the items did not yield a well-defined single factor. Only three of these items appeared to measure a unitary construct of testing experience. The three items are the number of different kinds of employment tests taken, the number of different kinds of non-

employment tests taken, and how recently tests were taken. These three items were used to develop a composite measure of testing experience. (See Appendix K for the results of the confirmatory factor analysis for the testing experience construct.)

Refer to Appendix L and M for the means, standard deviations, and correlations for all of the indicators in Study 2 for the experimental and control (i.e., brochure/no brochure) conditions. Also, refer to Appendix N for a list of the items that make up each of the subscales. Note that race and gender were coded using a 0/1 format with whites coded as 0 and African Americans coded as 1 and males coded as 0 and females coded as 1.

Internal consistency. Coefficient alphas were also determined. Overall, the magnitude of the alphas for the scales and subscales were good to excellent, with most of the coefficients in the .70 to .80 range. However, the internal consistency reliability for the Testing Experience composite was quite low (.51). Because this measure is assessing historical events that are likely to have small intercorrelations, a low internal consistency reliability is to be expected. See Table 3 for a list of the coefficient alphas for each scale and subscale.

Model assessments. The measurement models indicate how well constructs are being measured by the observed variables. In order to assess a measurement model, factor loadings, measurement error variances, goodness-of-fit indices, and modification indices were evaluated. The description of the measurement models and the structural model refer to specific parameters matrices. Please note the following LISREL terminology: Lambda X refers to factor loadings for independent latent variables,

Table 3

Coefficient Alphas for Scales and Subscales Used in Study 2

Variable	Coefficient Alpha	
	Scale	Subscale
General Test Motivation	.831	
Subscale 1: GMOT1		.637
Subscale 2: GMOT2		.640
Subscale 3: GMOT3		.716
General Test Anxiety	.859	
Subscale 1: GANX1		.649
Subscale 2: GANX2		.682
Subscale 3: GANX3		.567
General Beliefs about Testing	.867	
Subscale 1: GBEL1		.692
Subscale 2: GBEL2		.681
Subscale 3: GBEL3		.742
Testing Experience	.507	
Perceptions of Performance on the UTB	.783	
Cognitive Ability	.848	
Specific Test Motivation	.882	
Subscale 1: SMOT1		.735
Subscale 2: SMOT2		.655
Subscale 3: SMOT3		.748
Specific Test Anxiety	.843	
Subscale 1: SANX1		.533
Subscale 2: SANX2		.745
Subscale 3: SANX3		.581
Specific Beliefs about Testing	.902	
Subscale 1: SBEL1		.810
Subscale 2: SBEL2		.722
Subscale 3: SBEL3		.721

Lambda Y refers to factor loadings for dependent latent variables, Theta Delta refers to measurement error variances for independent latent variables, Theta Epsilon refers to measurement error variances for dependent latent variables, Beta refers to the structural coefficients among the dependent latent variables, and Gamma refers to the structural coefficients between the independent and dependent latent variables.

The T-values for factor loadings and structural coefficients were expected to be statistically significant (2.0 or greater), indicating that the estimation of the associated parameter statistically improves the fit of the model to the observed data. According to Jöreskog and Sörbom (1988), "parameters whose T-values are larger than 2.0 in magnitude are normally judged to be different from 0" (p. 89).

Goodness-of-fit indices that were used include the chi-square statistic, non-normed fit index, and comparative fit index. The chi-square statistic, though biased by sample size, was included because it is commonly used in the literature (MacCallum, 1990). The non-normed fit index (NNFI) and the comparative fit index (CFI) are unbiased by sample size and can range from 0 to 1.00. For both of these indexes, a good model fit is indicated with values of 0.90 or greater.

Multiple samples. One of the main purposes of this research was to investigate how giving information about testing influences testing attitudes. The data from the two conditions (brochure/no brochure) were compared to determine how the brochure affects the dependent latent variables. Therefore, the data from the two samples were compared using latent mean structure analysis. That is, mean differences on the latent variables were compared for the brochure and no brochure conditions. In order to

compare the two groups, an analysis of how the latent variables deviated from their means for the brochure and no brochure conditions was investigated. This process, according to Bollen (1989) is accomplished by investigating whether specific LISREL parameters (e.g., Alpha) are affected by differences between the two groups on the latent variables.

Nested model testing. All hypothesized relationships were tested in the structural model. A multivariate analysis of covariance (MANCOVA) approach, using LISREL, was incorporated to allow for the comparisons between the brochure and no brochure conditions. In MANCOVA, the dependent latent variables are adjusted for differences in the independent latent variables so that any mean changes in the dependent latent variables can be attributed to the experimental and control conditions (i.e., brochure/no brochure) and not due to changes in the independent latent variables (Harris, 1985). In other words, the independent latent variables are considered covariates that are controlled statistically in order to investigate whether the experimental and control conditions differentially influence the 1) means of the dependent latent variables, 2) relationships among the dependent latent variables, and/or 3) relationships between the independent and dependent latent variables. According to Cole, Maxwell, Arvey, and Salas (1993), assessing MANCOVA relationships using structural equation modeling "produces a highly viable alternative that provides accurate information on true group differences" (p. 183).

In order to investigate the existence of any or all of these three changes in relationships, a nested model approach was employed (Milsap & Hartog, 1988). A nested

model occurs "when one or more free parameters of a model are constrained" (e.g., equal to zero, equal to each other) (Pedhazur & Schmelkin, 1991, p. 651). In this situation, it is important to test for the possibility of the nested models yielding better fits to the data. If this occurred, it would indicate that the brochure/no brochure conditions differentially affected the structural relationships among the latent variables. Thus, the brochure would be affecting the participants in such a manner as to suggest that different latent variables were being measured in the brochure/no brochure conditions. In this situation, interpretation of differences in latent variable means is not appropriate.

Because participants were randomly assigned to the conditions, all nested models assume that the Lambda X, Phi, and Theta Delta matrices were invariant for the two conditions. Four nested models were compared for significant changes in the goodness-of-fit statistics. The first model was the Least Restricted Model. In this model, the Lambda Y, Beta, Gamma, and Theta Epsilon matrices were required only to have the same pattern for the brochure and no brochure conditions, though the individual parameter values could differ between the conditions. The second nested model, called the Equivalent Measurement Model, fixed Lambda Y and Theta Epsilon to be invariant (i.e., equal) for the conditions, and kept the same pattern for the Beta and Gamma matrices for the conditions. The third nested model was the Equivalent Regression Model, and it held Lambda Y and Gamma as invariant for the conditions, and kept the same pattern only for the Beta matrix. The fourth nested model was the MANCOVA Model which held Lambda Y, Beta, and Gamma invariant across the conditions. The nested models were compared pairwise to examine the various invariance hypotheses.

The fourth model, the MANCOVA Model, is the most parsimonious and was expected to offer the best fit to the data. If this was the case, any changes in the means of the dependent variables could be assessed and be attributed to the brochure intervention. However, if any of the other models fit the data better than the MANCOVA Model, mean changes in the latent variables could not be interpreted because the dependent latent variables have changed in their meaning.

III. RESULTS

Overview

The results for Study 2 are described here in four sections. The first section describes the measurement models for the independent and dependent variables. The second section describes the results of the comparison of the brochure/no brochure conditions. The third section explains the nested models within the structural model. The final section describes the structural model where hypotheses were tested.

Measurement Models

Measurement Model for Independent Variables

The measurement model for the independent factors (the latent variables) included three indicators each for the general test motivation, general test anxiety, and general beliefs about testing constructs which together form general testing attitudes. The remaining independent factors were testing experience, cognitive ability, race, and gender, which were all measured with a single indicator. Because testing experience and cognitive ability had only single indicators, their measurement error variances needed to be set from reliability information (Jöreskog & Sörbom, 1988). Measurement error variances were estimated by multiplying the observed variance for the indicator by 1.0 minus its coefficient alpha. Race and gender were assumed to have no measurement error.

For each of the independent factors, the factor loading for the first (or only) indicator was fixed to a value of 1.0. All other factor loadings were estimated.

According to Jöreskog and Sörbom (1988), fixing a factor loading for an indicator establishes a metric for the latent variable.

As exhibited in Appendix O, the factor loadings of the subscales were relatively high, ranging from .92 to 1.10, and all of the T-values were greater than 2.0 and considered statistically significant. Measurement error variances were also relatively small, indicating little measurement error in the indicators. The correlations between the independent variables ranged from -.41 to .50, indicating a pattern of relationships congruent with those presented in the literature and predicted in the hypotheses. The goodness-of-fit indices indicated that the measurement model provided a good fit for the independent variables (i.e., NNFI = .92 and CFI = .95).

Measurement Model for Dependent Variables

The measurement model for the dependent factors (the latent variables) included three indicators each for the specific test motivation, specific test anxiety, and specific beliefs about testing which together form specific testing attitudes. The remaining dependent factor was the perception of performance on the Universal Test Battery, which was measured by a single indicator. The measurement error for the perception of performance factor was fixed using coefficient alpha as a reliability estimate with the same procedure described for the measurement model for the independent variables.

As exhibited in Appendix P, the factor loadings of the subscales were relatively high, ranging from .80 to 1.28 and all of the T-values were greater than 2.0 and considered statistically significant. Measurement error variances were also relatively small, indicating little measurement error in the indicators. The correlations between

the dependent latent variables ranged from .19 to .68, again indicating consistent and predicted relationships between the variables. Squared multiple correlations ranged from .55 to .87, indicating that the congeneric reliabilities are congruent with the measurement error variances. The goodness-of-fit indices for the measurement model for the independent variables indicated that the this model provided a good fit for the independent variables (i.e., NNFI = .93 and CFI = .95).

Analysis of Variance for Brochure/No Brochure Conditions

The data from the manipulation check were analyzed for the brochure/no brochure conditions using analysis of variance. Results indicated significant differences on the number of correct items on the manipulation check (F (1, 193) = 44.81, $p < .01$) with the participants who received the brochure getting more of the items correct (M = 8.35) than those who did not receive the brochure (M = 6.48). This significant difference indicates that those who received the brochure were at least aware of or, at best, processing the testing information presented in the brochure compared to those who did not receive the brochure. After finding significant differences on the manipulation check, the structural model was assessed for the two conditions.

Nested Models

As explained in the Method section, four nested models were compared to determine any differences in the dependent and independent latent variable relationships based on the brochure/no brochure conditions. As shown in Table 4, there were no significant differences in the chi square values for the nested models between the two

Table 4

Chi-Square Differences for the Nested Models

Model	Chi-Square	df	Chi-Square Difference	df Difference
Least Restricted	1125.07	479	----	----
Equivalent Measurement	1128.10	485	3.03	6
Equivalent Regression	1141.22	492	13.12	7
MANCOVA	1147.40	495	6.18	3

Note. None of the chi-square difference values were significant using the differences in the degrees of freedom at $p < .05$.

conditions. This finding indicates that the brochure intervention did not lead to differences in the factor loadings of the dependent latent variables, relationships among the dependent latent variables, or relationships among the independent and dependent latent variables. Because there were no significant differences in the nested models and it is the most parsimonious approach, the MANCOVA model was the approach used to test the structural model. The MANCOVA model requires invariant matrices for the experimental and control conditions (i.e., brochure/no brochure conditions).

Structural Model

Structural coefficients and their standard errors (in parentheses) are shown in Figure 3. The effects of the independent variables on the dependent variables ranged from -.16 to .98. The T-values between general testing attitudes, specific testing attitudes, testing experience, cognitive ability, and perceptions of performance were greater than 2.0 (ranging from 2.08 to 12.79) and therefore considered statistically significant. The T-values for the relationships between the race and gender variables with the dependent variables were not greater than 2.0 and therefore not statistically significant. Refer to Appendix Q for the factor loadings, measurement error variances, squared multiple correlations, structural coefficients, and goodness-of-fit indices for the structural model.

There were mean differences in the dependent latent variables based on the brochure/no brochure conditions. In the comparison between the two conditions, the alpha coefficient for the specific beliefs about testing variable was significant, with a value of .17 and a T-value equal to 2.89. This result indicates that those participants who

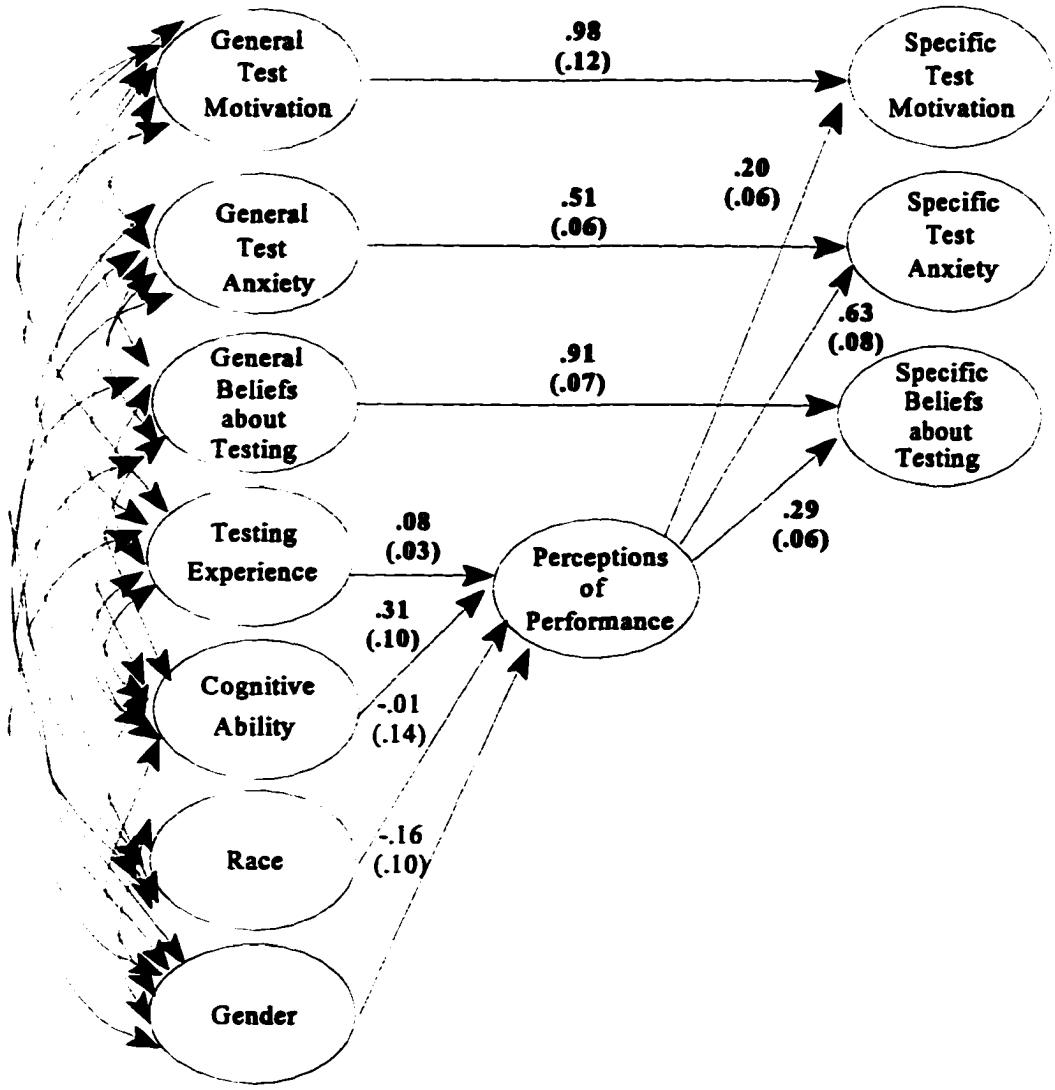

Figure 3. Structural model with structural coefficients and their standard errors (in parentheses). Bold indicates significant relationships with T-values greater than 2.0.

received the brochure had more positive specific beliefs about testing than those participants who did not receive the brochure. Thus, the underlying mean structure for the specific beliefs about testing scale was significantly different for the two groups. This finding indicates that the brochure intervention had a significant effect, resulting in more positive beliefs about testing for those who read it. The alpha coefficient for the specific test motivation (with a value of .07 and a T-value equal to 1.14).and specific test anxiety (with a value of .00 and a T-value equal to -.0) scales were not significantly different for the brochure and no brochure conditions.

The goodness-of-fit indices for the structural model indicated that the this model provided a relatively poor fit for the data (i.e., NNFI = .79, CFI = .80). Because the measurement models indicated a good fit to the data and the hypotheses were supported, it is likely that the poor overall fit for the model is due to the exclusion of other important variables in the model.

Correlations between latent variables. Relationships among the independent latent variables were hypothesized. Many of these relationships were supported by statistically significant correlations. The correlations between these latent variables are shown in Table 5. As can be seen in the table, general test motivation was significantly positively correlated with general test anxiety, general beliefs about testing, testing experience, and cognitive ability. General test anxiety was significantly positively correlated with general test motivation, general beliefs about testing, testing experience, cognitive ability, and perceptions of performance on the Universal Test Battery. General beliefs about testing was significantly positively correlated with general test motivation

Table 5

Correlations Between the Latent Variables

	1	2	3	4	5	6	7	8	9	10	11
1. PERC	1.00										
2. SMOT	0.45*	1.00									
3. SANX	0.69*	0.42*	1.00								
4. SBEL	0.39*	0.42*	0.48*	1.00							
5. GMOT	0.27*	0.84*	0.33*	0.42*	1.00						
6. GANX	0.27*	0.32*	0.71*	0.46*	0.33*	1.00					
7. GBEL	0.21*	0.38*	0.39*	0.89*	0.43*	0.48*	1.00				
8. EXP	0.51*	0.45*	0.48*	0.33*	0.42*	0.36*	0.26*	1.00			
9. COG	0.50*	0.33*	0.43*	0.29*	0.27*	0.29*	0.21*	0.28*	1.00		
10.RACE	-.05	0.02	0.06	-.14	0.04	0.15*	-.16*	0.36*	-.40*	1.00	
11.GENDER	-.25	-.10	-.23	-.22	-.05	-.16*	-.19*	-.18	-.09	0.17*	1.00

Note. N = 212. *$p < .05$. Abbreviations: PERC (perceptions of performance on the Universal Test Battery), SMOT (specific test motivation), SANX (specific test anxiety), SBEL (specific beliefs about testing), GMOT (general test motivation), GANX (general test anxiety), GBEL (general beliefs about testing), EXP (past testing experiences), COG (cognitive ability), RACE (participant's race), and GENDER (participant's gender). Asterisks indicate correlations that are statistically significant due to statistically significant associated T-values. For race, whites were coded as 0 and African Americans were coded as 1. For gender, males were coded as 0 and females were coded as 1.

and general test anxiety. Testing experience was significantly positively correlated with general test motivation, general test anxiety, general beliefs about testing, and perceptions of performance on the Universal Test Battery.

It was hypothesized that testing experience would be related to general testing attitudes and cognitive ability. This hypothesis was supported because testing experience was significantly positively correlated with general test motivation, general test anxiety, general beliefs about testing, and cognitive ability. Cognitive ability was significantly positively correlated with general test motivation, general test anxiety, general beliefs about testing, and perceptions of performance on the Universal Test Battery. Perceptions of performance on the Universal Test Battery was significantly positively correlated with general test anxiety, testing experience, and cognitive ability. Finally, race was significantly negatively correlated with cognitive ability and general beliefs about testing, indicating that whites tended to have higher scores on the cognitive ability test and more positive beliefs about testing, as hypothesized. However, contrary to the hypotheses, race was also significantly positively correlated with testing experience and general test anxiety, which suggested that African Americans have more testing experiences and tend to be less anxious about testing.

IV. DISCUSSION

Summary of Hypothesized Relationships

Based on the literature described in the Introduction section, it was expected that general testing attitudes would influence specific testing attitudes. Testing experience and cognitive ability were also expected to influence perceptions of test performance, and cognitive ability was expected to be related to general testing attitudes. In addition, perceptions of test performance were hypothesized to influence specific testing attitudes. Also, it was hypothesized that testing experience would be related to general testing attitudes and cognitive ability. The data support all of these hypotheses.

Race and gender were hypothesized to influence perceptions of performance. These hypotheses were not supported. Race also was not related to general test motivation, but was positively related to general test anxiety (with African Americans being less anxious about testing than whites) and negatively related to general beliefs about testing (with African Americans having more negative beliefs about testing than whites). Race was significantly related to cognitive ability and testing experience, with African Americans having lower cognitive ability scores, as hypothesized, but more testing experiences than whites--the opposite of what was hypothesized.

For the final hypothesis, it was expected that participants who received information about testing and corporate testing policy would have more positive specific (post-test) testing attitudes than those who do not receive the information. This hypothesis was partially supported because those participants who received the brochure

had more positive ratings on the beliefs about testing scale than those participants who did not receive the brochure.

Intelligence. Intelligence, or cognitive ability, was found to predict perceptions of performance, which supports previous research on self-assessment (Fletcher & Kerslake, 1992). This result indicates that, in general, the more intelligent you are, the more likely you are to predict that you have done well on a test. Because the test in question (the Universal Test Battery) was a cognitive ability test, then the more intelligent participants did perform better on the test, as they predicted.

Cognitive ability was also significantly correlated with general test anxiety. This finding indicates that those who are more intelligent are less anxious about test taking than those who are less intelligent. Cognitive ability was also significantly correlated with general test motivation and general beliefs about testing. These findings indicate that those with more intelligence tend to be more motivated to take tests and have more positive beliefs about testing than those who are less intelligent.

General testing attitudes. As predicted, general testing attitudes predicted specific testing attitudes. That is, the way individuals generally feel about tests helps them form perceptions of current testing experiences. Therefore, if an individual exhibits positive general test motivation attitudes, it is highly likely that he/she will also exhibit positive specific test motivation attitudes, and the same idea holds true for general test anxiety and general beliefs about testing. This finding agrees with the idea that individuals are usually quite consistent in their attitudes (Worchel et al., 1991) and that individuals use their past experiences to help them form their attitudes toward current

experiences (Adams, 1965).

The magnitude of this relationship was smallest for general test anxiety. This weaker, though still statistically significant relationship, is likely due to a decrease in test anxiety after the test has occurred. Though participants were asked to consider their anxiety toward the test in question, the fact that they had already been through the test probably resulted in reduced anxiety for the specific (post-test) measure of test anxiety.

General test motivation, general test anxiety, and general beliefs about testing were also positively correlated with testing experience, indicating that the more testing experiences, the more positive the general attitudes toward testing. These findings may be due to the idea that the more testing experiences an individual has, the less the testing experience is an enigma to him/her (Anastasi, 1982). That is, the more experiences one has, the clearer the expectations and the deeper the understanding of testing which lead to less test anxiety, more test motivation, and more positive beliefs about testing. However, because this relationship is correlational, it may be that individuals start with more positive testing attitudes and are therefore less anxious or worried and more motivated about test taking. These more positive attitudes may lead to more confidence and an increased openness to test taking experiences. Regardless of the nature of the relationships, these findings lend more support for the idea that the more testing experiences, the more positive the testing attitudes.

Race and gender. Neither race nor gender predicted perceptions of performance, but race was significantly related to cognitive ability and testing

experience, with African Americans scoring lower on the cognitive ability test, but having more reported testing experiences than whites. Finding lower scores on the cognitive ability test for African Americans in comparison to other subgroups is consistent with an abundance of past research on cognitive ability (e.g., Boehm, 1972). However, the finding that African Americans report more testing experiences is opposite of that hypothesized.

African Americans also reported less anxiety about taking tests, but had more negative beliefs about testing than whites. This disparity in attitudes may fit with the idea of "cultural inversion"--rejecting aspects of the dominant (i.e., white) culture (APA, 1995). Reporting that they are less anxious, but at the same time reporting more negative beliefs about testing may indicate a feeling of little control over the test taking experience (e.g., "why should I get worried because I know I cannot succeed in this system"). However, less test anxiety may not truly translate into less test motivation, and no significant differences were found on the test motivation scale for African Americans and whites. But, the disparity in the relationships between test anxiety and beliefs about testing may be indicate a feeling of learned helplessness with regard to the "system," a system in which employment testing, with all of its rules and policies, easily fits into.

Testing experience. Testing experience was found to be positively correlated with general test motivation, general test anxiety, general beliefs about testing, and cognitive ability. Testing experience was also found to influence perceptions of performance on the Universal Test Battery. These relationships support the idea that the more testing

experiences, the more positive the attitudes about testing and the higher the cognitive ability. This finding indicates that past experiences with tests help individuals form perceptions about how well they do on subsequent tests, again consistent with the social psychology literature (Worchel et al., 1991). The information from previous testing experiences, because it helps to form the "test schema," allows individuals to translate their own input into their own perceptions of performance.

Perceptions of performance. Perceptions of performance was predictive of specific testing attitudes. In other words, an individual's perceptions of how well he or she did on the test was positively related to the attitudes he/she has about the test. This finding is consistent with attribution theory (Weiner, 1985). If a test taker performs poorly on a test, then the person will not attribute the poor performance to a lack of ability. Instead, the test taker is likely to perceive the test to be unfair or exhibit other negative attitudes about the test and testing processes. However, if an individual does perform well on a test, it is likely that the person will believe the test to be fair and will have more positive testing attitudes.

The strongest relationship between perceptions of performance and specific test attitudes was for specific test anxiety. Its structural coefficient was two to three times larger than those for test motivation and beliefs about testing (i.e., .63 versus .20 and .29). This result implies that individuals who indicate that they were less anxious about their test performance (i.e., more positive scores on the test anxiety scale) were more likely to say they performed better on the test than those who said they were more anxious.

Brochure manipulation. Those participants who received the brochure had more positive specific beliefs about testing than those who did not receive the brochure. These differences imply that participants who received the brochure "accepted" the information in the brochure, they did not merely read it (Eagly & Himmelfarb, 1978, p. 518) and that this acceptance resulted in some degree of attitude change. This result implies that the brochure gave participants more information about the validity and utility of testing and that information translated into more positive beliefs about testing. This finding is encouraging because it supports the idea that many people may feel negatively about testing simply because they do not understand the reasons why tests are used. If more companies give information about testing to candidates taking employment tests, perhaps attitudes about employment testing will improve. This finding is consistent with other research that shows that giving information about testing, the job, or other aspects of the selection process will yield more positive outcomes than not giving the information (e.g., Rynes & Miller, 1983).

This result is consistent with Petty and Cacioppo's (1986) Elaboration Likelihood Model. The brochure offered persuasive information to the participants via the central processing route and resulted in changes in beliefs about testing. The Elaboration Likelihood Model would suggest that this type of attitude change is long lasting and resistant to change. Future research should investigate whether these changes in attitudes are long-term changes and how these changes affect future test performance.

Interestingly, there were no significant mean differences for the brochure/no

brochure groups on the specific test motivation and specific test anxiety measures. Finding no differences for these two measures may indicate that test motivation and test anxiety are individual attributes that are affect laden and that are difficult to change by giving information about testing.

A positive public image is important for most companies. Providing information can help form more positive perceptions which may result in more positive public images. The best way to present the information to the applicants may be to provide them detailed information about the test and the testing experience before the test and then to offer information about feedback and retest intervals, how the tests are used to make decisions, validity information, how tests are scored, and rules regarding confidentiality of test results after the test. The attributions that many people make about testing and the reactions to the testing process can have a negative impact on companies (e.g., the attraction to the organization, perceptions of fairness, likelihood to accept the job offer), even affecting behavior and performance if the applicant is hired (Arvey, 1992). Despite the difficulties faced when attempting to describe these complicated concepts to applicants, this research lends support to the idea that giving information about testing is well worth the effort.

Poor Model Fit

The overall structural model was not well supported by the data. The likely explanation for the poor fit is that there are additional latent variables that could be added to the model. Because the relationships among the constructs in this research had not been studied before, it is likely that there are other latent variables that could

improve model fit. For example, the degree to which a candidate needs to obtain the job that he/she is testing for and the number of other employment options he/she has are likely to influence the relationship between perceptions of performance and specific testing attitudes. Other latent variables that may be important to investigate are the values that individuals have (e.g., the importance of education, the justness of society, the importance of a secure future) and beliefs about opportunity (e.g., what can be achieved in life, being able to improve socio-economic status) (Glickman, n.d.).

Limitations of the Findings

A limitation to this research may involve the honesty in the participants' responses. The participants may have overstated their attitudes about test taking. That is, participants may have been motivated to be viewed positively by the company because they were trying to obtain positions. Steps were taken to ensure honest responses (i.e., written and verbal instructions that their responses were confidential and would not be related to employment opportunities), but some participants may have not felt comfortable enough to be completely honest.

Another limitation to this research was the measurement of testing experience. Unfortunately, the testing experience construct did not yield as tight a factor structure as hoped, and many of the aspects of testing experience were subsequently not included in the composite measure. Further research should investigate the complexities of testing experience and investigate how they are related to the other variables in this research.

Implications for Future Research and Practice

One of the most important implications from this research is that each testing experience adds to the general attitudes about testing, and that those general attitudes about testing influence the performance on the next test taken. In order to investigate this idea, a longitudinal study is required to see how each experience influences the next. Though difficult and onerous to conduct, a longitudinal study would allow for a more comprehensive analysis of this idea. Another related idea for further research involves investigating the stability of the test taking attitudes after the applicant is accepted or rejected for the job. It is likely, based on attribution theory, that testing attitudes may become more negative after rejection, as found in research by Lounsbury et al. (1989). Also, the kind of test feedback that the applicant receives could further influence test taking attitudes and should be investigated.

One of the key practical implications from this research is in regard to the information intervention. Giving more information about why tests are used is an easy way for companies to encourage more positive attitudes about their testing programs and would likely apply to any other human resources process or system, as well. Because it is so easy to do and because this research supports the idea that information really does change attitudes, companies should consider incorporating this type of information into their human resources policies and procedures.

Future research should investigate how personality variables are related to attitudes about testing. In some exploratory analyses conducted outside of the present research, there were significant statistical relationships among the testing attitudes and

the personality measures included in the Universal Test Battery. More research is needed to investigate how different aspects of the personality influence attitudes about testing. It is likely that the more "positive" personality traits (e.g., ambition, energy) are related to more positive testing attitudes, adding more fuel to the ever spiraling relationship between intelligence, testing attitudes, and test performance. Further research could also focus on how personality traits and test taking attitudes influence test validity. Research by Schmit and Ryan (1992) found that "the criterion-related validity of the personality test was found to be higher for the subsample with less positive test-taking motivation than for the subsample with higher test-taking motivation" (p. 634).

Conclusion

One of the goals of this research was to shed more light on why, on the average, African Americans consistently have lower scores on cognitive ability tests. Though no consistent general testing attitude differences were found for different races, this research showed that testing experiences, cognitive ability, and perceptions of performance help to explain attitudes toward testing. All of these variables are likely to impact test performance, but more research is needed to understand the discrepancy in cognitive ability tests for different races. As Guion (1992) stated "centuries of slavery and economic deprivation have, for black citizens as a group, had results more serious than mere depression of test scores" (p. 359). This deprivation has resulted in poor education, a sense of hopelessness, and a lack of competitive labor market skills. Obviously, more research is needed to further understand this important topic.

Overall, the support for the relationships among the latent variables was strong, indicating that this area of study is a fruitful one that possibly helps to explain many of the important questions we have about cognitive abilities, subgroup differences, and attitudes about testing. Further, it is expected that these findings would generalize to other employment testing situations. More research is needed to further investigate the complex relationships among the precursors to testing attitudes, testing attitudes, and test performance (e.g., how are perceptions of performance related to actual performance). Very little research has investigated these relationships and the research that has been conducted has been "fragmented and atheoretical" (Schmitt & Gilliland, 1992, p. 29). Because it seems that employment testing is here to stay and is likely to become even more prevalent, it is imperative that we delve deeper into these issues. The social and practical implications of differences in testing attitudes and influences on test performance are large and must be thoroughly understood.

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APPENDIX A

TESTING ATTITUDE SURVEY

Motivation

Doing well on this test (or these tests) is important to me.

I wanted to do well on this test or tests.

I tried my best on this test or test.

I tried to do the very best I could to on this test or tests.

While taking this test or test, I concentrated and tried to do well.

I want to be among the top scorers on this test (or these tests)

I pushed myself to work hard on this test or these tests.

I was extremely motivated to do well on this test or tests.

*I just didn't care how I did on this test or tests.

*I didn't put much effort into this test or tests.

Lack of Concentration

It was hard to keep my mind on this test or tests.

I found myself losing interest and not paying attention to the test or tests.

During the test session, I was bored.

I get distracted when taking tests of this type.

Belief in Tests

*This test or tests was a good reflection of what a person could do in the job.

*Tests are a good way of selecting people into jobs.

This kind of test or tests should be eliminated.

I don't believe that tests are valid.

Comparative Anxiety

I probably didn't do as well as most of the other people who took these tests.

I am not good at taking tests.

During the testing, I often thought about how poorly I was doing.

I usually get very anxious about taking tests.

*I usually do pretty well on tests.

*I expect to be among the people who score really well on this test.

My test scores don't usually reflect my true abilities.

I very much dislike taking tests of this type.

During the test or tests, I found myself thinking of the consequences of failing.

During the testing, I got so nervous I couldn't do as well as I should have.

Test Ease

This test was (or these tests were) too easy for me.

I found this test or tests too simple.

*I found this test or tests interesting and challenging.

*I felt frustrated because many of the test questions were too difficult.

External Attribution

I became fatigued and tired during the testing.

The questions on this test or tests were ambiguous and unclear.

I have not been feeling well lately and this affected my performance on the test or tests.

While taking the test or tests, I was preoccupied with how much time I had left.

I felt a lot of time pressure when taking this test or tests.

General Need Achievement

Once I undertake a task, I usually push myself to my limits.

I try to do well in everything I undertake.

*In general, I like to work just hard enough to get by.

Future Effects

*My performance on this test will not affect my chances for obtaining a job or gaining a promotion.

Scores from this test or tests will probably affect my future.

These test scores will be used in future decisions made about me.

Preparation

I spent a good deal of time preparing for this test or tests.

I prepared a lot for this test or tests.

*reverse scored

APPENDIX B

SUBJECT MATTER EXPERT RECOMMENDATIONS

Subject Matter Expert Recommendations

If the subject matter expert circled a 1, 2, or 3 on Exercise 2 (indicating that the three dimensions--test motivation, test anxiety, and beliefs about testing, were not adequately tapping into the domain of general testing attitudes) then he or she was asked to offer suggestion for other relevant dimensions that would more fully assess general testing attitudes.

Responses from SME Group:

- I'll be interested to see if you can differentiate between Test Motivation and Test Anxiety. There were several question that I could have rated on either scale. Would Like/Dislike Tests be another dimension? You can believe tests are useful and still not like them.
- Perhaps a cynicism/trust-distrust dimension would be useful "trick questions" "mis-use of results"
- From the employer's standpoint, there are probably also economic (cost of testing) and legal exposure dimensions.
- It is very hard to assess a "general testing attitude" -- most reactions vary widely depending on the specific testing situation. I can generally have a high belief in the usefulness of tests, be motivated to perform well, and have very low anxiety--but show up completely opposite on all these dimensions if I'm given a very poorly constructed (i.e., bad) test for a job I absolutely have to have in order to feed my family. In short, it depends too much on individual experience and specific circumstances.

APPENDIX C

MEASURES FOR SUBJECT MATTER EXPERT FOCUS GROUPS

Testing Attitudes: Assessing the Determinants and Consequences

Thank you for agreeing to participate in this study. The exercises that you are about to participate in will be used to develop a measure of general testing attitudes. Three exercises are included in this packet.

Exercise 1 asks you to sort items that have been developed to assess different components of testing attitudes into their respective dimensions.
Exercise 2 asks for your opinions about dimensions of general testing attitudes.
Exercise 3 asks for you to provide specific incidents that you have encountered regarding testing attitudes.

Please complete each exercise in the specified order. If you do not understand the directions at any time, please ask the researcher for clarification. ***Any information that you provide will be used for research purposes only.*** Answer the following questions by printing your answer or placing a check mark in the blank next to your response.

Background Information

Sex:

____ Female ____ Male

Race:

_____ African American
_____ American Indian/Alaskan Native
_____ Asian/Pacific Islander
_____ Hispanic
_____ White
_____ Other: _____

Age:

_____ 20 and under
_____ 21 to 30
_____ 31 to 40
_____ 41 to 50
_____ 51 to 60
_____ 61 and over

Education:

_____ 8th grade or less
_____ Some high school
_____ High school graduate
_____ Some college
_____ College graduate
_____ Some advanced college
_____ Master's degree (area:)
_____ Ph. D. (area:)

Job Title:

Company:

Years of Experience in Human Resources:

Years of Experience with Personnel Testing:

Years of Experience with Staffing:

General Testing Attitudes
Exercise 1: Sorting Items Into Dimensions

For each of the following items, write the corresponding letters for the dimension that the item best represents in the blank space before each item. Also, while you are reading, please edit or modify items that you believe to be unclear.

Use the following abbreviations:

BT for Belief in Tests - *refers to general opinions about the usefulness of tests*
TM for Test Motivation - *refers to desires for performing well on tests*
CA for Comparative Anxiety - *refers to concerns about taking tests*

1. I want to be among the top scorers on tests.
2. Tests are a way of treating people fairly and consistently.
3. I am extremely motivated to do well on tests.
4. During testing, I have gotten so nervous I couldn't do as well as I should have.
5. I try to do the very best I can on tests.
6. I very much dislike taking tests.
7. I would prefer supervisors/managers to independently select people for the job.
8. Doing well on tests is important to me.
9. I usually do pretty well on tests.
10. Tests should be eliminated.
11. I have tried my best on tests.
12. I expect to be among the people who score really well on tests.
13. Tests are a good reflection of what a person could do in the job.

Use the following abbreviations:

BT for Belief in Tests - *refers to general opinions about the usefulness of tests*
TM for Test Motivation - *refers to desires for performing well on tests*
CA for Comparative Anxiety - *refers to concerns about taking tests*

14. I probably don't do as well as most other people who take tests.

15. While taking tests, I concentrate and try to do well.

16. Tests are the company's way of roadblocking hard workers.

17. During testing, I often think about how poorly I am doing.

18. My test scores don't usually reflect my true abilities.

19. I don't care how well I do on tests.

20. During tests, I have found myself thinking of the consequences of failing.

21. I believe this company cares about how it selects people for jobs.

22. I push myself to work hard on tests.

23. I have wanted to do well on tests.

24. People who do well on tests are probably good performers on the job.

25. Tests are a good way of selecting people into jobs.

26. I am not good at taking tests.

27. I don't believe that tests are valid.

28. I don't put much effort into tests.

29. Tests have nothing to do with what I can really do on the job.

30. I usually get very anxious about taking tests.

General Testing Attitudes
Exercise 2: Rating Dimensions

The following three dimensions comprise the measure of general testing attitudes as it has been developed so far.

> Belief in Tests - *refers to general opinions about the usefulness of tests*
> Test Motivation - *refers to desires for performing well on tests*
> Comparative Anxiety - *refers to concerns about taking tests*

The goal of the General Testing Attitude Survey is to assess the testing attitudes that a person may have at any given point in time--NOT to assess the attitudes a person may have about a specific test or a specific testing experience. *Any dimensions that assess attitudes about specific tests are not applicable to the development of this measure.*

Given the information above, **to what extent do you believe these three dimensions combined are tapping into the entire domain of general testing attitudes?**

Please circle your response to this question on the following rating scale.

1	2	3	4	5
Not at All	To Some Extent	Moderately	To a Large Extent	To a Great Extent

If you circled a 1, 2, or 3, please offer suggestions for other relevant dimensions (and a definition of the dimension) of GENERAL testing attitudes that would more fully assess general testing attitudes:

General Testing Attitudes
Exercise 3: Critical Incidents

In the following blanks please write as many stories, incidents, discussions, etc. that you have witnessed (directly or indirectly) regarding reactions to personnel tests. Please give as much detail as possible when describing each of the incidents (use the back of the page if necessary). Also, try to generate both positive and negative incidents. If possible and if applicable to your organization, also generate any incidents regarding attitudes toward computerized tests. (Note: these incidents will be used for research purposes only and no incidents will in any way be linked to any person or organization.)

Incident Regarding Computerized Testing Attitudes:

Positive:

Negative:

Incident Regarding Testing Attitudes:

Positive:

Negative:

Incident Regarding Testing Attitudes:

Positive:

Negative:

Thank you for your participation!

APPENDIX D

ITEM MODIFICATIONS TO

THE GENERAL TESTING ATTITUDE SURVEY

Table D1

Test Motivation Item Development

Test Attitude Survey	After Researcher	After SMEs	After Pilot Study	After CFA
Doing well on this test is important to me.	Doing well on tests is important to me.	Doing well on tests is important to me.	Doing well on tests is important to me.	Doing well on tests is important to me.
I wanted to do well on this test.	I have wanted to do well on tests.	I have wanted to do well on tests.	I want to do well on tests.	I want to do well on tests.
I tried my best on this test.	I have tried my best on tests.	I have tried my best on tests.	I have tried my best on tests.	I have tried my best on tests.
I tried to the very best I could to on this test.	I try to do the very best I can on tests.	I try to do the very best I can on tests.	I try to do the very best I can on tests.	I try to do the very best I can on tests.
While taking this test, I concentrated and tried to do well.	While taking tests, I concentrate and try to do well.	I concentrate while taking tests so that I can do well.	I concentrate while taking tests so that I can do well.	I concentrate while taking tests so that I can do well.
I want to be among the top scorers on this test.	I want to be among the top scorers on tests.	I want to be among the top scorers on tests.	I want to be among the top scorers on tests.	I want to be among the top scorers on tests.
I pushed myself to work hard on this test.	I push myself to work hard on tests.	I push myself to work hard on tests.	I push myself to work hard on tests.	I push myself to work hard on tests.
I was extremely motivated to work hard on this test.	I am extremely motivated to do well on tests.	I am extremely motivated to do well on tests.	I am extremely motivated to do well on tests.	I am extremely motivated to do well on tests.
I just didn't care how I did on this test.	I don't care how well I do on tests.	I don't care how well I do on tests.	I don't care how well I do on tests.	ITEM DELETED
I didn't put much effort into this test.	I don't put much effort into tests.	I don't put much effort into tests.	I don't put much effort into tests.	I don't put much effort into tests.

Table D2

Test Anxiety Item Development

Test Attitude Survey	After Researcher	After SMEs	After Pilot Study	After CFA
I probably didn't do as well as most of the other people who took these tests.	I probably don't do as well as most other people who take tests.	I probably don't do as well as most other people who take tests.	I probably don't do as well as most other people who take tests.	I probably don't do as well as most other people who take tests.
I am not good at taking tests.	I am not good at taking tests.	I am not good at taking tests.	I am not good at taking tests.	I am not good at taking tests.
During the testing, I often though about how poorly I was doing.	During testing, I often think about how poorly I am doing.	During testing, I often think about how poorly I am doing.	During testing, I often worry about how poorly I am doing.	During testing, I often worry about how poorly I am doing.
I usually get very anxious about taking tests.	I usually get very anxious about taking tests.	I usually get very anxious about taking tests.	I usually get very anxious about taking tests.	I usually get very anxious about taking tests.
I usually do pretty well on tests.	I usually do pretty well on tests.	I usually don't worry about taking tests.	I usually don't worry about taking tests.	I usually don't worry about taking tests.
I expect to be among the people who score really well on this test.	I expect to be among the people who score really well on tests.	I rarely get anxious about how well I perform on tests.	I get anxious about how well I perform on tests.	ITEM DELETED
My test scores don't usually reflect my true abilities.	My test scores don't usually reflect my true abilities.	My test scores don't usually reflect my true abilities because I get very nervous while taking tests.	My test scores don't usually reflect my true abilities because I get very nervous while taking tests.	My test scores don't usually reflect my true abilities because I get very nervous while taking tests.

Table D2 (Continued)

Test Attitude Survey	After Researcher	After SMEs	After Pilot Study	After CFA
I very much dislike taking tests of this type.	I very much dislike taking tests.	I very much dislike taking tests.	I dislike taking tests.	I dislike taking tests.
During the test, I found myself thinking of the consequences of failing.	During tests, I have found myself thinking of the consequences of failing.	During tests, I have found myself thinking of the consequences of failing.	During tests, I have found myself thinking of the consequences of failing.	During tests, I have found myself thinking of the consequences of failing.
During the testing, I got so nervous I couldn't do as well as I should have.	During testing, I have gotten so nervous I couldn't do as well as I should have.	During testing, I have gotten so nervous I couldn't do as well as I should have.	During testing, I have gotten so nervous I couldn't do as well as I should have.	During testing, I have gotten so nervous I couldn't do as well as I should have.

Table D3

Beliefs About Testing Item Development

Test Attitude Survey	After Researcher	After SMEs	After Pilot Study	After CFA
This test was a good reflection of what a person could do in the job.	Tests are a good reflection of what a person could do in the job.	Tests are a good reflection of what a person could do in the job.	Tests are a good reflection of what a person could do on the job.	Tests are a good reflection of what a person could do on the job.
Tests are a good way of selecting people into jobs.	Tests are a good way of selecting people into jobs.	Tests are a good way of selecting people into jobs.	Tests are a good way of selecting people into jobs.	Tests are a good way of selecting people into jobs.
This kind of test should be eliminated.	Tests should be eliminated.	Tests should be eliminated.	Tests should be eliminated.	Tests should be eliminated.
I don't believe that tests are valid.	I don't believe that tests are valid.	I don't believe that tests are valid.	I don't believe that tests are valid (i.e., that tests predict who will be successful on the job).	I don't believe that tests are valid (i.e., that tests predict who will be successful on the job).
ITEM DEVELOPED	Tests are a way of treating people fairly and consistently.	Tests are a way of treating people fairly and consistently.	Tests are a way of treating people fairly and consistently.	Tests are a way of treating people fairly and consistently.
ITEM DEVELOPED	I would prefer supervisors/managers to independently select people for the job.	I would prefer supervisors/managers to independently select people for the job.	I would prefer that supervisors/managers not use tests to select people for jobs.	I would prefer that supervisors/managers not use tests to select people for jobs.
ITEM DEVELOPED	Tests are the company's way of roadblocking hard workers.	Tests are the company's way of roadblocking hard workers.	Tests are the company's way of roadblocking hard workers	ITEM DELETED

Table D3 (Continued)

Test Attitude Survey	After Researcher	After SMEs	After Pilot Study	After CFA
ITEM DEVELOPED	I believe this company cares about how it selects people for jobs.	I believe this company cares about how it selects people for jobs.	I believe companies use valid tests (i.e., tests that predict who will be successful) to select people for jobs.	I believe companies use valid tests (i.e., tests that predict who will be successful) to select people for jobs.
ITEM DEVELOPED	People who do well on tests are probably good performers on the job.	People who do well on tests are probably good performers on the job.	People who do well on tests are probably good performers on the job.	People who do well on tests are probably good performers on the job.
ITEM DEVELOPED	Tests have nothing to do with what I can really do on the job.	Tests have nothing to do with what I can really do on the job.	Tests have nothing to do with what people can really do on the job.	Tests have nothing to do with what people can really do on the job.

APPENDIX E

MEASURES USED IN PHASE 2

Project Testing

Thank you for agreeing to participate in this study. Please follow the instructions that are numbered below in the order that they are presented. If you do not understand the instructions or have any questions, please raise your hand and the experimenter will help you.

1) Complete the ***Informed Consent***.

2) Complete the ***General Testing Attitude Survey*** by filling in the appropriate circles on the enclosed bubble sheet with a #2 pencil.

3) Read the brochure entitled ***Questions and Answers about Selection Testing and the UTB***.

4) Answer the questions on the ***Testing Questionnaire*** by filling in the appropriate circles on the enclosed bubble sheet with a #2 pencil.

5) Check to make sure you have filled in a response to all 43 items.

6) Complete the ***Psychology Credit Form***. Remove the bottom portion of the form for your records.

7) Put all forms (including the ***Psychology Credit Form***) back in to the envelope.

8) Return the envelope to the experimenter.

9) Obtain the ***Project Testing Debriefing*** from the experimenter and read it.

Thank you for your participation!

Project Testing

Thank you for agreeing to participate in this study. Please follow the instructions that are numbered below in the order that they are presented. If you do not understand the instructions or have any questions, please raise your hand and the experimenter will help you.

1) Complete the ***Informed Consent***.

2) Complete the ***General Testing Attitude Survey*** by filling in the appropriate circles on the enclosed bubble sheet with a #2 pencil.

3) Answer the questions on the ***Testing Questionnaire*** by filling in the appropriate circles on the enclosed bubble sheet with a #2 pencil. This questionnaire is a general knowledge questionnaire that is being evaluated by us on segments of the general public.

4) Check to make sure you have filled in a response to all 43 items.

5) Complete the ***Psychology Credit Form***. Remove the bottom portion of the form for your records.

6) Put all forms (including the ***Psychology Credit Form***) back in to the envelope.

7) Return the envelope to the experimenter.

8) Obtain the ***Project Testing Debriefing*** from the experimenter and read it.

Thank you for your participation!

General Testing Attitude Survey

INSTRUCTIONS: Rate the extent to which you agree with each of the following statements by selecting a number that corresponds to your response. Fill in the appropriate number for each statement on the bubble sheet in this packet with a #2 pencil. Please answer honestly and respond to each statement.

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

1. **I want to be among the top scorers on tests.**
2. **Tests are a way of treating people fairly and consistently.**
3. **I am extremely motivated to do well on tests.**
4. **During testing, I have gotten so nervous I couldn't do as well as I should have.**
5. **I try to do the very best I can on tests.**
6. **I very much dislike taking tests.**
7. **I would prefer supervisors/managers to independently select people for the job.**
8. **Doing well on tests is important to me.**
9. **I usually don't worry about taking tests.**
10. **Tests should be eliminated.**
11. **I have tried my best on tests.**
12. **I rarely get anxious about how well I perform on tests.**
13. **Tests are a good reflection of what a person could do in the job.**
14. **I probably don't do as well as most other people who take tests.**
15. **I concentrate while taking tests so that I can do well.**

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

16. **Tests are the company's way of roadblocking hard workers.**
17. **During testing, I often worry about how poorly I am doing.**
18. **My test scores don't usually reflect my true abilities because I get very nervous while taking tests.**
19. **I don't care how well I do on tests.**
20. **During tests, I have found myself thinking of the consequences of failing.**
21. **I believe this company cares about how it selects people for jobs.**
22. **I push myself to work hard on tests.**
23. **I have wanted to do well on tests.**
24. **People who do well on tests are probably good performers on the job.**
25. **Tests are a good way of selecting people into jobs.**
26. **I am not good at taking tests.**
27. **I don't believe that tests are valid.**
28. **I don't put much effort into tests.**
29. **Tests have nothing to do with what I can really do on the job.**
30. **I usually get very anxious about taking tests.**

Testing Questionnaire

Please choose the best answer to the following questions by filling in the appropriate letter on the bubble sheet with a #2 pencil. If you do not know the answer to the question, DO NOT GUESS--instead, select the letter with the answer "I don't know."

31) What is a selection test?
- a. Any instrument or process that is used only for hiring new employees
- b. Any instrument or process that is used for placement, promotion, demotion, or transfer
- c. Any instrument or process that is used only for placement or promotion
- d. I don't know

32) Which of the following does Bell Atlantic use for selecting new employees?
- a. Cognitive skills tests
- b. SAT scores
- c. Grade point averages
- d. I don't know

33) Which of the following is an acceptable reason to use selection tests?
- a. Applicants like selection tests
- b. To increase discrimination
- c. Both a. and b.
- d. Neither a. nor b.
- e. I don't know

34) How does Bell Atlantic benefit by placing qualified people into jobs?
- a. By increasing the likelihood that they will remain in the job
- b. By increasing the likelihood that they will like the job
- c. By increasing the likelihood that they will increase turnover
- d. I don't know

35) Which does Bell Atlantic incorporate into its selection process?
- a. objective standards
- b. subjective standards
- c. supervisors' opinions
- d. I don't know

36) What is the UTB?
- a. the Uniform Test Battery
- b. the Universal Test Battery
- c. the Undergraduate Testing Battery
- d. I don't know

37) Which of the following is NOT included in the UTB?
- a. spelling
- b. science
- c. number computation
- d. I don't know

38) How long does it take to complete the UTB?
- a. 1 hour
- b. 2 hours
- c. 3 hours
- d. I don't know

39) Who has to take the UTB?
- a. all undergraduate applicants
- b. all applicants for management-level positions
- c. all applicants for associate-level positions
- d. I don't know

40) The UTB is:
- a. a paper-and-pencil test
- b. a computerized test
- c. an interview
- d. I don't know

41) Your gender:
- a. female
- b. male

42) Your race:
- a. African American
- b. American Indian/Alaskan Native
- c. Asian/Pacific Islander
- d. Hispanic
- e. White

Other:_____

43) Your age:
- a. 20 and under
- b. 21 to 30
- c. 31 to 40
- d. 41 to 50
- e. 51 and over

APPENDIX F

STUDY 1 CONFIRMATORY FACTOR ANALYSES

Table F1

General Test Motivation: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM1	.47	.58	.27
ITEM3	.60	.51	.41
ITEM5	.60	.25	.59
ITEM8	.61	.30	.55
ITEM11	.40	.65	.20
ITEM15	.46	.41	.35
ITEM19	.62	.40	.49
ITEM22	.63	.31	.56
ITEM23	.44	.46	.29
ITEM28	.63	.56	.41

Note. N = 172. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 35, $p < .01$) = 81.25, non-normed fit index = .90, and comparative fit index = .92. All T-values for factor loadings and measurement error variances are statistically significant ($p < .05$) and are greater than 2.0.

Table F2

General Test Anxiety: Factor Loadings Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM4	.93	.60	.59
ITEM6	.53	.97	.22
ITEM9	.59	1.10	.24
ITEM12	.44	1.16	.14
ITEM14	.65	.70	.38
ITEM17	.78	.59	.51
ITEM18	.93	.52	.63
ITEM20	.67	.95	.32
ITEM26	.84	.68	.51
ITEM30	.87	.51	.60

Note. N = 172. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 35, p < .01) = 160.12, non-normed fit index = .77, and comparative fit index = .82. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are greater than 2.0.

Table F3

General Beliefs about Testing: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM2	.53	.72	.28
ITEM7	.53	.83	.25
ITEM10	.66	.77	.36
ITEM13	.75	.62	.48
ITEM16	.32	.57	.15
ITEM21	.12	.57	.02
ITEM24	.40	.63	.20
ITEM25	.72	.26	.67
ITEM27	.43	.56	.25
ITEM29	.64	.58	.41

Note. N = 172. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 35, $p < .01$) = 120.57, non-normed fit index = .75, and comparative fit index = .81. All T-values for factor loadings and measurement error variances are statistically significant ($p < .05$) and are greater than 2.0, except for ITEM21 (the T-value for this item is 1.85). This item was subsequently modified to more clearly assess General Beliefs about Testing.

APPENDIX G

SCRIPT USED TO OBTAIN PARTICIPANTS

Data Collection

Participant Sign-Up Script

Hi. May I speak with _____ ?

I am calling from Bell Atlantic. You have recently been scheduled to take the Universal Test Battery on _____ , is this correct?

We were wondering if you would be interested in participating in a research project that we are conducting. It would take place about 20 minutes before you take the UTB and about 10 minutes after you take the UTB. You would be completing surveys about how you feel about tests.

We will be paying you $10 if you participate. Your participation has nothing to do with getting a job with Bell Atlantic and your participation is completely voluntary. Are you interested in participating?

If yes:

-show up at 8:15 (or 45 minutes before scheduled)
-go to regular test session early (same directions as given by HRS)
-meet in lobby
-nothing to do with HRStrategies
-tell name of the person he/she will be meeting before the UTB
-call me if any problems (give number)
-thank

APPENDIX H

MEASURES USED IN STUDY 2

Project Testing
Instructions

Thank you for agreeing to participate in this study. Please follow the instructions listed below:

1) **Answer each question in the order specified.**

2) **Answer all questions.**

3) **Write legibly.**

4) **If you have any questions, please ask the person who gave you this packet.**

5) **When you finish, please put all materials back into the envelope and return the entire packet to the person who gave you the packet.**

6) **Begin on the next page.**

Thank you for your participation!

Project Testing

I, _____, understand that by agreeing to participate in this research I am allowing the researcher to use the information I offer for research purposes only. I also agree that the researcher may obtain my Universal Test Battery scores as part of the research. I understand that my name will not be linked to this research, no information will be shared with any Bell Atlantic employee (except for the researcher) about the specific information that I offer, I may leave at any time, and participation in this research will not impact my employment status at Bell Atlantic.

Signature: _____
Date: _____

Please answer the following questions by printing your answer or placing a check mark in the blank next to your response.

Social Security Number: _____

Age:

_____ 20 and under
_____ 21 to 30
_____ 31 to 40
_____ 41 to 50
_____ 51 and over

YOUR Highest Degree Achieved:

_____ Elementary School Graduate
_____ High School Graduate
_____ Associate's Degree or Technical/Trade School Degree
_____ Bachelor's Degree (4 year college degree)
_____ Master's Degree
_____ Doctoral Degree or other Professional Degree (e.g., Law School)
_____ Professional Certificate/License

YOUR MOTHER'S Highest Degree Achieved:

_____ Elementary School Graduate
_____ High School Graduate
_____ Associate's Degree or Technical/Trade School Degree
_____ Bachelor's Degree (4 year college degree)
_____ Master's Degree
_____ Doctoral Degree or other Professional Degree (e.g., Law School)
_____ Professional Certificate/License
_____ Unknown/Not Applicable

YOUR FATHER'S
Highest Degree Achieved:

_____ Elementary School Graduate
_____ High School Graduate
_____ Associate's Degree or Technical/Trade School Degree
_____ Bachelor's Degree (4 year college degree)
_____ Master's Degree
_____ Doctoral Degree or other Professional Degree (e.g., Law School)
_____ Professional Certificate/License
_____ Unknown/Not Applicable

When you were in high school, which of the following would best describe your family's income level?

_____ Lower Class
_____ Lower Middle Class
_____ Middle Class
_____ Upper Middle Class
_____ Upper Class

1) Have you ever taken any test preparation classes?

_____ Yes _____ No

If yes, how many? _____

2) Which of the following categories best describe the previous types of jobs you have held (check all that apply)?

_____ Sales/Retail
_____ Telemarketing
_____ Craft/Technical
_____ Construction/Repair
_____ Advertising
_____ Banking
_____ Clerical/Receptionist
_____ Military
_____ Data Entry/Processing
_____ Waiter/Waitress
_____ Database Admin./Analyst
_____ Computer Programming
_____ Education/Teaching
_____ Hair Stylist/Cosmetician
_____ Nursing/Health Care
_____ Artist
_____ Truck/Taxi/Bus Driver
_____ Building Maintenance
_____ Engineering/Drafting
_____ Customer Service
_____ Social Work
Other: _____

3) How many times have you had an interview to apply for a job?

_____ 0
_____ 1 - 2
_____ 3 - 4
_____ 5 - 6
_____ More than 6

If you have had an interview(s), how well do you think you generally performed on the interview(s)?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

4) How many times have you taken an employment test to apply for a job?

_____ 0
_____ 1 - 2
_____ 3 - 4
_____ 5 - 6
_____ More than 6

5) Have you ever taken an employment test that asks you questions about honesty, stealing, etc.?

_____ Yes _____ No

If yes, how well do you think you generally performed on this kind of test?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

6) Have you ever taken an employment test that was a cognitive abilities test (e.g., asked you to solve math problems, find spelling errors, read a passage and answer questions about it)?

_____ Yes _____ No

If yes, how well do you think you generally performed on this kind of test?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

7) Have you ever taken an employment test that asked you to "pretend" like you were doing the job you were applying for by roleplaying?

_____ Yes _____ No

If yes, how well do you think you generally performed on this kind of test?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

8) Have you ever taken an employment test that asked you to do such things as type or lift something heavy, etc.?

_____ Yes _____ No

If yes, how well do you think you generally performed on this kind of test?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

9) Have you ever taken an employment test that asked you questions about your personality or interests?

_____ Yes _____ No

If yes, how well do you think you generally performed on this kind of test?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

10) Overall, how well do you think you usually do on the employment tests you have taken?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

11) The above questions refer to tests you may have taken for employment purposes. What other kinds of tests have you taken? Check all that apply.

_____ Classroom tests in high school
_____ Classroom tests in college
_____ Classroom tests in graduate school
_____ Scholastic Aptitude Test (SAT)
_____ California Achievement Test (CAT)
_____ American College Test (ACT)
_____ Graduate Record Exam (GRE)
_____ Technical certification exams
_____ Training exams
_____ Licensing exams
_____ Armed services tests
_____ IQ tests
_____ Vocational interests/career preferences tests
_____ Personality tests
_____ Other:

12) Overall, how well do you usually do on these other tests (i.e., tests that are not used for employment purposes)?

_____ Very well
_____ Above average
_____ Average
_____ Below average
_____ Poorly

13) How many times have any of your friends, coworkers, family members, and/or neighbors ever talked to you about employment tests?

_____ 0
_____ 1 - 2
_____ 3 - 4
_____ 5 - 6
_____ More than 6

If friends, coworkers, family members, and/or neighbors have talked to you about employment tests, what was the general tone of what they said?

_____ Extremely Positive
_____ Positive
_____ Somewhat Positive
_____ Neutral
_____ Somewhat Negative
_____ Negative
_____ Extremely Negative

14) How recently have you had an interview?

_____ never had an interview
_____ 1 day to 3 months ago
_____ 4 to 6 months ago
_____ 7 months to approximately one year ago
_____ approximately two years ago
_____ approximately three years ago
_____ more than four years ago, but less than 10 years ago
_____ more than 10 years ago, but less than 20 years ago
_____ more than 20 years ago

15) How recently have you taken an **employment** test?

_____ never taken an employment test
_____ 1 day to 3 months ago
_____ 4 to 6 months ago
_____ 7 months to approximately one year ago
_____ approximately two years ago
_____ approximately three years ago
_____ more than four years ago, but less than 10 years ago
_____ more than 10 years ago, but less than 20 years ago
_____ more than 20 years ago

16) How recently have you taken <u>other</u> tests (i.e., tests that are **not** used for employment purposes)?

_____ never taken a non-employment test
_____ 1 day to 3 months ago
_____ 4 to 6 months ago
_____ 7 months to approximately one year ago
_____ approximately two years ago
_____ approximately three years ago
_____ more than four years ago, but less than 10 years ago
_____ more than 10 years ago, but less than 20 years ago
_____ more than 20 years ago

17) Have you ever taken any psychology classes?

_____ Yes _____ No

If yes, how many? _____

18) Have you ever taken any classes that covered testing or measurement topics?

_____ Yes _____ No

If yes, how many? _____

For items 19-21, please circle the letter that represents the ONE best answer to the question.

19) If you were taking a multiple choice test and did not know the answer to a question BUT you knew that there was a penalty for incorrect answers, which of the following would you do?

a. Choose the last answer.
b. Guess the answer only if you could eliminate most of the options.
c. Randomly guess the answer.
d. Choose the first answer.

20) If you were taking a test and wanted to score as well as possible on the test, which of the following would you do?

a. Guess the answer to the question.
b. Work as quickly as possible.
c. Pay careful attention to directions.
d. Always go with your gut reaction.

21) If you were taking a multiple choice test and did not know the answer to a question BUT you knew there was no penalty for guessing, which of the following would you do?

a. Cover up the answer choices and only look at the question.
b. Guess an answer.
c. Not choose any answer.
d. Choose the last answer.

General Testing Attitude Survey

INSTRUCTIONS: Please read the next set of statements carefully. Answer honestly when responding to each statement. Indicate the extent to which you agree or disagree with each statement by writing the number that represents your response in the blank beside the statement. Use the following scale:

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

___ 1. I want to be among the top scorers on tests.

___ 2. Tests are a way of treating people fairly and consistently.

___ 3. I am extremely motivated to do well on tests.

___ 4. During testing, I have gotten so nervous that I couldn't do as well as I should have.

___ 5. I try to do the very best I can on tests.

___ 6. I dislike taking tests.

___ 7. I would prefer that supervisors/managers not use tests to select people for a job.

___ 8. Doing well on tests is important to me.

___ 9. I usually don't worry about taking tests.

___ 10. Tests should be eliminated.

___ 11. I have tried my best on tests.

___ 12. I get anxious about how well I perform on tests.

___ 13. Tests are a good reflection of what a person could do on a job.

___ 14. I probably don't do as well as most other people who take tests.

___ 15. I concentrate while taking tests so that I can do well.

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

___ 16. Tests are a company's way of roadblocking hard workers.

___ 17. During testing, I often worry about how poorly I am doing.

___ 18. My test scores don't usually reflect my true abilities because I get very nervous while taking tests.

___ 19. I don't care how well I do on tests.

___ 20. During tests, I have found myself thinking of the consequences of failing.

___ 21. I believe companies use valid tests (i.e., tests that predict who will be successful on the job) to select people for jobs.

___ 22. I push myself to work hard on tests.

___ 23. I want to do well on tests.

___ 24. People who do well on tests are probably good performers on the job.

___ 25. Tests are a good way of selecting people into jobs.

___ 26. I am not good at taking tests.

___ 27. I don't believe that tests are valid (i.e., that tests predict who will be successful on the job).

___ 28. I don't put much effort into tests.

___ 29. Tests have nothing to do with what people can really do on the job.

___ 30. I usually get very anxious about taking tests.

Testing Brochure

BELL ATLANTIC
Questions and Answers
about
Selection Testing
and the
UTB

What is a selection test?

Any instrument or process that is used as a basis for making selection decisions (e.g., placement, promotion, demotion, transfer) is considered a test under the federal guidelines for employee selection. Bell Atlantic uses a variety of selection tests, such as:

- COGNITIVE SKILLS TESTS: These tests cover basic skills, such as reading, vocabulary, and math.
- MINICOURSES: Minicourses are short training sessions where applicants are provided information about a job. After they receive the training, they are tested on what they learn.
- SIMULATIONS: Simulation tests require the applicant to actually perform a task or tasks that are the same as (or similar to) the tasks required on the job.

Why do we need selection tests?

Although many people dislike having to take tests in order to get a job, the use of tests to make employment decisions benefits both the company and the applicants.
Tests help the company identify applicants who are likely to perform well on a particular job. Placing qualified people into jobs benefits the company by increasing:

- the likelihood that they will remain in the job, and
- productivity levels.

From the applicant's point of view, placement in a job for which you are qualified is important. Performing a job well results in a sense of accomplishment and a more satisfying work experience. On the other hand, not having the qualifications required for your job is likely to result in a stressful work environment.

The use of selection tests is also the fairest way to make employment decisions. Tests provide the most accurate and objective indication of an applicant's ability to perform a job. The use of objective indicators (e.g., tests) rather than subjective indicators (e.g., a supervisor's opinion) to make decisions ensures that all applicants are treated in the same manner.

The UNIVERSAL TEST BATTERY (UTB) is one of Bell Atlantic's most widely used tests.

What is the UNIVERSAL TEST BATTERY?

The UNIVERSAL TEST BATTERY (UTB) is a computerized battery of ten tests designed to measure the basic knowledge, skills, and abilities necessary to perform associate-level jobs. Each of the ten subtests measures a different skill or ability. The following is a list of each of the UTB subtests:

- Spelling-*measures your ability to recognize whether a word is spelled correctly.*
- Clerical Speed and Accuracy-*measures your ability to recognize differences in pairs of names, addresses, numbers, and other symbols.*
- Concept Formation-*measures your ability to recognize similarities among words.*
- Number Computation-*measures your ability to solve basic math problems.*
- Spatial Visualization-*measures your ability to visualize groups of objects from a different perspective.*
- Vocabulary-*measures your ability to recognize words that are similar in meaning.*

- Number Series-*measures your ability to recognize the pattern that describes how a series of numbers relate to each other.*
- Mechanical Comprehension-*measures your understanding of basic mechanical concepts.*
- Reading Comprehension-*measures your ability to read and understand passages of materials.*
- Candidate Assessment of Background and Life Experiences-*measures your interpersonal skills including persuasiveness, ambition, energy, reliability, people orientation, and social adjustment.*

The UTB takes approximately 2 hours to complete, with time limits for completing each subtest.

All candidates applying for associate positions must take the UTB. The complete battery is given for all associate positions. However, not all subtests may be relevant to a specific job. Only scores on the subtests related to the job for which the candidate has applied are considered in determining qualification status.

What is taking the UTB like?

The UTB is a computerized test. However, only a few keys are used while taking the test. Before you begin the test, you are given time to become familiar with the keys you will need to take the test. *No typing or computer experience is necessary.*

Why does Bell Atlantic use the UTB?

The purpose of the UTB is to identify those candidates who are likely to perform well in associate-level positions. Extensive research has supported that those who perform well on UTB subtests relevant to a particular position also tend to perform well in that position.

Testing Questionnaire

Please choose the best answer to the following questions by circling the appropriate letter. Use only the information provided in this packet to help you answer the questions.

1) **What is a selection test?**
   a. Any instrument or process that is used for hiring, placement, promotion, demotion, or transfer
   b. Any instrument or process that is used only for hiring new employees
   c. Any instrument or process that is used only for placement or promotion
   d. Any instrument or process that is used to determine performance levels on the job

2) **Which of the following does Bell Atlantic use for selecting new employees?**
   a. Cognitive skills tests
   b. SAT scores
   c. GRE scores
   d. Quality of college education

3) **Which of the following is an acceptable reason to use selection tests?**
   a. Applicants like selection tests
   b. To increase applications
   c. Both a. and b.
   d. Neither a. nor b.

4) **How does Bell Atlantic benefit by placing qualified people into jobs?**
   a. By increasing the likelihood that they will remain in the job
   b. By increasing the likelihood that they will like the job
   c. By increasing the likelihood that turnover will increase
   d. By reducing the likelihood of job satisfaction

5) **Which of the following is used in determining who qualifies on the UTB?**
   a. objective standards
   b. subjective standards
   c. supervisors' opinions
   d. managers' opinions

6) **What is the UTB?**
   a. the Uniform Test Battery
   b. the Universal Test Battery
   c. the Undergraduate Testing Battery
   d. the Universal Technician Battery

7) **Which of the following is NOT included in the UTB?**
   a. spelling
   b. science
   c. number computation
   d. mechanical comprehension

8) **How long does it take to complete the UTB?**
   a. about 1 hour
   b. about 2 hours
   c. about 3 hours
   d. about 4 hours

9) **Who has to take the UTB?**
   a. all undergraduate applicants
   b. all applicants for management-level positions
   c. all applicants for associate-level positions
   d. all applicants for all positions

10) **The UTB is:**
   a. a paper-and-pencil test
   b. a computerized test
   c. an interview
   d. a roleplay test

11) **Did you read Bell Atlantic's official UTB Test Brochure?**
   a. yes
   b. no

UTB
Testing Attitude Survey

INSTRUCTIONS: Please read the next set of statements carefully. Refer **ONLY** to the UTB (the Universal Test Battery--the test you just took) when making your ratings. Please answer honestly when responding to each statement. Indicate the extent to which you agree or disagree with each statement by writing the number that represents your response in the blank beside the statement. Use the following scale:

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

___ 1. I wanted to be among the top scorers on the UTB.

___ 2. The UTB is a way of treating people fairly and consistently.

___ 3. I was extremely motivated to do well on the UTB.

___ 4. During the UTB, I was so nervous I couldn't do as well as I should have.

___ 5. I tried to do the very best I could on the UTB.

___ 6. I disliked taking the UTB.

___ 7. I would prefer that supervisors/managers not use the UTB to select people for a job.

___ 8. Doing well on the UTB is important to me.

___ 9. I didn't worry about taking the UTB.

___ 10. The UTB should be eliminated.

___ 11. I have tried my best on the UTB.

___ 12. I am anxious about how well I performed on the UTB.

___ 13. Performance on the UTB is a good reflection of what a person could do on a job.

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

____ 14. I probably didn't do as well as most other people who took the UTB.

____ 15. I concentrated while taking the UTB so that I could do well.

____ 16. The UTB is the company's way of roadblocking hard workers.

____ 17. During the UTB, I often worried about how poorly I was doing.

____ 18. My UTB scores won't reflect my true abilities because I got very nervous while taking the UTB.

____ 19. I don't care how well I did on the UTB.

____ 20. During the UTB, I found myself thinking of the consequences of failing.

____ 21. I believe this company uses valid tests (i.e., tests that predict who will be successful on the job) to select people for jobs.

____ 22. I pushed myself to work hard on the UTB.

____ 23. I wanted to do well on the UTB.

____ 24. People who do well on the UTB are probably good performers on the job.

____ 25. The UTB is a good way of selecting people into jobs.

____ 26. I am not good at taking tests like the UTB.

____ 27. I don't believe that the UTB is valid (i.e., that the UTB predicts who will be successful on the job).

____ 28. I didn't put much effort into the UTB.

____ 29. The UTB has nothing to do with what people can really do on the job.

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

____ 30. I got very anxious about taking the UTB.

____ 31. I think I scored in the top 10% on the UTB.

____ 32. I think I scored in the bottom 10% on the UTB.

____ 33. I think I scored about average on the UTB.

____ 34. Compared to others, I think I did well on the UTB.

____ 35. I think the UTB is a good test of my abilities.

____ 36. I was comfortable with the computer that I took the UTB on.

____ 37. I was anxious about taking a test on a computer.

____ 38. I was comfortable with the questions that were asked in the last part of the UTB, the Candidate Assessment of Background and Life Experiences.

____ 39. In school, I did well in Spelling.

____ 40. In school, I did well in Math.

____ 41. In school, I did well in Science.

____ 42. In school, I did well in Reading.

43. Estimate the percentage of your answers that were **correct** on the UTB (the test you just took) by checking one of the following responses:

____ 90 - 100%
____ 70 - 89%
____ 50 - 69%
____ 30 - 49%
____ 10 - 29%
____ Below 10%

Answer either #44 or #45, depending on which applies to you.

44. If you think you did well on the UTB, why do you think you did well?

_____

_____

_____

_____

45. If you think you did poorly on the UTB, why do you think you did poorly?

_____

_____

_____

_____

Thank you for your participation!
Thank you for your participation!

Please return this packet to the person who gave it to you.

APPENDIX I

DEBRIEFING

THANK YOU!

Thank you for participating in this research. The purpose of this study was to investigate peoples' general attitudes about testing and how previous testing experiences affect attitudes toward employment testing. This research also focuses on whether people who receive information about testing (i.e., the testing brochure that you may have read) will have more positive testing attitudes than those who do not receive the information. Your participation will help answer important questions about testing so that we can have a better understanding of this part of the hiring process.

As stated earlier, your involvement in this study will have no impact on any selection decisions made. The researchers have no role in making selection decisions and will not be sharing any information related to your participation with hiring managers.

Thanks again for your participation!

APPENDIX J

RESULTS OF CONFIRMATORY FACTOR ANALYSES FOR THE GENERAL TESTING ATTITUDE SURVEY AND THE SPECIFIC TESTING ATTITUDE SURVEY

Table J1

General Test Motivation: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM1	.36	.24	.35
ITEM3	.51	.40	.39
ITEM5	.25	.19	.25
ITEM8	.41	.21	.44
ITEM11	.36	.21	.39
ITEM15	.39	.22	.41
ITEM22	.50	.25	.50
ITEM23	.38	.16	.47
ITEM28	.31	.46	.17

Note. N = 212. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 27, p < .01) = 70.21, non-normed fit index = .88, and comparative fit index = .92. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are greater than 2.0.

Table J2

General Test Anxiety: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM4	.84	.81	.47
ITEM6	.51	.71	.27
ITEM9	.68	.91	.34
ITEM14	.55	.72	.29
ITEM17	.70	.57	.47
ITEM18	.91	.48	.63
ITEM20	.75	.83	.40
ITEM26	.67	.49	.48
ITEM30	.66	.81	.35

Note. N = 212. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 27, p < .01) = 79.23, non-normed fit index = .89, and comparative fit index = .92. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are greater than 2.0.

Table J3

General Beliefs about Testing: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM2	.68	.65	.41
ITEM7	.55	.73	.29
ITEM10	.58	.61	.36
ITEM13	.82	.76	.47
ITEM21	.45	.69	.23
ITEM24	.77	.60	.50
ITEM25	.88	.21	.79
ITEM27	.76	.47	.55
ITEM29	.56	.71	.31

Note. $N = 212$. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square ($df = 27$, $p < .01$) = 76.93, non-normed fit index = .91, and comparative fit index = .93. All T-values for factor loadings and measurement error variances are statistically significant ($p < .05$) and are greater than 2.0.

Table J4

Specific Test Motivation: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM1	.65	.49	.46
ITEM3	.59	.31	.31
ITEM5	.57	.31	.31
ITEM8	.62	.15	.15
ITEM11	.60	.15	.15
ITEM15	.44	.25	.25
ITEM22	.34	.34	.34
ITEM23	.48	.43	.43
ITEM28	.42	.19	.19

Note. N = 212. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 27, p < .01) = 111.42, non-normed fit index = .88, and comparative fit index = .91. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are greater than 2.0.

Table J5

Specific Test Anxiety: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM4	.69	.46	.51
ITEM6	.42	.74	.20
ITEM9	.54	1.27	.19
ITEM14	.64	.61	.40
ITEM17	.88	.47	.62
ITEM18	.76	.66	.47
ITEM20	.74	.78	.41
ITEM26	.72	.65	.44
ITEM30	.63	1.02	.28

Note. N = 212. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 27, p < .01) = 70.02, non-normed fit index = .90, and comparative fit index = .93. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are greater than 2.0.

Table J6

Specific Beliefs about Testing: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
ITEM2	.60	.42	.46
ITEM7	.68	.63	.42
ITEM10	.70	.41	.55
ITEM13	.83	.50	.58
ITEM21	.61	.41	.47
ITEM24	.83	.37	.65
ITEM25	.81	.17	.80
ITEM27	.56	.60	.34
ITEM29	.64	.69	.37

Note. N = 212. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 27, p < .01) = 59.62, non-normed fit index = .94, and comparative fit index = .97. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are greater than 2.0.

APPENDIX K

RESULTS OF CONFIRMATORY FACTOR ANALYSIS FOR TESTING EXPERIENCE

Table K1

Testing Experience: Factor Loadings, Measurement Error Variances, and Item Reliabilities

	Factor Loading	Measurement Error Variance	R^2
NUM	.81	1.46	.31
NUMNON	.92	3.87	.18
REC	.91	1.83	.31
PERC	.28	.45	.15
TONE	.29	1.45	.05

Note. N = 212. R^2 = item reliabilities. Estimates of goodness-of-fit are: chi-square (df = 5, p < .01) = 35.33, non-normed fit index = .64, and comparative fit index = .66. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are greater than 2.0. Abbreviations: NUM (the number of employment tests taken), NUMNON (the number of nonemployment tests taken), REC (how recently tests have been taken), PERC (the perception of performance on employment and nonemployment tests taken), and TONE (the tone of the discussions about testing).

APPENDIX L

SUBSCALE MEANS, STANDARD DEVIATIONS, AND CORRELATIONS FOR BROCHURE CONDITION

Table L1

Subscale Means, Standard Deviations, and Correlations for Brochure Condition

Subscale	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. GMOT1	4.42	0.54	1.00																						
2. GMOT2	4.34	0.48	0.47	1.00																					
3. GMOT3	4.52	0.52	0.57	0.63	1.00																				
4. GANX1	3.17	0.84	0.39	0.19	0.15	1.00																			
5. GANX2	3.49	0.87	0.41	0.32	0.20	0.78	1.00																		
6. GANX3	3.38	0.85	0.40	0.30	0.16	0.74	0.77	1.00																	
7. GBEL1	3.64	0.70	0.35	0.25	0.26	0.29	0.30	0.22	1.00																
8. GBEL2	3.45	0.86	0.36	0.18	0.24	0.41	0.29	0.30	0.60	1.00															
9. GBEL3	3.26	0.82	0.30	0.15	0.22	0.45	0.44	0.34	0.56	0.52	1.00														
10. COG	4.78	0.66	0.10	0.07	0.11	0.13	0.16	0.23	0.01	-.10	0.20	1.00													
11. EXP	14.57	3.74	0.26	0.13	0.16	0.18	0.23	0.22	0.08	0.05	0.17	0.19	1.00												
12. PERC	3.83	0.63	0.38	0.27	0.31	0.48	0.53	0.53	0.20	0.25	0.23	0.37	0.25	1.00											
13. SMOT1	4.35	0.59	0.46	0.47	0.56	0.21	0.33	0.27	0.31	0.12	0.27	0.24	0.18	0.50	1.00										
14. SMOT2	4.34	0.49	0.27	0.55	0.55	0.10	0.13	0.12	0.17	0.23	0.16	0.19	0.17	0.41	0.54	1.00									
15. SMOT3	4.45	0.57	0.40	0.48	0.63	0.10	0.18	0.06	0.18	0.20	0.29	0.23	0.11	0.39	0.72	0.61	1.00								
16. SANX1	3.53	0.78	0.27	0.10	0.11	0.66	0.60	0.58	0.14	0.20	0.29	0.36	0.23	0.58	0.41	0.20	0.23	1.00							
17. SANX2	3.60	0.89	0.28	0.16	0.15	0.57	0.65	0.63	0.10	0.05	0.22	0.40	0.22	0.66	0.36	0.17	0.23	0.74	1.00						
18. SANX3	3.47	0.87	0.10	0.04	0.01	0.46	0.50	0.62	-.06	-.08	0.10	0.41	0.18	0.60	0.17	0.14	0.08	0.60	0.76	1.00					
19. SBEL1	3.76	0.72	0.28	0.21	0.20	0.38	0.39	0.27	0.69	0.59	0.60	0.06	0.11	0.23	0.40	0.21	0.31	0.37	0.31	0.10	1.00				
20. SBEL2	3.62	0.76	0.27	0.16	0.33	0.35	0.31	0.25	0.56	0.56	0.58	0.18	0.14	0.36	0.45	0.29	0.42	0.43	0.33	0.14	0.79	1.00			
21. SBEL3	3.46	0.76	0.29	0.28	0.31	0.40	0.44	0.33	0.49	0.49	0.60	0.28	0.25	0.30	0.43	0.28	0.44	0.45	0.49	0.25	0.78	0.72	1.00		
22. RACE	0.53	0.50	0.06	0.05	0.01	0.16	0.17	0.16	-.18	-.13	-.16	0.29	-.37	0.08	-.14	-.06	-.17	-.02	-.01	0.07	-.22	-.20	-.22	1.00	
23. GENDER	0.34	0.47	-.14	0.10	-.04	-.21	-.15	-.03	-.13	-.00	-.11	-.07	-.08	-.20	-.26	0.07	-.13	-.35	-.21	-.12	-.13	-.19	-.07	0.07	1.00

Table L1 (continued)

Note. N = 107. Abbreviations: GMOT1 - GMOT3 (general test motivation subscales), GANX1 - GANX3 (general test anxiety subscales), GBEL1 - GBEL3 (general beliefs about testing subscales), COG (cognitive ability), EXP (past testing experiences), PERC (perceptions of performance on the Universal Test Battery), SMOT1 - SMOT3 (specific test motivation subscales), SANX1 - SANX3 (specific test anxiety subscales), SBEL1 - SBEL3 (specific beliefs about testing subscales), RACE (participant's race), and GENDER (participant's gender).

APPENDIX M

SUBSCALE MEANS, STANDARD DEVIATIONS, AND CORRELATIONS FOR NO BROCHURE CONDITION

Table M1

Subscale Means, Standard Deviations, and Correlations for No Brochure Condition

Subscale	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. GMOT1	4.51	0.44	1.00																						
2. GMOT2	4.37	0.56	0.66	1.00																					
3. GMOT3	4.59	0.42	0.66	0.51	1.00																				
4. GANX1	3.16	0.85	0.28	0.17	0.28	1.00																			
5. GANX2	3.50	0.81	0.32	0.26	0.19	0.70	1.00																		
6. GANX3	3.39	0.76	0.20	0.12	0.05	0.59	0.71	1.00																	
7. GBEL1	3.66	0.83	0.24	0.25	0.42	0.50	0.44	0.24	1.00																
8. GBEL2	3.40	0.85	0.22	0.10	0.43	0.50	0.44	0.18	0.78	1.00															
9. GBEL3	3.29	0.88	0.28	0.31	0.38	0.44	0.39	0.15	0.78	0.69	1.00														
10. COG	4.80	0.74	0.26	0.27	0.18	0.14	0.28	0.21	0.20	0.19	0.33	1.00													
11. EXP	14.81	3.88	0.22	0.30	0.24	0.15	0.11	0.07	0.14	0.16	0.10	0.18	1.00												
12. PERC	3.74	0.70	0.21	0.17	0.33	0.35	0.28	0.22	0.34	0.37	0.32	0.22	0.32	1.00											
13. SMOT1	4.39	0.66	0.61	0.51	0.40	0.23	0.26	0.25	0.23	0.16	0.28	0.33	0.18	0.24	1.00										
14. SMOT2	4.30	0.64	0.50	0.56	0.35	0.11	0.12	0.06	0.22	0.11	0.23	0.30	0.30	0.19	0.74	1.00									
15. SMOT3	4.42	0.71	0.53	0.50	0.40	0.21	0.24	0.12	0.29	0.23	0.40	0.41	0.20	0.25	0.84	0.74	1.00								
16. SANX1	3.51	0.82	0.16	0.09	0.20	0.64	0.47	0.38	0.43	0.37	0.38	0.30	0.03	0.45	0.22	0.17	0.28	1.00							
17. SANX2	3.57	0.84	-.02	-.16	-.04	0.39	0.42	0.38	0.15	0.18	0.09	0.29	-.05	0.35	0.02	-.13	0.04	0.57	1.00						
18. SANX3	3.42	0.79	0.01	0.00	- .08	0.27	0.38	0.40	0.04	0.03	0.07	0.36	-.09	0.45	0.16	-.02	0.18	0.58	0.72	1.00					
19. SBEL1	3.60	0.84	0.25	0.27	0.32	0.49	0.47	0.30	0.77	0.62	0.71	0.25	0.24	0.52	0.35	0.39	0.41	0.56	0.22	0.22	1.00				
20. SBEL2	3.34	0.84	0.19	0.12	0.30	0.53	0.42	0.31	0.68	0.65	0.65	0.33	0.20	0.43	0.34	0.23	0.40	0.62	0.37	0.31	0.82	1.00			
21. SBEL3	3.36	0.86	0.13	0.16	0.23	0.40	0.33	0.15	0.73	0.63	0.69	0.29	0.17	0.36	0.27	0.23	0.35	0.48	0.16	0.20	0.73	0.74	1.00		
22. RACE	0.54	0.50	0.06	0.04	0.06	0.11	0.10	0.17	-.05	-.05	-.15	0.21	-.36	-.06	0.09	0.14	0.05	-.14	-.21	-.17	-.05	-.08	-.13	1.00	
23. GENDER	0.29	0.46	-.02	-.07	-.09	-.19	-.20	0.08	-.30	-.24	-.19	-.19	-.10	-.17	0.08	0.02	0.04	-.24	-.22	-.07	-.25	-.20	-.17	.27	1.00

Table M1 (continued)

Note. N = 103. Abbreviations: GMOT1 - GMOT3 (general test motivation subscales), GANX1 - GANX3 (general test anxiety subscales), GBEL1 - GBEL3 (general beliefs about testing subscales), COG (cognitive ability), EXP (past testing experiences), PERC (perceptions of performance on the Universal Test Battery), SMOT1 - SMOT3 (specific test motivation subscales), SANX1 - SANX3 (specific test anxiety subscales), SBEL1 - SBEL3 (specific beliefs about testing subscales), RACE (participant's race), and GENDER (participant's gender).

APPENDIX N

ITEMS THAT COMPRISE EACH SUBSCALE USED IN STUDY 2

Table N1

Items that Comprise Each Subscale Used in Study 2

Subscale	Items
GMOT1	3, 5, 15
GMOT2	11, 22, 28
GMOT3	1, 8, 23
GANX1	6, 9, 18
GANX2	4, 17, 26
GANX3	14, 20, 30
GBEL1	10, 21, 25
GBEL2	2, 7, 13
GBEL3	24, 27, 29
COG	Mean of 7 Universal Test Battery subscales (spelling, vocabulary, reading comprehension, number series, number computation, concept formation, and spatial visualization)
EXP	Sum of number of employment tests, number of nonemployment tests, and recency of tests taken
PERC	Mean of items 31, 32, 34, 43
SMOT1	3, 5, 15
SMOT2	11, 22, 28
SMOT3	1, 8, 23
SANX1	6, 9, 18
SANX2	4, 17, 26
SANX3	14, 20, 30
SBEL1	10, 21, 25
SBEL2	2, 7, 13
SBEL3	24, 27, 29

APPENDIX O

MEASUREMENT MODEL FOR INDEPENDENT LATENT VARIABLES

Table O1

Measurement Model for Independent Latent Variables: Factor Loadings, Measurement Error Variances, Factor Correlations, and Goodness-of-Fit Indices

	Factor Loadings							Measurement Error Variance
	GMOT	GANX	GBEL	EXP	COG	RACE	GENDER	
GMOT1	1.00	.00	.00	.00	.00	.00	.00	.09
GMOT2	.93	.00	.00	.00	.00	.00	.00	.13
GMOT3	.92	.00	.00	.00	.00	.00	.00	.09
GANX1	.00	1.00	.00	.00	.00	.00	.00	.23
GANX2	.00	1.10	.00	.00	.00	.00	.00	.12
GANX3	.00	.94	.00	.00	.00	.00	.00	.22
GBEL1	.00	.00	1.00	.00	.00	.00	.00	.15
GBEL2	.00	.00	1.02	.00	.00	.00	.00	.28
GBEL3	.00	.00	1.01	.00	.00	.00	.00	.27
EXP	.00	.00	.00	1.00	.00	.00	.00	7.07
COG	.00	.00	.00	.00	1.00	.00	.00	.08
RACE	.00	.00	.00	.00	.00	1.00	.00	.00
GENDER	.00	.00	.00	.00	.00	.00	1.00	.00

Table O1 (cont.)

	Factor Correlations						
	GMOT	GANX	GBEL	EXP	COG	RACE	GENDER
GMOT	1.00						
GANX	0.40*	1.00					
GBEL	0.45*	0.50*	1.00				
EXP	0.40*	0.25*	0.20	1.00			
COG	0.23*	0.26*	0.18*	0.03	1.00		
RACE	0.06	0.16*	-.14	0.35*	-.41*	1.00	
GENDER	-.07	-.17	-.20*	-.17	-.10	0.17*	1.00

Note. N = 212. Abbreviations: GMOT (general test motivation), GANX (general test anxiety), GBEL (general beliefs about testing), EXP (testing experience), COG (cognitive ability), RACE (participant's race), and GENDER (participant's gender). Estimates of goodness-of-fit are: chi-square (df = 36, p < .01) = 76.81, non-normed fit index = .94, and comparative fit index = .96. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are 2.0 or greater. Asterisks indicate correlations that are statistically significant (p < .05) for their associated T-values.

APPENDIX P

MEASUREMENT MODEL FOR DEPENDENT LATENT VARIABLES

Table P1

Measurement Model for Dependent Latent Variables: Factor Loadings, Measurement Error Variances, Factor Correlations, and Goodness-of-Fit Indices

	Factor Loadings				Measurement Error Variance
	PERC	SMOT	SANX	SBEL	
UTBPERC	1.00	.00	.00	.00	.10
SMOT1	.00	1.00	.00	.00	.10
SMOT2	.00	.80	.00	.00	.13
SMOT3	.00	1.07	.00	.00	.08
SANX1	.00	.00	1.00	.00	.29
SANX2	.00	.00	1.28	.00	.08
SANX3	.00	.00	1.15	.00	.21
SBEL1	.00	.00	.00	1.00	.12
SBEL2	.00	.00	.00	1.03	.13
SBEL3	.00	.00	.00	.96	.21

Table P1 (cont.)

	Factor Correlations			
	PERC	SMOT	SANX	SBEL
PERC	1.00			
SMOT	0.42*	1.00		
SANX	0.68*	0.19	1.00	
SBEL	0.50*	0.47*	0.41*	1.00

Note. N = 212. The following abbreviations are used in the appendix: PERC (Perceptions of Performance on the UTB), SMOT (Specific Test Motivation), SANX (Specific General Test Anxiety), and SBEL (Specific Beliefs about Testing). Estimates of goodness-of-fit are: chi-square (df = 30, p < .01) = 89.94, non-normed fit index = .93, and comparative fit index = .95. All T-values for factor loadings and measurement error variances are statistically significant (p < .05) and are 2.0 or greater. Asterisks indicate correlations that are statistically significant (p < .05) for their associated T-values.

APPENDIX Q

STRUCTURAL MODEL

Table Q1

Structural Model: Factor Loadings, Measurement Error Variances, Squared Multiple Correlations, Structural Coefficients, and Goodness-of-Fit Indices

	Factor Loadings							Measurement Error Variance
	GMOT	GANX	GBEL	EXP	COG	RACE	GENDER	
GMOT1	1.00	.00	.00	.00	.00	.00	.00	.04
GMOT2	.99	.00	.00	.00	.00	.00	.00	.15
GMOT3	.97	.00	.00	.00	.00	.00	.00	.08
GANX1	.00	1.00	.00	.00	.00	.00	.00	.28
GANX2	.00	1.10	.00	.00	.00	.00	.00	.12
GANX3	.00	.95	.00	.00	.00	.00	.00	.23
GBEL1	.00	.00	1.00	.00	.00	.00	.00	.10
GBEL2	.00	.00	.97	.00	.00	.00	.00	.24
GBEL3	.00	.00	1.00	.00	.00	.00	.00	.22
EXP	.00	.00	.00	1.00	.00	.00	.00	11.29
COG	.00	.00	.00	.00	1.00	.00	.00	.31
RACE	.00	.00	.00	.00	.00	1.00	.00	----
GENDER	.00	.00	.00	.00	.00	.00	1.00	----

Table Q1 (cont.)

	Factor Loadings				Measurement Error Variance
	PERC	SMOT	SANX	SBEL	
UTBPERC	1.00	.00	.00	.00	.22
SMOT1	.00	1.00	.00	.00	.08
SMOT2	.00	.97	.00	.00	.12
SMOT3	.00	.90	.00	.00	.13
SANX1	.00	.00	1.00	.00	.23
SANX2	.00	.00	.96	.00	.33
SANX3	.00	.00	.95	.00	.21
SBEL1	.00	.00	.00	1.00	.21
SBEL2	.00	.00	.00	.97	.14
SBEL3	.00	.00	.00	.91	.18

Table Q1 (cont.)

	Beta Matrix			
	PERC	SMOT	SANX	SBEL
PERC	----	----	----	----
SMOT	.26	----	----	----
SANX	.72	----	----	----
SBEL	.36	----	----	----

Table Q1 (cont.)

	Gamma Matrix						
	GMOT	GANX	GBEL	EXP	COG	RACE	GENDER
PERC	----	----	----	.08	.31	-.01	-.16
SMOT	.93	----	----	----	----	----	----
SANX	----	.48	----	----	----	----	----
SBEL	----	----	.87	----	----	----	----

Note. N = 212. The following abbreviations are used in the appendix: GMOT (general test motivation), GANX (general test anxiety), GBEL (general beliefs about testing), EXP (testing experience), COG (cognitive ability), PERC (perceptions of performance on the UTB), SMOT (specific test motivation), SANX (specific test anxiety), SBEL (specific beliefs about testing), RACE (participant's race), and GENDER (participant's gender). Estimates of goodness-of-fit are: chi-square (df = 382, $p < .01$) = 807.22, non-normed fit index = .79, and comparative fit index = .80. All T-values for factor loadings (except for RACE and GENDER) and measurement error variances are statistically significant ($p < .05$) and are 2.0 or greater.

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