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# MULTI-DIMENSIONAL PERFORMANCE REQUIRES MULTI-DIMENSIONAL PERDICTORS:

# PREDICTING COMPLEX JOB PERFORMANCE USING COGNITIVE ABILITY, PERSONALITY AND EMOTIONAL INTELLIGENCE ASSESSMENT INSTRUMENTS AS COMBINATORIAL PREDICTORS

**by**

**J.T. Kostman**

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**Abstract**

MULTI-DIMENSIONAL PERFORMANCE REQUIRES
MULTI-FACETED PREDICTORS:

PREDICTING COMPLEX JOB PERFORMANCE USING COGNITIVE ABILITY, PERSONALITY AND EMOTIONAL INTELLIGENCE ASSESSMENT INSTRUMENTS AS COMBINATORIAL PREDICTORS

by

**J.T. Kostman**

**Adviser: Professor Harold Goldstein**

Cognitive ability has largely been recognized as the single best predictor of job performance across all organizations and positions. This research demonstrates that by adopting a multidimensional perspective to job performance, as opposed to the unitary perspective commonly adopted for purposes of convenience, alternative strategies for achieving organizational success can be demonstrated. In an inbound sales center, salespeople with relatively lower levels of General Mental Ability (GMA) who demonstrated relatively higher levels of Emotional Intelligence (EI), combined with specific personality dimensions, proved to be as successful as their more cognitively gifted colleagues. EI was also shown to predict performance sub-dimensions, such as teaming ability and customer service, which did not correspond to GMA. The addition of EI and specific personality dimensions also lent considerable incremental validity to GMA in predicting Net Sales. This study shows that when jobs are more realistically considered as complex amalgams of sub-tasks, non-cognitive predictors such as EI and aspects of personality may serve equally well, and even outperform, cognitive ability assessment instruments, in predicting vital dimensions of performance.

# Acknowledgments

I learned a lot while writing this dissertation. I learned about intelligence. I learned about personality. And I learned about emotional intelligence. The most important lessons I learned about these things didn't come from the research I conducted or from the hundreds of studies, articles and books that I read. They came from the people I knew along the way.

I learned about intelligence from my son, Jake. When I began my graduate studies Jake was just eight years old. Already possessing a formidable mind, I watched him evolve over the next five years into one of the most insightful and penetrating thinkers I have ever known. His insatiable curiosity and the speed with which he processes information hold me in awe. At thirteen Jake has already developed a profound intelligence while still maintaining a deep rooted kindness. He has proven for me that intelligence combined with compassion make for an extraordinary human being.

I learned about personality from my daughter, Brittany. Her indomitable spirit, the courage of her convictions, and the dogged tenacity she brings to everything she does served as a constant source of inspiration throughout this project. Indeed, she has become a model for how I would like to live my own life. When I began this undertaking Brittany was still a little girl. By the time it was finished she had blossomed into a confident and determined woman. Anyone who doubts that personality and sheer force of will can lead to success should get to know Brittany. Her zest for life, kind heart and agile mind make her a source of inspiration to everyone she knows.

I learned about emotional intelligence from my brother, John Eddy. When I started this research I had my doubts as to whether or not emotional intelligence even existed as an independent construct, let alone whether it would prove to be important to success. As I came to better understand the concept, I came to see that it was personified in my own little brother. John's kindness, compassion and ability to look into people's hearts make him one of the most intelligent people I have ever known. His extraordinary interpersonal and intrapersonal intelligence have significantly contributed to his own success – and the success of all those who are privileged to know him. When I first met John he was just fourteen; one year older and one year younger than Jake and Brittany are now. Finding John saved my life. I raised him and he raised me – and I learned more from him in the process than he will ever know.

The person from whom I have learned the most, however, has been my wife Angie. The smartest, kindest and most extraordinary person I have ever known, she is also the person I admire most in the world. Angie has been a constant source of surprise for all the years we have been together. Brilliant, nurturing, tough and loving all at the same time, she is one of those all too rare people who embodies all the positive qualities I studied through this research – and something more. Wisdom. I can't begin to count the number of times Angie has made me laugh when I was sure there was nothing to laugh about, and how often she has made me stop and think when without her I would have gone off in the wrong direction. She has been an integral part of every good idea I have had for nearly half my life; even this dissertation came directly from her counsel. She is, quite simply, the most amazing person I have ever known and the best thing that has ever happened to me.

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# Multi-Dimensional Performance Requires Multi-Faceted Predictors: Predicting Complex Job Performance Using Cognitive Ability, Personality and Emotional Intelligence Assessment Instruments as Combinatorial Predictors

## CHAPTER I: INTRODUCTION AND REVIEW OF THE LITERATURE

### Statement of the Problem

*Simple solutions to complex problems invariably create unintended consequences.*

*– James Halperin*
*The Truth Machine*

The successful performance of a job, any job, requires the individual cast in the role to effectively perform a wide and diverse range of behaviors. Even the simplest position – butcher, baker or candle stick maker – requires that the incumbent perform not just one task, but a broad amalgam of sub-tasks ranging in their complexity, and each requiring the possession of an often disparate and distinct set of knowledge, skills, abilities and personality characteristics (KSAPs) (Murphy, 1996). The possession or absence of each of these KSAPs in turn contributes, to a greater or lesser extent, to the likelihood of an individual's success in a given position (Murphy & Cleveland, 1995). Simply stated, the *sin qua non* of personnel selection is to develop instruments that effectively identify those KSAPs that most readily lend themselves to success in the considered position, and then effectively discriminate among candidates based on their possession of those same KSAPs (Schmidt, Ones & Hunter, 1992; Murphy, 1996). Selection instruments so developed provide a tool with which organizations are able to select candidates whose collection of knowledge, skills, abilities, and personality

characteristics are the best fit for the multi-dimensional demands of the positions they seek to fill (Murphy & Cleveland, 1995).

While developing practical selection instruments with a high degree of utility that are predictive, psychometrically valid, and legally defensible poses a considerable and complex challenge to all organizations (Arvey & Faley, 1988; Boudreau, 1991; Cascio, 1991; Cascio & Bernardin, 1981; Hunter & Hunter, 1984; Pfeffer, 1994), few would argue that, fundamentally, the most basic goal of selection is to accurately determine both the multi-dimensional requirements of the position being studied and the multi-faceted abilities of the candidates – and to then effect the best possible fit between the two (Cascio, 1991; Gatewood & Field, 2001). Yet, despite the seeming self-evidence of this most fundamental goal, each of the dominant perspectives currently being advanced in personnel selection research expressly violates this basic premise (Murphy, 1996).

While considerable research, experience and common sense confirm that job performance is indeed a complex and multi-dimensional composite of numerous distinct behaviors (Borman & Motowidlo, 1993; Campbell. McCloy, Oppler, & Sager, 1992), Murphy (1996) makes the point that, whether for purposes of convenience or expedience, personnel selection research has traditionally treated job performance rather more narrowly; indeed, the majority of past research has treated performance as if it were a single, unitary construct (Murphy, 1996).

Although this approach is undoubtedly more convenient for purposes of assessment, adopting this overly simplistic view of job performance substantially inhibits construct, content and criterion-related validity, and also spuriously increases the likelihood of the correlation of performance with any single predictor (Guion, 1998). By

amalgamating the various dimensions that tend to manifest in actual job performance into a single factor, the richness of what constitutes superior and substandard performance is frequently lost through the artificial compression of a multi-dimensional construct into a single factor (Carroll, 1993; Sternberg & Detterman, 1986; Guion, 1998).

This same problem has also manifest with respect to predictors. Gould (1995) and Murphy (1996), by example, have both offered that the predictive ability of *g*, which has been forwarded by numerous past researchers as the single best predictor of performance across all organizations and positions (Hough, Eaton, Dunnette, Kamp, & McCloy, 1990; Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, 1992; Schmidt, Ones, & Hunter, 1992) likely represents a composite of multiple facets of intelligence with its spurious predictive ability being due to the compression of the constituent sub-dimensions of intelligence on which it is based. In this respect Gould (1995) offers that *g* is likely little more than a convenient fiction resulting from the rotational dimension of the factor analysis being employed, and that alternative rotational choices would likely manifest in more diverse – and meaningful – factors. As a consequence, Gould (1995) contends, coincident correlations of *g* with any outcome criterion tend to be little more than artifactual consequences of those composite dimensions, which make an actual contribution to prediction.

Murphy (1996, p. 6) has similarly offered that as a consequence of the high predictive ability of cognitive ability instruments, I/O Psychologists may be "victims of our own success." Murphy contends "the success of researchers in demonstrating simple and generalizable relationships between [cognitive] ability and performance has had the unfortunate tendency to discourage thinking and research on more complex models of

performance." Murphy (1996, p.8) has similarly argued that "The apparent simplicity and generalizability of the [cognitive] ability-performance relationship is both a blessing and a curse", as this oversimplification and narrow conception of both predictors and performance has been a large part of the spurious effectiveness of *g* as a predictor. Murphy (1996, p. 7) specifically finds fault with the presumption, despite clear evidence to the contrary (Borman & Motowidlo, 1993; Campbell, McCloy, Oppler, & Sager, 1992), that "the [cognitive] ability-performance relationship can be adequately summarized with a single correlation coefficient (or with a relatively small range of plausible *r* values), [implying] that both [cognitive] ability and performance are unitary phenomena." Murphy (1996) concludes that "[I]t is unlikely that the domain of job performance can be adequately or even sensibly represented in terms of a single summary score."

Despite the seemingly obvious need to consider both performance and predictors from a multidimensional perspective, Witt, Burke, Barrick and Mount (2002) recently expressed their considerable surprise at the "paucity of research" addressing the interactive effects of even the most intuitively related personality factors (i.e., conscientiousness and agreeableness) or the consideration of any combinatorial predictors, with their research being the first to even consider, let alone demonstrate, an interaction between personality variables.

What is true of predictors is clearly also true of outcome criterion. As actual job performance is multi-dimensional, to be meaningfully and maximally predictive, multiple outcome criteria should be considered in making decision predictions (Murphy, 1996). All jobs, no matter how simple, consist not of a single outcome criterion, but rather of

multiple tasks and duties. As with predictors, however, past personnel research has typically collapsed the multi-dimensional facets of performance into a single metric, typically represented by either an aggregate of the subjective scores ascribed by a supervisors or, as is commonly the case in sales organizations like those studied in the research presented here, by a single "objective" criterion (i.e., net sales). As a consequence, similar to the problem of relying on a single predictor, desirable performance outcomes are inappropriately coalesced to such an extent as to make the concept of job performance muddled to the point of being nearly meaningless (Guion, 1998; Murphy, 1996).

Following Murphy (1996) and Witt, Burke, Barrick and Mount (2002), the line of reasoning which serves as the logical structure of this research is as follows (see Table 1 for further illustration):

- Job Performance is best understood as a composite of numerous behaviors and not as a unitary, singular construct.
- Each of the outcome variables that contribute to overall performance may require the demonstration of a different set of KSAPs.
- Each outcome variable is likely to be more highly correlated with a different predictor or set of predictors.
- While there is likely to be a single best predictor for any single outcome variable, no single predictor is equally predictive of all outcome variables.
- Predictor variables other than the single best predictor may, in combination, prove to be as effective in prediction as the single best predictor.

Specifically, as it pertains to the research presented here, the contention will be that:

- Sales performance cannot be adequately measured by a single metric. Overall performance is best understood as being a combination of several factors, including net sales, teaming ability and customer service.
- Each of these outcome variables is best predicted by the following predictor variables, either alone or in combination: Cognitive ability, personality, and/or emotional intelligence.
- While *g* is highly predictive of net sales, teaming ability and customer service skills are likely to be more highly correlated with personality and emotional intelligence factors.
- Relatively lower abilities on any one predictor (e.g., cognitive ability) may be compensated for by relatively higher levels in some combination of the remaining predictors for any of the considered outcome criterion.

In addressing the need to employ a multi-faceted predictor / multi-dimensional performance perspective it will be necessary to address the considerable fractionalization current among personnel selection researchers with respect to both (a) the tacit preference for relying on a single predictor and outcome, as well as (b) the determination of which predictor is best.

The advantages of adopting a multiple criterion model (Ghiselli, 1964; Guion, 1965, 1998; Schmidt & Kaplan, 1971) versus an ultimate criterion model (Blum & Naylor, 1968; Nagle, 1953; Thorndike, 1949) will be further addressed in later sections of

this paper, as will the effect of what has subsequently been termed "the criterion problem" (Austin & Villanova, 1992; Thayer, 1992; Guion, 1998). As to the determination of which predictor is best, even a glancing familiarity with the literature reveals that there are presently three dominant camps of I/O Psychologists, with each having called for the adoption of a different single predictor criterion – and each having claimed the predictor being advanced by their camp to be the "final answer" for predicting job performance (Goldstein, Zedeck & Goldstein, 2002).

By far the largest of the three camps, resting their position on a sizeable and rather impressive body of literature that includes several substantial meta-analyses and validity generalization studies, maintains that cognitive ability, or more specifically, *g*, has consistently proven itself to be "the single best predictor of performance across all organizations and positions" (Hough, Eaton, Dunnette, Kamp, & McCloy, 1990; Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, 1992; Schmidt, Ones, & Hunter, 1992) (For dissenting views on the relative importance and generalizability of cognitive ability, see McClelland, 1993; Sternberg & Wagner, 1993). Indeed, various studies have shown cognitive ability to account for as much as 29% of the variance in actual workplace performance, and a meta-analytic study conducted by the U.S. Department of Labor demonstrated the validity of cognitive measure for predicting job performance to be .51 (Hunter, 1980). Resting on the support of thousands of studies and nearly 100 years of quantitative data, these findings have led Schmidt and Hunter *(1998*, p. 262) to conclude that "the most frequently used cognitive ability tests are valid for all jobs and all job families" and that "the validity of the cognitive tests studied is neither specific to situations or specific to jobs."

Despite the considerable promise cognitive ability has demonstrated in its predictive ability and generalizability, sole reliance on it as a predictor has caused considerable concern in several quarters. Numerous researchers have charged that cognitive ability is inadequate as a construct to fully address the multiplicity of abilities candidates bring with them to the workplace (Sternberg, 1999; McClelland, 1973). It has also been convincingly argued that there is a tendency in Western cultures, and in American culture in particular, for their to be a very narrow conception of what does and does not constitute intelligence (Vygotsky, 1978; Gardner, 2000). In Western societies, it has been argued, verbal, analytic and spatial reasoning skills are prized above artistic and kinesthetic abilities (Gardner, 1993). Likewise, relational or practical intelligence, while considered invaluable from a business perspective, are typically not even assessed in traditional cognitive ability assessment instruments (Mayer & Salovey, 1997; Sternberg & Wagner, 1993).

Further exacerbating the problem of such a narrow conception of intelligence, virtually all cognitive ability tests rest their findings on nearly the same aspects of intelligence, as evidenced by the strong correlation found between them (Spearman, 1927; Jensen, 1985, 1993) – this in spite of the fact that there is no commonly agreed upon definition of what intelligence even *is* (Gardner, 1993) or what it is that *g* actually measures (Sternberg & Wagner, 1993) (For dissenting views, see Gottfredson, 1994; Jensen, 1985, 1993; Schmidt & Hunter, 1988). While some controversy remains over the veracity of *g* as a construct, its operational definitions also tend to vary widely, even among those who support it conceptually (Gould, 1994).

Another major consideration with respect to cognitive ability assessments is the recognition of the inherently racial bias of such instruments, evinced through their consistent demonstration of a ½ and 1 standard deviation sub-group difference for both Hispanic and Black test takers, respectively, when contrasted with Whites (Hunter & Hunter, 1984; Schmidt, 1988; Schmidt, Greenthal, Hunter, Berner, & Seaton, 1977). These findings are particularly disturbing in light of the considerable evidence that demonstrates there to be no difference in actual workplace performance between these groups (Cascio & Phillips, 1979; Cox, 1996; Goldstein, Ruminson, Yusko, & Smith, 2000; Schmidt, Clause, & Pulakos, 1996; Shade, 1982).

According to Helms (1992), these spurious differences in Black / White cognitive ability test scores results from the measurement of distinct constructs in the two populations. The differences that manifest in scores are attributable, according to Helms, in large part due to the emphasis placed on social relations and reasoning in social contexts in Black communities, while White American culture emphasizes "rugged individualism." Cognitive ability tests, being largely devoid of contextual and social aspects of reasoning in the assessment of intelligence, consequently may offer too sterile of a mechanism with which to evaluate the abilities of Black test takers (Helms, 1992). Shade (1982) has likewise argued that Blacks and Whites may simply employ different strategies to achieve success, with Blacks taking advantage of culturally valued relational abilities and Whites taking advantage of culturally valued scholastic ability, which tend to be more highly correlated with traditional measures of intelligence.

Adding fuel to the fire of racial disparity through the assessment of cognition, the extraordinarily controversial best-seller[1] *The Bell Curve*, published in 1996 by Herrnstein and Murray, exacerbated an already politically volatile topic, making the search for alternative selection criteria to cognitive ability even more imperative. Finally, legal factors have also compelled employers to look for alternative means for assessing the potential abilities of candidates. In several landmark cases the Courts have held, as they did in *Griggs v. Duke Power* (1971), that the "passing of a standardized general intelligence test as a condition of employment" may be deemed discriminatory, unless intelligence is shown to "demonstrably [be] a reasonable measure of job performance" for the specific position being considered, and not for all positions in general. Because of the reasons cited here, and further enumerated in later sections of this paper, finding alternatives to cognitive ability as a predictor of success appear to be imminently in the interest both of corporations and society.

In proffering such an alternative, a growing number of researchers have come to support personality, and the Five Factor Model (FFM) in particular, as offering a superior alternative to assessments of cognitive ability for predicting organizational success (Roberts & Hogan, 2001). Like cognitive ability, however, performance prediction predicated on personality predispositions presents a paradox to psychology. While the lay public generally considers personality to be the most important aspect of psychology, until recently psychologists considered personality to be one of the *least* important areas of study (Roberts & Hogan, 2001).

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[1] Many thanks to my colleague, friend, and brother, John Eddy, for making the point that the designation "best-selling" does not necessarily imply "best-reasoning."

Despite a considerable history of personality testing having been largely shunned by the psychological community, Roberts & Hogan (2001) cite four main reasons for the recent resurgence among psychologists, and I/O Psychologists in particular, to personality assessment: 1) The inherent bias of cognitive ability assessment instruments, 2) Development and refinement of the "Big 5" personality dimensions, 3) Findings from the Army's Project Alpha, and 4) Recent meta-analyses supporting the construct and predictive validity of various personality dimensions, with conscientiousness and emotional stability in particular having been shown to consistently predict performance across virtually all positions. This last point resulted in Tett (2001) contending that there are not likely to be *any* positions in which relatively higher levels of conscientiousness would prove detrimental to performance.

As a consequence of the increasing attention being given to the importance of human capital in the general business community (Howard, 1996; Kraut & Korman, 1998; Lev, 2001; Stewart, 1997), the consideration of personality factors has garnered considerable additional attention among our organizational constituents, requiring a concomitant increase in attention by the research community. In a persuasive demonstration of the extent to which prospective employers now consider aspects of personality to be important in making selection decisions, Joyce Hogan (2001) analyzed 8,000 employment advertisements appearing in the Sunday newspapers from eight regions of the United States over a period of 4 months. She found specific personality characteristics, such as initiative, integrity and people skills to be listed as selection requirements at least as often as technical competencies. As technical skills can be learned, and personality traits are innate, it has subsequently been argued that personality

characteristics may be even more important than technical skills in making selection decisions (Buckingham & Coffman, 1998; Michaels, Handfield-Jones, Axelrod, 2001; Roberts & Hogan, 2001)[2].

Yet a final major camp in the fray over the best predictor of organizational success contends that both personality and cognitive ability assessments have missed "the single most essential determinant of organizational success, Emotional Intelligence" (Goleman, 2000). Building on Gardner's (1983) concept of multiple intelligences, Salovey and Mayer (1990) proposed that in addition to the traditional western conceptualization of intelligence and its sole consideration of numeric, verbal and spatial reasoning, two additional dimensions – inter-personal and intra-personal intelligences – which they refer to collectively as "Emotional Intelligence" combine to account for the greatest source of variance in actual performance on the job. As a consequence of the extraordinary popularization of this construct by Goleman (1995a, 1995b, 1996, 1998), the media, lay public and business community alike have latched on to Emotional Intelligence (EI) as, to quote Goleman's hyperbole, "the single most important predictor of a person's success in virtually all aspects of life" (Goleman, 1995a)[3]. As both intelligence and personality are considered to be largely innate and fixed, it seems likely that part of the popularity of EI stems from its consistency with the American ethos of being a set of abilities that can be acquired and developed by anyone.

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[2] While Schmidt and Hunter (1998) have previously argued quite vehemently against the predictive validity of personality, another meta-analysis by Harter, Hayes and Schmidt (2002) has recently recognized a profound relationship between employee satisfaction, employee engagement and business outcomes. This research seems to support or at least infer the importance of non-cognitive factors in effecting job performance.

[3] Despite the substantial hype generated over EQ, to date the corpus of empirical research has been minimal. The reasons for this are not doubt attributable in large part to the rivalry among instrument developers and the subsequent inability to arrive at a consensus on construct dimensionalization. This issues will be further addressed in the section on Emotional Intelligence later in this paper.

This research is intended to demonstrate that by asserting the relative superiority of each of the three dominant perspectives in predicting overall organizational success, past research has taken a somewhat wrong-headed approach to the prediction of performance. Far from being a unitary construct, the set of behaviors that constitute organizational success are multi-faceted in their nature, and as such, each of these predictors are likely to differentially address a fundamentally different aspect of performance. By dissecting performance into its constituent elements and considering performance from a more granular perspective, this research will show that each of the three approaches does, in fact, predict performance – though each predictor tends to be more highly correlated with a specific aspect of performance and subsequently a specific sub-criterion.

By examining multiple criteria identified through research (Austin, 1954; Bureau of Labor Statistics, 1997; Churchill, Ford, Hartley, & Walker 1985; Cleveland, 1948; Ford, Walker, Churchill, & Hartley, 1987; Guastello, 1996; Hunter, 1986; Vinchur, Schippman, Switzer & Roth, 1998; Weaver, 1969) and an extensive job analysis, it will be shown that while intelligence, personality and emotional intelligence each predict overall performance, they each do so by addressing a separate, though equally important, aspect of performance.

Specifically, for the organization being studied (the Canadian based sales division of a U.S. owned manufacturing organization) this research is intended to demonstrate that net sales, teaming ability and customer service each contribute uniquely to overall job performance. While each of these three predictors will be shown to reliably predict

performance on one of these three aspects of performance, this research will show that none prove to be the single best predictor of performance across all dimensions.

This research will demonstrate that while each of the sub-components addressed by the various predictors collectively contribute to the gestalt of overall performance, multiple strategies may be employed by incumbents to ensure their overall organizational success by performing relatively better on any combination of the three dimensions being considered. A summary of the premises for this research is included as Table 1. More simply, however, this research can be summed up as beginning and ending with an empirical investigation of the same simple, but vital question first asked by Goldstein, Zedeck & Goldstein (2002): When it comes to making selection decisions, should *g* be "our final answer"? As this research will demonstrate, the answer is a resounding "no."

## - Table 1 -
## Research Premise

| | | | | |
|---|---|---|---|---|
| **Premise**<br>Job Performance is best understood as a composite of numerous behaviors and not as a unitary, singular construct. | Each of the outcome variables that contribute to overall performance may require the demonstration of a different set of KSAPs. | Each outcome variable is likely to be more highly correlated with a different predictor or set of predictors. | While there is likely to be a single best predictor for any single outcome variable, no single predictor is equally predictive of all outcome variables. | Predictor variables other than the single best combination, prove to be as effective in prediction as the single predictor may, in best predictor. |
| **Case Study**<br>Sales performance cannot be adequately measured by a single metric. Overall performance is best understood as being a combination of several factors, including net sales, teaming ability and customer service. | Each of these outcome variables is best predicted by the following predictor variables, either alone or in combination: Cognitive ability, personality, and/or emotional intelligence. | While *g* is highly predictive of net sales, teaming ability and customer service skills are likely to be more highly correlated with personality and emotional intelligence factors. | Though there is likely to be some covariance and overlap between these predictors on the various aspects of performance, overall success is unlikely should either of the other two predictors not achieve a threshold level. | Relatively lower abilities on any one predictor (e.g., *g*), may be compensated for by relatively higher levels in some combination of the remaining predictors for any of the considered outcome criterion. |
| **Illustrative Example**<br>John is considered to be one of the best salespeople in the company. His bookings are high, though not the best in the firm. He does, however make a valuable contribution to the overall performance of his team and his customers have a greater propensity to make repeat purchases. | John's cognitive ability score (*g*) is relatively low, when compared with other incumbents. | John's scores on both conscientiousness and agreeableness (personality dimensions) and his overall emotional intelligence scores are all relatively high. | Taken alone, John's *g* score is only minimally predictive of his current success. | The combination of his personality and emotional intelligence combine to make John one of the most successful salespeople in the company. |

## Objectives

The primary objective of this study will be to demonstrate that neither cognitive ability, personality, or emotional intelligence are, individually, the best predictors of performance, and that each predicts a different aspect of performance more or less successfully, either individually or in combination with another of the described predictors.

Specifically, this research will advance and attempt to address the following hypotheses:

*Hypothesis 1:* Cognitive Ability will prove to be highly predictive of Net Sales

*Hypothesis 2:* Personality and Emotional Intelligence will prove to be predictive of Net Sales, though not to the same extent as Cognitive Ability

*Hypothesis 3:* Cognitive Ability will not prove to be as successful a predictor of either Teaming Ability or Customer Service as Emotional Intelligence

*Hypothesis 4:* Aspects of both Personality and Emotional Intelligence will lend incremental validity to Cognitive Ability in predicting Net Sales

*Hypothesis 5:* The incremental validity gained from Emotional Intelligence and Conscientiousness (and possibly one or more additional personality sub-dimensions), will prove to be as predictive of Net Sales as Cognitive Ability.

Substantiation of these hypothesis would demonstrate that those with relatively lower levels of cognitive ability (*g*) may employ alternative strategies for achieving Net Sales results by relying on relatively higher levels of Emotional Intelligence and aspects of their Personality (e.g., Conscientiousness).

The findings of this study are expected to advance our understanding of the interactive effects of three distinct constructs – cognitive ability, personality and emotional intelligence – which, independently and in combination, are able to predict the three outcome criterion found to be most predictive of organizational success both within the organization being studied, and in sales organizations in general (i.e., net sales, teaming abilities, customer service). This research adopts a multiple criterion approach, the rational for which will be established in subsequent portions of this paper. Selection of the chosen predictors is based on both findings of previous research identifying these predictors as being indicative of success for a sales organization and an extensive job analysis conducted with the host organization, both of which will likewise be further addressed in later sections of this paper.

## Introduction to Background Literature

In conducting the literature review for this research, I was as surprised as Witt, Burke, Barrick & Mount (2002) at what they describe as a "paucity of research" concerning the interactive effects of various combinations of personality variables in predicting performance. This review will describe what little research does presently exist in this regard, as well as the likewise surprisingly limited research that has addressed the interactive effects of personality, cognitive ability and emotional intelligence in various combinations in predicting performance.

Beginning by first addressing the literature concerning the argument of whether a single or multiple criterion approach is most appropriate for defining organizational performance (Ghiselli, 1964; Guion, 1961, 1965, 1997; Schmidt & Kaplan, 1971; Blum & Naylor, 1968; Nagle, 1953; Thorndike, 1949), the majority of this literature review will then focus on the areas of intelligence, personality and emotional intelligence testing in general.

In reviewing the intelligence literature, I will explore the history of intelligence testing, and how it pertains to selection decisions in particular. Included in this analysis will be a consideration of current conceptions and alternative theories of intelligence (Gardner, 1993; Jensen, 1993; Sternberg, 1991), with a particular focus on the current preoccupation with *g* as a predictor of organizational success (Goldstein, Zedeck & Goldstein, 2002; Jacoby & Glauberman, 1995; Murphy, 1996). The review will then address research concerning limitations on the predictive validity of intelligence, as well as cultural implications of intelligence testing.

The literature review on personality will include a brief overview of the history of personality testing and an overview of personality testing research in general. Of particular focus will be the "Big Five" personality dimensions proposed by Cattell (1965) and its legacy, the Five Factor Model (FFM) (Hergenhahan, 1990; Barrick & Mount, 1991; Hogan, 1998; Schneider, Smith, Taylor, & Fleenor, 1998). The review of the personality literature will conclude with a survey of current research on the predictive ability of personality in general, and of specific personality factors in particular (Barrick & Mount, 1991; Hogan, 1998; Schneider, Smith, Taylor, & Fleenor, 1998; Guastello, 1995).

The final section of the literature review will focus on the relatively new construct of Emotional Intelligence, as proposed by Salovey and Mayer (1990). Mayer and Salovey's (1997) model of emotional intelligence will then be discussed in detail along with several subsequent refinements of the construct (Bar-On, 1997; Bedwell, 2001; Goleman, 1998), and research demonstrating the independence of emotional intelligence as a construct (Levi, 2001) will be reviewed.

# Chapter II

## The Criterion Problem

*All classifications made by man are arbitrary, artificial, and false. But an equally simple consideration shows that these classifications are useful and indispensable; and above all, that they are unavoidable because they correspond to an innate tendency in our way of thinking. – Egon Fridel*

One of the most vexing problems in the development of assessable constructs is what has come to be termed "the criterion problem" (Guion, 1965). The criterion problem is an acknowledgment of the inherent limitations of assessment instruments in their ability to fully satisfy the demands of either content or construct validity. It is an acknowledgement of the practical impossibility of perfectly and proportionally including representational criteria for all the sub-facets and sub-dimensions contained within a given construct (e.g., a test of intelligence cannot possibly contain all dimensions that constitute actual intelligence) (Guion, 1965).

The criterion problem is also a recognition that as a consequence of the particular instrumentality being employed in the assessment process, it is inevitable that at least some capabilities that are extraneous to the construct of interest will also be assessed (e.g., language proficiency is often collaterally assessed in tests of domain-specific capabilities). In evaluating a construct the criterion problem brings attention to the realization that while it is a theoretic impossibility to fully satisfy either content and construct validity, the objective of personnel selection research must be to remain

mindful of these inherent deficiencies and to continually strive to minimize the discrepancies between the construct and the mechanism for its assessment to the greatest degree practical (Thayer, 1992).

While considerable attention has been given to the criterion problem from a theoretic perspective, little has been done from a practical perspective to address its impact on the development of selection instruments (Thayer, 1992). Surveying manifestations of the criterion problem since 1917, Austin and Villanova (1992) echoed the sentiments of Wallace and Weitz (1955) who, nearly forty years earlier, offered that: "the criterion problem continues to lead all other topics in lip service and to trail most in terms of work reported."

Among the most considerable practical concerns for personnel selection researchers with respect to the criterion problem is whether to employ unitary, multiple or composite criterion in the development of both predictors and outcome criterion for selection instruments. Though personnel selection is, in reality, nearly always a multivariate process involving multiple X variables and multiple Y variables (Seashore, Indik, & Georgopoulos, 1960; Peres, 1962; Ghisellie, 1956), Murphy and Shiarella (1994, p.825) have offered that: "Much of what we know about the validity of selection devices is based on univariate relationships between tests and criterion measures."

While early researchers maintained that criterion should be as narrowly and homogenously defined as possible (Brogden & Taylor, 1950; Nagel, 1953), the tide has shifted over the past forty years to a belief that criterion should be as inclusive and general as possible (Ghiselli, 1956; Guion, 1961, 1965; Dunnette, 1963). Although univariate predictors have indeed been the most prevalent focus of study by personnel

selection researchers due, no doubt, to their relative simplicity and convenience in assessing criterion-related validity (Murphy, 1996), few if any modern researchers would argue for their conceptual merit above that of either composite of multiple predictors (Schmidt & Kaplan, 1971). The real question facing personnel selection researchers then is which of the two approaches – composite of multiple criterion – are most preferable. This issue has become a considerable point of contention.

While some have maintained that composite criteria are "indispensable" (Nagel, 1953), others have said that as actual job performance is inherently multi-dimensional "efforts should be made to predict profiles of success" (Toops, 1944) in lieu of defining a single, or even composite, job index. Though most organizations do not make such practices explicit, in their actual practice the majority do rely on multiple selection measures in their hiring process (Boudreau et al., 1994; Gatewood & Field, 1994; Hakstian, Wooley, Wooley, & Kryger, 1991a, 1991b; Jones & Wright, 1992; Milkovich & Boudreau, 1994) through the use of multiple assessment methods (e.g., tests, interviews, evaluations), intended to tap multiple domains (e.g., cognitive ability, personality, social skills, job-specific knowledge). There has been a recent and growing trend toward the utilization of multiple assessment methods, stemming from the growing recognition that "job performance" is a complex and multidimensional domain (Astin, 1964; Borman Hanson, & Hedge, 1997; Campbell, 1990; Conway, 1996; Murphy, 1989, 1996).

As noted earlier, despite the overwhelming empirical and anecdotal evidence supporting a multiple predictor and criterion approach, for purposes of convenience the majority of criterion-related validity studies still do rely on unitary predictors and single

outcome criterion (Murphy, 1996). While doubtless a simpler means of determining criterion-related validity, this approach is often contrary to real-world and scientific goals. In considering the disparate nature of the constituent elements that collectively contribute to overall job performance, Murphy and Shiarella (1994, p.824) have offered that "the facets that underlie the construct of job performance may in some cases be only weakly intercorrelated, and different organizational policies for emphasizing one facet or another when defining job performance could lead to substantially different conclusions about the validity of selection tests." Aggregating behavioral or psychological constructs that are unrelated to one another may result in the development of composite scores that represent an underlying economic dimension while at the same time remain virtually meaningless from a behavioral perspective.

An example of the problems inherent to using a composite approach were demonstrated by Murphy and Shiarella (1997) who used a Monte Carlo simulation to explore the validity of cognitive ability tests and personality tests in predicting "job performance" (where performance was conceptualized as a composite of multiple performance measures, including individual task performance and organizational citizenship behaviors). They found the validity of the selection batteries they considered to vary substantially as a consequence of the relative weight attributed to both predictors and criteria. In their analysis Murphy and Shirella (1997) concluded that "depending on how precisely 'performance' is defined, the same test battery can have relatively high or relatively low levels of validity."

It should also be considered that while composite criteria may indeed identify the most "well rounded" candidates, such individuals are frequently not the most desirous for

the hiring organization (Buckingham & Coffman, 1998). Organizations have increasingly begun to realize the considerable value of teaming individuals with complementary skills (Buckingham & Coffman, 1998) and "teaming for talent" has become a nearly ubiquitous phenomenon among the most successful of the Fortune 1000 companies (Katzenbach & Smith, 1993). This perspective acknowledges the tremendous synergistic advantages gained from partnering individuals with idiosyncratic and complimentary talents with one another, as illustrated in Table 2, below. A multiple criterion perspective that acknowledges and takes advantage of these differences offers a distinct advantage to organizations through the identification of in-role virtuosos and the development of complimentary partnerships (Buckingham & Coffman, 1998). This approach has a decided advantage over aggregate scoring methods, which, by dint of their design, result in candidate pools whose abilities are more homogenous and amorphous.

**Table 2**

| | ***Company A*** | | | | ***Company B*** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Complimentary Skills** | | | | **Equivalent Skills** | | | |
| | Ability X | Ability Y | Ability Z | | | Ability X | Ability Y | Ability Z |
| Employee 1 | **10** | 6 | 5 | *Vs.* | Employee A | 7 | 7 | 7 |
| Employee 2 | 5 | **10** | 6 | | Employee B | 7 | 7 | 7 |
| Employee 3 | 6 | 5 | **10** | | Employee C | 7 | 7 | 7 |
| ***Company A*** is able to outperform ***Company B*** in every area, despite the fact that employees of both companies have the same composite scores. | | | | | | | | |

The current shift toward teaming individuals with complimentary skills also demonstrates an at least intuitive understanding of the need to avoid what Schneider's (1995, 1996) ASA theory describes as a common flaw in the recruiting, selection and

retention practices of most organizations. According to Schneider, near-sighted practices which tend to engender the development of a largely homogenous workforce that values conformity over diversity and complimentarity inevitably leads to the development of organizations with limited scope, capabilities and vision. If unchecked, this pattern of behavior ultimately proves, according to Schneider, to be "the death knell" to organizations for which differentiation is the *sin qua non* of strategic advantage when operating in the competitive, dynamic and fluid environment of modern business.

The segmentation of responsibilities that tends to occur in actual job settings also supports the advantages of a multiple criterion approach that promotes the selection of candidates with differentiated abilities. It is a fundamental and sustaining premise of economics that greater specialization inexorably leads to greater organizational and market efficiencies (Smith, 1776; Friedman, 1967; Hayek, 1945; Samuelson, 1977). The composite criterion approach by its very nature washes away the opportunities to be gained from individual abilities by treating them as a commodity. In so doing the composite approach fails to acknowledge the tremendous values to be gained from the idiosyncratic skills of individual contributors and the possibility of capitalizing on the unique talents each is able to make.

The basic contention of composite criterion advocates is that criterion should be aggregated to provide a single measure of overall "success" or "value to the organization" in order to provide decision-makers with a means with which to compare candidates (Toops, 1944; Thorndike, 1948; Brogden & Taylor, 1950; Nagel, 1953; Tiffin & McCormick, 1965). By contrast, multiple-criterion advocates contend that measures of different variables cannot be meaningfully combined. In his inimitable style Cattell

(1957) advances the latter perspective by offering that: "ten men and two bottles of beer cannot be added to give the same total as two men and ten bottles of beer." More prosaically, Schmidt and Kaplan (1971) have offered: "the worker who is slow and accurate in assembly work, for example, may achieve the same composite criterion score as another worker who works fast but makes more errors." As these two patterns of behavior are so fundamentally different, advocates of a multiple criterion approach maintain, it makes no sense to combine them under the same composite score (Ghiselli, 1956; Dunnette, 1963; Guion, 1965).

In an effort to resolve the controversy Guion (1961) offered that criterion elements should remain separate during the validation process and should then be subjectively weighted into a composite criterion for each individual when selection decisions are being made. Guion contends that this procedure moves the unavoidable reliance on subjective judgment over the aggregation of criterion to a "more sensible place" as decision makers can consider the relative importance of individuals on a case-by-case basis. It is unlikely, in light of legal precedents that have been established since Guion (1961) that courts would consider such capricious practices favorably. Likewise, the use of subjective weights would mean that the efficacy of the selection process could not be evaluated independently of the individual decision maker's talent for intuiting which elements to combine (Schmidt & Kaplan, 1971).

The central premise underlying the argument for a composite criterion is the typically unarticulated assumption that criterion should represent an economic, rather than a behavioral construct (Schmidt & Kaplan, 1971). While well intentioned, this

perspective is somewhat misguided, as it fails to consider two key issues – both of which are manifestations of the criterion problem.

With respect to the predictors, the composite approach fails to recognize the inherent subjectivity involved in the choices of both the facets of performance that are chosen for inclusion as well as the weightings ascribed to each (Schmidt & Kaplan, 1971). By artificially aggregating distinct (and potentially uncorrelated) performance dimensions into a single composite labeled "overall success" (Toops, 1944), "performance on the task" (Thorndike, 1948), "overall contribution" (Nagle, 1953), or "overall value of the individual in the job" (Gaylord & Brogden, 1964), past research has implicitly assumed the aspects of performance chosen to be those that are collectively and wholly determinative of economic success for a given organization – and in accordance with the weightings ascribed to each. This seems unlikely even in the best of circumstances. Brogden and Taylor (1950), arguably the spokesmen of their time, are emblematic of this problem; in their assertion that the most important consideration in assessing performance should be that "the criterion should measure the contribution of the individual to the overall efficiency of the organization." In the industrial and manufacturing environments which served as the backdrop of research in I/O Psychology in the 1940's and 1950's, efficiency was indeed the primary (if not singular) expectation of employees. In the context of the factories of this era it no doubt seemed appropriate to have the same evaluative criteria for an employee one would have for a machine. Expectations of employees in contemporary organizations are (one would hope) somewhat different. Contrary to Brogden and Taylor (1950) contention that the only question worth considering with respect to employees is "How much does the employee

produce, and how good is it?" modern organizations are forced to consider that while efficiency may certainly be *an* organizational goal, it is rarely (if ever) *the* organizational goal.

With respect to the outcome criterion, advocates of the composite approach tacitly assume economic performance (i.e., sales, revenue) to be the only measure of performance worthy of consideration. This perspective fails to consider that there are multiple determinants of an organizations long-term financial well being, many of which are occasionally tangential, or even at odds with, its short-term financial interests (e.g., actions leading to lifetime customer value, increased brand recognition, growth, innovation, etc.).

In deciding on the relative value of adopting a composite or multiple criterion approach it is also worth considering Schmidt and Kaplan's (1971) caution that "None of those favoring composite criteria mention the attainment of increased understanding of the psychological and behavioral processes involved in various tasks as a goal of the validation process. By contrast, the advocates of multiple criteria view increased understanding as an important goal of the validation process, perhaps co-equal with the practical and economic goals."

In offering "a review and resolution" to the controversy of composite vs. multiple criteria Schmidt and Kaplan (1971) offered that "the majority of industrial psychologists will probably not find either of these models entirely satisfactory." They observe that both approaches offer advantages and deficiencies; while a composite approach offers practical and economic advantages, the multiple dimension approach offers far superior behavioral and psychological validity. In light of reconceptualized notions of teaming for

complimentary talents, however, it would seem that the composite approach no longer offers either of the potential advantages proposed by Schmidt and Kaplan (1971) over a multiple-criterion approach.

## Modern Times Call for Multiple Criterion

A central premise of the research presented here is that as actual performance is multi-dimensional, it is best predicted through multi-faceted predictors (Seashore, Indik, & Georgopoulos, 1960; Peres, 1962; Ghisellie, 1960). Relying exclusively on even those predictors which have proven themselves to have high predictive validity for a single outcome criterion offers a perspective that is, by definition, limited. This is consistent with the perspective previously advanced by others that "although most studies of criterion-related validity focus on univariate relationships, the complex and multidimensional nature of the performance construct and the widespread use of multiple selection devices argues in favor of multivariate frameworks for evaluating validity" (Murphy & Shiarella, 1997).

Though largely ignored in practice, Guion (1961) pointed out the need for a more sophisticated approach utilizing simultaneous prediction of multiple criteria over forty years ago in arguing "that (a) there are in many personnel situations dimensions of job performance and of performance consequences that are quite independent of each other, and that (b) the relative importance of these independent criteria ought not be judged prior to validation research – as is so commonly done in the development of 'composite' criteria – but ought to instead be judged after the empirical data are in, at the time these data are to be used."

In a fit of pique Dunnette (1963, p.320) similarly offered that ". . . much selection and validation research has gone astray because of an overzealous worshiping of *the* criterion with an accompanying will-o-the-wisp searching for a single best measure of job success. . . . I say: junk *the* criterion! Let us cease searching for single or composite measures of job success and proceed to undertake research which accepts the world of success dimensionality as it really exists."

Even in relatively low-complexity jobs, performance has been demonstrated to be multidimensional (Seashore, Indik, & Georgopoulos, 1960; Peres, 1962; Ghisellie, 1960). Furthermore, job demands often change over time (Ghiselli & Haire, 1960; Fleishman & Fructer, 1960; Bass, 1962) in response to organizational needs (Prien, 1966), further contributing to the need to consider jobs from a dynamic rather than a static perspective. Studies of more complex jobs (e.g., college professor, scientist) have shown up to 15 relatively independent factors (Taylor, Smith, Ghiseliln, & Ellison, 1961; Taylor, Price, Richards, & Jacobson, 1964). These findings would seem to support the likelihood that incumbents are able to effectively employ alternative strategies for success despite that do not comport to *a priori* conceptions of what patterns of behaviors might be expected for success.

In light of the increasingly dynamic and volatile economic circumstances most organizations face, the factorial composition of composite criterion increasingly run the risk of becoming obsolete shortly after selection is made. By utilizing a multiple criterion approach organizations retain the needed flexibility to divest themselves of capabilities they may no longer need (i.e., hiring employees equally capable of making

buggy whips and microchips is a distinct disadvantage if it should become necessary to segment employee populations for purposes of expansion or reduction).

# Chapter III

## Cognitive Ability

> *For well over two thousand years, at least since the rise of the Greek city-state, a certain set of ideas has dominated discussion of the human condition in our civilization. This collection of ideas stresses the existence and the importance of mental powers – capacities that have been variously termed rationality, intelligence, or the deployment of mind. The unending search for an essence of humanity has led, with seeming ineluctability, to a focus upon our specie's quest for knowledge; and those capacities that figure in knowing have been especially valued. (Gardner, 1985)*

With some minimal dissent (McClelland, 1993; Sternberg & Wagner, 1993), cognitive ability, or more specifically, *g*, has consistently been heralded among the majority of Industrial / Organizational Psychologists as "the single best predictor of performance across all organizations and positions" (Hough, Eaton, Dunnette, Kamp, & McCloy, 1991; Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, 1992; Jensen, 1992; Schmidt, Ones, & Hunter, 1992). Various studies and meta-analyses (Hunter, 1980; Pearlman, et al., 1980) have shown cognitive ability to account for a significant portion of the variance in actual workplace performance, and Hunter and Schmidt (1981; 1998), relying on "the support of thousands of studies and nearly 100 years of quantitative data" have offered that "the most frequently used cognitive ability tests are

valid for all jobs and all job families" and that "the validity of the cognitive tests studied [are] neither specific to situations or specific to jobs."

One of the most persuasive studies linking intelligence to job performance comes from a massive meta-analytic study conducted for the U.S. Department of Labor (Hunter, 1980; Hunter & Hunter, 1984) that included over 32,000 employees in 515 widely diverse civilian jobs. This meta-analysis found predictive validities for performance ranging from .23 for "completely unskilled jobs" to .58 for professional positions. The validity for middle complexity level jobs– which the authors contend include 62% of all jobs in the U.S. economy – was reported to be .51 (Hunter, 1980; Hunter & Hunter, 1984). These findings were consistent with those reported by other meta-analyses (Pearlman, et al., 1980) and numerous other studies (Hough, Eaton, Dunnette, Kamp, & McCloy, 1991; Ree & Earles, 1991, 1992, 1993; Jensen, 1993; Schmidt, Ones, & Hunter, 1992).

In considering 85 years of research on nineteen of the most commonly used selection methods, Schmidt and Hunter (1998) found general mental ability (GMA) (i.e., intelligence or general cognitive ability; Hunter & Hunter, 1984; Ree & Earles, 1992) to consistently be the best overall predictor of future performance for employees hired without previous job experience specific to the position. In this same research Schmidt and Hunter (1998) also demonstrate that pairing GMA with three of the remaining eighteen predictors produced incrementally more valid predictions. Specifically, pairing GMA with a work sample test resulted in a mean validity of .63; GMA plus an integrity test resulted in a mean validity of .65; and GMA paired with a structured interview resulted in a mean validity of .63. Though not among their top three pairings (but

relevant to the research which will be presented here), GMA and conscientiousness resulted in a mean validity of .60 (Schmidt & Hunter, 1998). In re-asserting the dominance of intelligence as a predictor, Schmidt and Hunter (1998) further demonstrated that no predictors compared to GMA on their individual merits, and that few added sufficient incremental validity to GMA to warrant even their conjunctive use.

It is interesting to note, in consideration of the research that will be presented here, an acknowledged limitation of the Schmidt and Hunter (1998) study. According to the authors:

> This article examined the multivariate validity of only certain predictor combinations: combinations of two predictors with one of the two being GMA. Organizations sometimes use more than two selection methods, and it would be informative to examine the incremental validity from adding a third predictor. For some purposes, it would also be of interest to examine predictor combinations that do not include GMA.

While this research will stipulate to the predictive ability of *g* for many "jobs of medium complexity" as described by Schmidt and Hunter (1998), it is important to note that though the jobs their research considered may in fact have accounted for 62% of all positions in the U.S., the distribution of people *within* those jobs is not constant. As a consequence of their reliance on data collected from civil service positions (Hartigan & Wigdor, 1989), Schmidt and Hunter's meta-analysis conspicuously omitted a segment of the U.S. working population that accounts for more job than nearly any other: sales related occupations. As different as the roles, responsibilities and expectations are of sales professionals than for those occupying civil service "jobs of medium complexity",

the generalizability of the Schmidt and Hunter meta-analysis must be questioned, at least with respect to sales positions. Others have offered similar cautions in generalizing the Schmidt and Hunter meta-analysis to non-governmental positions that might not be analogues to corporate positions (Hartigan & Wigdor, 1989).

While the general applicability of intelligence as a predictor has been fairly well established for most jobs, the effectiveness of *g* in predicting sales and sales related positions has been considerably more equivocal. Hunter and Hunter (1984) found validities to be .61 for salespersons, but only .27 for sales clerks. Another meta-analysis (50 studies, $N = 31{,}732$) found an average uncorrected $r$ of .17 (Schmidt et al., 1984) for salespersons, while yet another meta-analytic review of job-performance predictors – this one specifically addressing a sales population (Vinchur, Schippman, Switzer, & Roth, 1998) – demonstrated cognitive ability to show a correlation of .40 with supervisor ratings, but only .04 with objective sales data.

## What is Intelligence?

As valuable as contemporary measures of intelligence, and *g* in particular, have proven themselves to be, reliance on tests of intelligence for purposes of selection raises some additional questions and concerns; not the least of which is what exactly intelligence is, and what it is these tests are actually measuring. Conceptualizations and definitions of intelligence vary widely between different researchers – indeed, when Sternberg and Detterman (1986) asked two-dozen prominent theorists to define intelligence they received "two-dozen somewhat different definitions." Despite their being no real consensus on what intelligence is, the notions of intelligence and

intelligence testing have become so ubiquitous that their validity is unfortunately taken for granted – by members of the lay public and psychologists alike.

Issues of fairness and bias also become serious concerns when relying on the efficacy and predictive ability of cognitive assessment instruments. As noted previously, a considerable body of research has demonstrated the inherently discriminatory nature of intelligence tests with respect to race, as evidenced by the consistent demonstrations of a ½ and 1 standard deviation sub-group difference for both Hispanic and Black test takers, respectively, when contrasted with Whites (Hunter & Hunter, 1984; Schmidt, 1988; Schmidt, Greenthal, Hunter, Berner, & Seaton, 1977; Roth, Bevier, Switzer & Tyler, 2001; Wonderlic, 1999).

While several prominent researchers have cautioned selection researchers to confine themselves to addressing only matters of bias, attributing concerns with fairness to the social/legal/political arena (Guion, 1961), this perspective seems rather disingenuous and shortsighted. Resting on the argument that in the absence of bias fairness is a subjective concept to be determined by social mores and not scientific inquiry (Guion, 1961) ignores the fact that, as Sternberg and Kauffman (1998) have observed, "[I]n the United States, IQ typically accounts only for roughly 10% of the variation, on average, in individual differences across the domains of success [which are typically surveyed]. Put another way, about 90% of the variation, and sometimes quite a bit more, remains unexplained." Similarly even in the most generous attributions of intelligence tests, scores are reported to correlate .54 on average with job performance (Schmidt & Hunter, 1993), accounting for 29% of the variance in actual performance and leaving the remaining 71% unaccounted for. By definition then these instruments do not

account for the majority of those factors that do contribute to performance. As such, the absence of cultural biases only demonstrates that the sub-dimension of performance to which cognitive ability is directly attributable is not being adversely affected – it does not speak to the remaining 71% – 90% of variation that is tacitly ignored as a consequence of relying on *g* as a sole predictor. The mere demonstration of an absence of bias is not enough. A non-biased instrument that results in racially discriminatory practices excludes those aspects of performance that likely do account for success in the adversely impacted group. In avoiding Type I errors, this perspective tacitly promotes Type II errors, which are likely to be more injurious to the affected parties (Cohen, 1988). By not considering that members of minority groups may employ alternative strategies for success (Shade, 1982), the reliance on cognitive ability excludes the consideration of other possibilities. As this matter directly affects both construct and content validity, fairness must be considered a scientific concern.

Likewise, all scientists have a moral obligation to consider the historical genesis of the research on which their current body of knowledge is based and to consider whether the foundation of that research might be so tainted as to bring the ethicality of its continued use into question (McNeill, 1993; Siegel, 1988; Sun, 1988). To this end, and to better understand the theoretical underpinnings of intelligence testing, we are obligated to at least consider the historical foundations and premises on which intelligence testing has thus far been based.

Another factor that must be considered before accepting the validity of *g* as a predictor was raised by Landy (1986). Support for the validity of *g* has, to date, been almost wholly based on its demonstrated predictive ability (Hough, Eaton, Dunnette,

Kamp, & McCloy, 1991; Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, 1992, 1993; Schmidt, Ones, & Hunter, 1992). This, according to Landy (1986), is an insufficient foundation on which to base an assumption of validity: "Although the purpose of employment testing is prediction, a criterion-related design is not the only, or possibly not even the best, way to support the inference that people who do better on the test will do better on the job. . . . the strongest support for such an inference must be more than the simple statement of statistical association. Among other things, one needs to know something about the integrity of the criterion" (Landy, 1986). Relying on nothing more than a correlative relationship between predictor and criterion, according to Landy, amounts to little more than "shotgun empiricism."

Furthering Landy's point, it must also be considered that while intelligence may well be an important correlate to successful job performance, there is no compelling proof that standard "intelligence" tests are measuring anything other than the extent to which a person has been assimilated into the dominant culture (Cox, 1995). Before accepting the results of intelligence it is therefore, again, imperative to consider their theoretical foundation. Most modern selection researchers would agree that Boring's (1923) definition of intelligence as being "whatever it is that intelligence tests test" is insufficient and unacceptable. While *g* has demonstrated predictive validity, this is not a sufficient reason to hold that it is intelligence that is being measured. It has become an unfortunate convention of jargon – and a consequence of sloppy thinking – that the lay public (and indeed, many members of the professional psychological community) tend to refer to *g*, cognitive ability, and intelligence as though they are the same thing. They clearly are not (Sternberg & Kauffman, 1998). This is not merely an issue of semantics.

If standard measures of intelligence (*g*) are culturally biased and are truly more predictive of cultural adaptation than innate intelligence, they should not be accorded undue consideration in assessing an individual's likelihood of "fitting in" to an organization. In considering the veracity of the dominant model of intelligence it is then incumbent on researchers to at least consider the historical and conceptual underpinnings on which these measures are based and if indeed it is innate intelligence, and not cultural fit, that they measure.

In considering the possibility that *g* may be more a measure of cultural assimilation than intelligence, we are also forced to confront its potential educability. If *g* is indeed a reflection of cultural assimilation, it reasons that scores may be improved both individually and societally. This seems at least plausible when one considers the types of questions typical of modern intelligence tests. The Wonderlic Personnel Test™ (Wonderlic, 1999), currently the most widely used cognitive ability assessment instrument for selection purposes, asks questions that require domain-specific knowledge of arithmetic, algebra and geometry as well as a fairly sophisticated command of the English language and Western culture[4]. It therefore seems that the influence of different American sub-cultures, both through their access to and the value they place upon formal education, would likely play a significant role in determining the extent of group members previous exposure to and familiarity with the types of problems included in these tests. If indeed intelligence tests are culturally influenced, the disparate nature of the curriculum included in elementary and high-school education correspondent to socio-

[4] The first question asked in Form IV of the Wonderlic® Personnel Test is: REAP is the opposite of: obtain, cheer, continue, exist, sow. A relatively simple question for anyone raised in a Judeo-Christian tradition, it is unlikely that even the most fluent of Buddhists or Sikhs would be nearly as well prepared to answer this same question correctly. Or as the saying goes, "As ye reap . . ."

economic status likely has a profound affect on scores (i.e., logic, rhetoric, philosophy, argumentation and reason – skills essential to a significant percentage of the questions assessed by the Wonderlic Personnel Test™ – are less likely to be taught at inner-city schools) (Department of Education, 2001).

In light of these issues it therefore seems prudent that one considers the conceptual foundations on which tests of intelligence testing are based, both methodologically and philosophically, before accepting the predictive ability of intelligence tests as the *de facto* most efficacious means of assessing performance. A review of this literature will also demonstrate the pervasive racism, cultural bias and near-sightedness that have been hallmarks of the intelligence testing tradition.

## A Brief History of Intelligence Testing

Intelligence has historically been among the most studied aspects of human ability (Gardner, 1985). Formal psychological studies of intelligence date back over 100 years and have involved some of the most noteworthy figures in psychology. Intelligence research remains one of the most hotly contested and widely studied areas in modern psychology (Estes, 1992) – though some have argued that little has changed since the first formal studies (Carroll, 1982; Horn, 1979; Lohman & Rocklin, 1995).

As a consequence of the extent of the literature subsequently generated on intelligence and intelligence testing, the review offered here is necessarily limited. There are numerous more comprehensive reviews of the history of intelligence theory and testing available (Detterman, 1982; Guilford, 1968, 1969, 1977; Gustafsson, 1984; Hilgard, 1989; Horn, 1979; Lennon, 1985; Lohmin & Rocklin, 1995; Siegle, 2002;

Sternberg, 1985), and the reader is referred to any of these excellent anthologies for more comprehensive treatment of this subject.

While numerous theories of intelligence have been proffered at least since the pre-Socratic philosophers (Robinson, 1986), credit for the first effort to establish a systematic process for differentiating between people on the basis of cognitive ability rightly belongs with Juan Huarte y Navarro. In what is widely recognized as the first textbook on differential psychology (*Examen de los ingenios para las scienzias*, reprinted as *The Tryal of Wits: Discovering the Great Differences of Wits Among Men and What Sort of Learning Suits Best with Each Genius*), Huarte (1575) advocated ability testing and vocational counseling as a means of assuring an appropriate fit between a person and their occupation. Citing humors, climate, the brain and other conditions as reasons for differences in human intelligence, Huarte maintained that intelligence, and thus higher civilization, could only prosper in moderate climates; an idea later endorsed by Herder (Siegle, 2002)[5]. Though not well remembered by contemporary psychologists, Huarte's impact was far reaching. While Lavater regarded him as the predecessor of physiognomy (Zusne, 1975), Gall regarded him as the predecessor of phrenology because of his ascription of individual differences in intelligence to bodily build (Hothersall, 1995).

While the trait of intelligence is held in inestimable regard by virtually all Western societies, the majority of the history of intelligence testing since Huarte has, unfortunately, been rather ignoble. The dominant contemporary conception of

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[5] In an interesting historical irony – and remarkable demonstration of racism – Walter Francis Willcox, chief statistician for the United States Census Bureau and professor of social science and statistics at Cornell University, offered in the 1911 edition of *The Encyclopedia Britannica*, under the heading "Negro," that the reason for the inferior intellective abilities of Negroes could most likely be attributed to "the easy conditions of tropical life and the fertility of the soil" that "have reduced the struggle for existence to a minimum." As a consequence, he further opined: "his environment has not been such as would tend to produce in him the restless energy which has led to the progress of the white race." (Encyclopedia Britannica, 1911)

intelligence and its characteristics of being generalizable, immutable, innate and linked to physiological factors (Sahakian, 1981) began with Franz Gall. While most often remembered as the father of phrenology, Gall was also the first to posit the possibility of focal area specificity within the brain and to hypothesize there to be a link between brain functions and intellective abilities (Hothersall, 1995). While his conclusions regarding the specific functions of the regions of the brain have since proved to be incorrect, and his theory of the relations between brain form and function naïve, his work did serve to stimulate interest in intelligence research and was the impetus for subsequent research conducted by Sir Francis Galton (Robinson, 1986). While Gaul had advanced a differentiating theory of intelligence, the notion that mental abilities could be sufficiently operationalized so as to permit testing originated with Galton. Working from the premise that human talents are conveyed genetically, Galton, extending the work of his cousin Charles Darwin, publishing his first major work *Hereditary Genius* in 1869.

The longitudinal research Galton presented in this *magnum opus* consisted of an extensive analysis of data on the family performance of nearly one thousand individuals from over three hundred different families extending across several generations and included an extraordinary variety of professional fields. The most comprehensive subset in Galton's data involved eight generations of the celebrated Bach family, his study of which led him to conclude that families with talents (i.e., musical ability) tend to produce talented progeny (Galton, 1869). While hopelessly methodologically flawed by modern standards, this research led Galton to conclude that abilities, including mental abilities, must have a genetic cause (Howley, Howley & Pendravis, 1985).

Hypothesizing that, as a consequence of the overwhelming impact of genetic influences environmental factors likely played only a minimal role in the determination of intelligence, Galton was the first to formally propose that for society to continue to thrive, and indeed to survive, it would be crucial to embark on an aggressive program of eugenics in order to develop a superior breed of human (Fancher, 1985). In *Hereditary Intelligence,* Galton (1869) offered that, as it would be a relatively simple matter "to obtain, by careful selection, a permanent breed of dogs or horses gifted with particular powers of running, or of doing anything else, so it would [similarly] be quite practicable to produce a highly-gifted race of men by judicious marriages during several consecutive generations." As Galton realized that people did not typically manifest their highest level of abilities until relatively late in life, the challenge he faced was a need to find a way to assess intelligence much earlier – while people were still at pre-childbearing age – to avoid allowing what could otherwise be disastrously inappropriate decisions regarding procreation. It was this concern that led Galton to attempt to develop a process for measuring intelligence (Hothersall, 1995).

Based on his hypothesis that intelligence was linked to the senses, in 1882 Galton established the world's first mental tests center for the public in London (Zusne, 1975), where he conducted tests of visual acuity, auditory acuity, tactile sensitivity, and reaction time (Colangelo & Davis, 1991). Based on the findings from these tests, Galton was able to substantiate his hypothesis, observing:

> The discriminative faculty of idiots is curiously low; they hardly distinguish between heat and cold, and their sense of pain is so obtuse that some of the more idiotic seem hardly to know what it is.

> In their dull lives, such pain as can be excited in them may literally be accepted with a welcome surprise. (Fancher, 1985)

With the publication of the book stemming out of this research, *Inquiries into Human Faculty and Its Development* (1883), Galton's work on the creation of mental tests first came to public attention. Capitalizing on the books success, Galton was able to collect data on nearly nine thousand paying customers at his Anthropometric Laboratory over the course of the next seven years, from 1884 to 1890 (Fancher, 1985).

Undaunted by not having a precise means of measuring the interrelationships within this considerable dataset, Galton encouraged a bright young graduate student of his to develop a method for doing so. In developing a statistical method to assist Galton in his work, Karl Pearson developed the Pearson Correlation (Salsburg, 2001). Armed with this powerful new statistical tool, Galton developed additional analytic methods, including the percentile rank and the concept of regression toward the mean (Carroll, 1982) to further explain his findings. Galton ultimately brought these techniques to bear in founding the study of individual level measurements. It was this work that soon caught the attention of James McKeen Cattell, a young researcher in Wilhelm Wundt's Leipzig laboratory (Fancher, 1985).

After completing his degree in Liepzig, Cattell moved to England to study with Galton. For a brief time Cattell set up a laboratory at Cambridge similar to his new mentor's, and also began to pursue research in individual differences (Sahakian, 1981). Returning to the United States, Cattell served for a limited time as a professor of psychology at the University of Pennsylvania (Carroll, 1982) before settling into his

position of eventual prominence in the study of individual psychological differences at Columbia (Fancher, 1985).

It was in an 1890 article for *Mind* that Cattell first introduced the term "mental tests." In the article, *Mental Tests and Measurement*, he proposed ten mental tests for use with the general public (Zusne, 1975). Attributing much of the foundation of his own work to Galton (Hothersall, 1995), Cattell called for further research on the development of tests of mental ability. This call was taken up in force through the 1890's, during which time Pearson was also able to further refine and perfect his correlation technique (Salsburg, 2001).

In the first substantial application of Pearson's formula, Clark Wissler (1901), one of Cattell's graduate students at Columbia, compared the mental tests of 300 Columbia University and Barnard College students with their academic grades to establish support for Cattell's hypothesis regarding the predictive ability of mental tests. He found there to be little correlation between the two. Cattell's work suffered a considerable blow as a result, resulting in the "death of the anthropometric test movement" (Siegel, 2002) and a migration of practicing psychologists toward the work of Alfred Binet, who had recently begun developing measures of "high mental processes (Zusne, 1975). According to Davis and Rimm (1989), despite the temporary setback precipitated by the Wissler[6] study, it was Cattell's 1890 paper, and its call for further development of tests of mental ability, that was largely responsible for the favorable reception Binet's test would receive in the United States.

Alfred Binet is perhaps the first recorded case of the wounded healer. While recovering from a nervous breakdown he suffered while attending medical school, Binet

[6] Wissler eventually left psychology and became an anthropologist (Carroll, 1982).

came across several books in the library on conducting psychological experiments and in them found his life's work (Siegle, 2002). While working at the Salpetriere Hospital under the direction of Jean Martin Charcot[7], Binet began experimenting with the administration of tests and puzzles to his young daughters, Madeline and Alice. In three articles published in 1890 stemming out of this diversion from his primary research, Binet noted his observation that the difference in reaction time between children and adults to be contingent on the extent to which the child was paying attention (Hothersall, 1995). Binet continued to report empirical data on his daughters as they grew and elaborated on the distinctly different styles of intelligence they manifested in a 1902 publication, *L'Etude Experimentale de l'Intelligence* (The Experimental Study of Intelligence).

Shortly after meeting a young physician named Theodore Simon in 1899, Binet began to cultivate an interest in the mentally handicapped and became a member of *La Societe Libre pour l'Etude Psychologique de l'Enfant* (The Free Society for the Psychological Study of the Child). The society was formed in response to a growing awareness in France of the insufficiently met needs of children with disabilities, culminating in the passing of a law requiring a minimum course of public education for all children, including the mentally handicapped. In 1904 the Minister of Public Education of France appointed a committee, including Binet, to study and make recommendations regarding the education of the mentally retarded children of Paris. Among the first of its findings the commission noted that:

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[7] Charcot would come to mentor and greatly influence the work of another promising young student while at Salpetriere; Sigmund Freud. A great admirer, the young Freud once commented in a letter to his fiancé: "He [Charcot] is a man whose common sense borders on genius."

> . . . teacher's judgments of student ability were biased by such traits as docility, neatness, and social skills. Some children were placed in schools for the retarded because they were too quiet, too aggressive, or had problems with speech, hearing, or vision. (Davis & Rimm, 1989)

As a consequence of the commissions initial investigation it became obvious that an objective diagnostic system for classification would have to be developed, and Binet and Simon were charged with the responsibility for doing so. The French government had already developed a three-tier system for categorizing mental retardation and Binet and Simon's task was to develop a system with which to diagnose and classify children within this scale, as well as distinguishing those with a level of normal weakness (Davis & Rimm, 1989). While still enamored by the richness of the case study method from the time he spent with Charcot, Binet soon recognized the need to develop a standardized dimension for comparing individuals if his and Simon's findings were to have broad applicability (Siegle, 2002).

Through considerable testing Binet and Simon soon found that "normal" children differed in their cognitive ability and problem mastery as a function of their age (a finding which would eventually become central to the research of Jean Piaget). Out of these studies Binet and Simon developed and published the first intelligence test in 1905. The original instrument consisted of a series of 30 items of ascending difficulty. The first item of the test demonstrated what the team considered to be the earliest sign of intelligence, tracking ability, tested by having the child follow a matchstick with their eyes. This ability was thought by Binet to be beyond the cognitive capabilities of the most profoundly retarded children, and subsequently served as a threshold test. The most

difficult tasks were considered beyond the ability of the "subnormals," but could easily be performed by a "normal" child of eleven or twelve. The test was intended to discriminate among a wide range of mental functions, including attention, memory, discrimination, imagination, and verbal fluency (Binet & Simon, 1911). The field tests for this instrument were conducted with a group consisting of 50 normal and 45 subnormal children (Fancher, 1985).

In 1908, the Binet-Simon test was expanded to include 58 items. The applicable age was also extended to include children ranging in age from three to thirteen and revisions allowed further discriminative ability at the six to eight-year-old range. In 1911 Binet made his final revisions to the test, including five items for each age level, while increasing the applicable age range to include children up to 15 years of age, and also included an adult category (Fancher, 1985). It was from this final test that the concept of a mental age was developed (Colangelo & Davis, 1991; Davis & Rimm, 1989; Lyman, 1986; Zusne, 1975).

In the Binet scoring system individuals received a score of one-fifth of a year for each question answered correctly on the test determining their age level, so that a "normal" would receive a score coincident with his or her chronological age. Binet's scoring system was eventually modified by the German psychologist William Stern (1921), who developed the concept of an Intelligence Quotient (IQ). While studying student scores on Binet's test Stern had found the variations in mental age to increase consistent with chronological age and, on further analysis, discovered that if he were to divide the chronological age by the mental age the ratio tended to remain constant

(Carroll, 1982). It was this formula that allowed for the calculation of an IQ score and became the standard metric among practicing psychologists (Carroll, 1982).

It is important to note that despite his having been the first to do so, throughout his life Binet maintained that intelligence should not be reduced to a single score (Fancher, 1985) and that he also believed intelligence to not be fixed, but subject to substantial change, In *Idees Modernes sur les Enfants* (Modern Ideas about Infants), Binet (1909) proposed several strategies for improving children's intelligence, even at the lowest testable levels. Clark (1979) makes the point that Binet's ideas about the educability of intelligence were not proposed again until the 1960s, and that even today many of his articles and speeches would be considered radical.

Broad and Wade (1982) similarly make the point that in developing intelligence tests Binet laid down three cardinal principles for their use, each of which have subsequently been "systematically ignored and perverted by his American imitators." According to Broad and Wade (1982), "Binet's Rule 1 was: The scores do not define anything innate or permanent. Rule 2: The scale is a rough guide for identifying and helping learning-disabled children; it is not a way of measuring normal children. Rule 3: Low scores don't mean a child is innately incapable."

It is not just slightly ironic in light of subsequent perversions of intelligence testing that Binet's purpose for developing his tests was to ensure greater equality. The reason behind Binet's developing a systematic method for testing intelligence was to ensure that children's academic needs could be more effectively met, and not as a means of assessing their global abilities (Hothersall, 1995). It is only relatively recently, in fact, that cognitive ability tests been used to make categorical decisions regarding general

abilities. From the very first formal tests of intelligence Binet (1911) also expressed concern over the inevitability of cultural loading and biases being inevitable in the construction of assessment instruments, maintaining that no matter how well intentioned the developer, there would always be something going on in the background with respect to privilege, background and upbringing ultimately impacting the construction of these instruments (Binet, 1913) – concerns that have since been largely unheeded.

Binet died in the same year as Galton; the later having long since retired, the former at the pinnacle of his career at 54. Despite having produced over 277 publications (Dennis, 1954), Binet did not inspire any true devotees. The majority of those who did eventually adopt his techniques did so from a largely "Galtonian" perspective (Fancher, 1985).

## The Modern View of Intelligence and Intelligence Testing

### Charles Spearman – *g* Whiz

The psychometric approach that has come to dominate psychological theory for nearly a century began with Charles Spearman's (1904) theory of general intelligence, or *g*. In 1904 Spearman, a former soldier who abandoned a promising military career at the age of 34 to study with Wilhelm Wundt at the University of Leipzig made a discovery that would dramatically change the scope and nature not only of intelligence testing, but of applied psychology in general. Relying on his recently developed *Method for Tetrad Differences* (a precursor to modern factor analysis based on the work of Galton),

Spearman found that all of the mental tests then in use by the nascent psychological community resulted in findings that were positively correlated[8] (Hothersall, 1995).

Spearman proposed that the reason for this correlation was not coincidental; indeed, his analysis disclosed there to be a general factor that could account for performance on all of these tests. This factor, he proposed, was the ephemeral and elusive general factor of intelligence, or *g*, that had been the subject of philosophical speculation since the beginning of western civilization (Spearman, 1927). Spearman concluded, in proposing his "two-factor theory," that "every mental test, however diverse in the content or skills called for, measures only two factors: *g* and *s*, a factor specific to each test (Spearman, 1927) (a position still supported by Jensen (1972, 1977, 1980, 1985, 1987, 1993), who maintains that if we "partial out any test's *g* component, . . . its validity drops to near zero").

Subsequent research forced Spearman to eventually, albeit reluctantly, modify his two-factor theory to accommodate the existence of group factors, acknowledging that tests with similar task demands tended to correlate higher with each other than with tests with other demands (e.g., tests of mathematical ability tend to correlate more strongly with one another than tests of verbal reasoning). It was, however, Spearman's *g*, the common factor accounting for the majority of variance in all mental ability tests, that ultimately came to predominate the psychological view of intelligence.

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[8] Though he did not know it at the time, Spearman's work had repeated previous research by Cattell that had been previously discredited by Wissler's application of the Pearson correlation. Fortunately for him, Spearman's own work showed a considerably higher correlation than did Cattell's. About this Spearman later wrote "Had I seen [Wissler's] work earlier, I should certainly have thought the matter disposed of and should never have started my own work in this direction. Since the conflicting results were there, however, they had at least to be explained. After much pondering over them, I had at last a happy thought which embodied itself in the concept of "attenuation." (Fancher, 1985)

The first serious challenge to Spearman's single common factor (*g*) theory, and the subsequent genesis of the multiple intelligences perspective, came from Thurstone (1938), who proposed that intelligence consists not of a single factor, but rather of multiple dimensions. Thurstone demonstrated through factor analysis seven primary mental abilities: verbal comprehension, numerical facility, spatial ability, perceptual speed, rote memory, induction and deduction (it is interesting to note that the first three of these abilities have remained the primary focus of cognitive ability tests). While Thurstone's theory did hold sway for several years, subsequent studies showed there to be sufficient intercorrelation between these three factors to ultimately vindicate Spearman's concept of *g*. There would not be another serious effort to demonstrate multiple dimensions of intelligence until Guilford proposed a model offering 120 independent factors in 1956[9].

Impressed by Binet's tests, though not his theory, Spearman applied his statistical test to Binet's intelligence test as well – offering these results as yet further evidence of the existence of a general factor of intelligence (Fancher, 1985). In response to this study, the British statistician Godfrey Thomson demonstrated that even randomly generated scores produce a hierarchical pattern of correlation coefficients similar to those obtained by Spearman; a conclusion that remains the touchstone of a debate continues to this day (Fancher, 1985).

Like his mentor Francis Galton, Spearman strongly also supported the activities of the Eugenics Society through his professional life. Writing for the society in 1912 he offered "One can . . . conceive the establishment of a minimum index [of *g*] to qualify for

[9] Guilford was ultimately forced to acknowledge the lack of independence among these factors and subsequent research has seriously called both the tenability and veracity of his model into question (Brody, 1992; Lohman & Rocklin, 1995).

parliamentary vote, and above all, for the right to have offspring" (Hart & Spearman, 1912). Spearman's "g-ocentric" legacy remains the dominant theory of intelligence and has continued largely unchallenged until modern times, with some notable exceptions (Gardner, 1985; Sternberg, 1996).

### Intelligence Testing Comes To America (Or Does It?)

While Galton's motives for developing an intelligence test were undoubtedly dubious, it is to an American, Henry Goddard, to whom the onerous distinction of being the first to use, and systematically abuse, intelligence tests on a large scale belongs (Fancher, 1985). Shortly after championing the use of his own plagiarized version of Binet's test as being mandatory for children attending public school in the State of New Jersey in the 1920's – under the guise of providing a means for overcoming prejudices against the children of minorities and ethnic immigrants – Goddard began a systematic campaign promoting eugenics and national xenophobia (Siegle, 2002).

Following on the heels of the publication of a dubious ethnographic study entitled *The Kallikak Family: A Study in the Heredity of Feeblemindedness* (1912), Goddard gained considerable cachet in political circles. As a member of the Committee for the Heredity of the Feeble-Minded and a psychological consultant to the Eugenics Society of the American Breeders' Association, Goddard (1914) recommended that: "defective classes be eliminated from the human stock through sterilization," with such "defective classes" including the feebleminded, paupers, criminals, epileptics, the insane, and the congenitally handicapped (Van Wagenen, 1914). Far from being a lone voice, Goddard was joined in these recommendations by a committee consisting of Alexander Graham Bell, Walter B. Cannon, Robert Yerkes, Edward Lee Thorndike, and Lewis Terman.

In 1927 the United States Supreme Court, in a landmark case entitled *Buck vs. Bell*, ruled in favor of the sterilization of mentally handicapped women. Relying in larger part on Goddard's research, Chief Justice Oliver Wendell Holmes wrote the opinion for the majority ordering seventeen-year-old Carrie Buck to be forcibly sterilized, with Holmes offering in his majority opinion that "three generations of imbeciles are enough.[10]"

Goddard relentlessly promoted and successfully introduced his version of the Stanford-Binet at Ellis Island to serve as a final litmus test to guard against allowing the immigration of those of "inferior stock" among the huddled masses yearning to be free then streaming into the United States to avoid persecution and starvation in Europe.

## The Intelligence Testing War

The year 1917 marks a distinct turning point both in U.S. and psychological history. As Woodrow Wilson led the nation into World War I as President of the United States, Robert Yerkes led the effort to mainstream intelligence testing as President of the American Psychological Association. Anxious to show the contribution that psychology could make to the war effort, Yerkes proposed blanket administration of intelligence tests to all military recruits (1921). In an impassioned address to members of the APA, Yerkes offered "We should not work primarily for the exclusion of intellectual defectives, but rather for the classification of men in order that they may be properly placed in the military service (Fancher, 1985).

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[10] If this story could be made any more surreal, it would be by the fact that Carrie Buck was actually not cognitively impaired at all. She had been raped by her foster brother and institutionalized by her foster parents to avoid the embarrassment of a scandal. When she died in 1983 Carrie was remembered as having been a loving wife, an avid reader – and not at all "feebleminded."

Yerkes' bold proposal would change the nature of intelligence testing in two fundamental ways. First, rather than conducting individual testing as had been done previously, to accommodate the extraordinary number of subjects needing to be tested Yerkes' plan would call for group administrations. Second, and perhaps more importantly, the tests would for the first time be used for positive as well as negative selection. Instead of measuring what an individual could not do, the tests would now be required to predict what they could (Siegle, 2002).

After being turned down by the Navy, Yerkes was able to convince the Surgeon General of the Army to consider his proposal (Fancher, 1985). Basing his work on the research of Goddard, Otis, Bingham, Wells and Thurstone, Yerkes joined forces with Lewis Terman and David Wechsler in developing the Army Alpha and Beta (Fancher, 1985). The Alpha consisted of eight subtests and took 25 minutes to administer. The Beta was an equivalent test developed for recruits who were illiterate in English. Both tests produced a "mental age" score, as the IQ scoring system proposed by Stern was considered inappropriate (Carroll, 1982).

The initial trial of the test was conducted on 80,000 men[11] (Fancher, 1985). Having been sufficiently impressed with the results of the field test the Army commissioned Yerkes and his team to administer an additional 200,000 tests per month, with over 1,750,000 tests ultimately being administered by the end of the war in November of 1918 (Fancher, 1985).

The overwhelmingly positive reception to the Army Alpha and Beta among the general public set off a firestorm in the development of intelligence and other ability tests

[11] This was obviously in a time that modern psychometricians can only longingly refer to as "the good old days."

in the private sector. By the early 1900s over 350 intelligence tests were available to the general public (Tannenbaum, 1983). While a handful were well constructed and developed by some of the leading psychologists of the time, including Otis, Thorndike, and Thurstone, the majority were poorly designed with no regard to test construction or psychometric validity (Carroll, 1982); a prime example being one test of intelligence designed by the famed inventor, Thomas Edison. Among the questions asked in Edison's test: What telescope is the largest in the world? Who was Plutarch? How is leather made? Why is cast iron called pig iron? (Hothersall, 1995).

While the Army Alpha and Beta popularized the concept of intelligence testing, it was a book by Edward Thorndike (1904), *Introduction to the Theory of Mental and Social Measurements*, which had gained newfound popularity among aspirant intelligence test developers, that provided them the means with which to apply statistical methods to the construction and application of mental tests and truly establish the psychometric movement in testing (Carroll, 1982). In his book Thorndike (1904) described intelligence as a general ability transcending a wide range of tasks and as "the capacity to form connections among ideas and concepts" (Siegle, 2002). Thorndike contended that: "persons of high intelligence were those who had the capacity to form a large number of connections and had the opportunity through education and experience to do so."

As popular as Yerkes' tests were during the war, they would eventually become a source of considerable controversy. While the Army testing program produced the single greatest collection of data ever available for psychological research (Fancher, 1985), three of the conclusions that Yerkes' drew would remain a source of contention and spark

further debate that continues to this day. In *Psychological Examining in the United States Army* (1921), Yerkes offered that the average army recruit had the mental age of a 13-year-old child. In a second study published with his colleague Carl Bingham (1923), Yerkes reported that immigrants from northern Europe scored considerably lower than white native-born Americans, and that those from southern and eastern Europe scored significantly below those from northern Europe[12]. Finally, Yerkes and Brigham reported that blacks scored considerably lower than whites and that blacks from northern states typically outperformed whites from southern states.

Given his findings it is not surprising that like so many of his predecessors in the history of the development of intelligence testing Yerkes also became a strong advocate of the eugenics movement (Hothersall, 1995). It is somewhat ironic that with the extraordinary influence Yerkes had on the evolution of intelligence testing (for better or worse), he is best remembered among psychologists for the experimental studies of animal behavior he pioneered with Thorndike (Zusne, 1975).

Though Yerkes had not been particularly impressed with Binet's intelligence test (or Goddard's plagiarized version of it), one of his colleagues in the development of the Army Alpha and Beta, Lewis Terman, believed the test to have considerable promise for further development (Siegle, 2002). Terman, partnering with his graduate student H.G. Childs, worked to correct what he found to be a fundamental flaw in the design of the original Binet test. Since its introduction to the U.S. the Binet test had demonstrated an inability to sufficiently discriminate among test takers due, Terman and Childs

[12] Both Yerkes and Brigham failed to account for the fact that time in the U.S. substantially affected scores and that northern Europeans, as a group, had emigrated to the U.S. considerably before those from southern and eastern Europe.

discovered, to its being incorrectly calibrated resulting in inflated scores for young American children and deflated scores for older ones (Fancher, 1985).

Terman and Childs succeeded in developing a more accurate version of the test, which they published in 1912. A second version of this test, which they called the *Stanford Revision of the Binet-Simon Scale*, introduced further refinements (Terman & Childs, 1916) and became an immediate success among psychologists and school administrators. This title of this test was eventually abbreviated to the *Stanford-Binet*; and it is this test which has remained the standard by which all subsequent tests of intelligence have been measured (Fancher,1985).

Another of Terman's modifications to the Binet test was to adopt Stern's measurement quotient as a means of scoring and measuring intelligence, which he also referred to as an intelligence quotient, or IQ (Zusne, 1975). Terman published several revisions of the Stanford-Binet (1937 & 1960), with a final version being published in 1986, and became a very wealthy man in the process (Davis & Rimm, 1989).

It is curious to note that while Terman defined intelligence as the ability to engage in abstract thinking, he never sufficiently operationalized what he believed abstract thinking to mean (Clark, 1979). Guilford (1977) has demonstrated that the Stanford-Binet only minimally assesses abstract thinking ability, with its primary focus being on assessing understanding or knowledge and memory. Tannenbaum (1991) has likewise noted that Terman never formally proposed a theory of intelligence; he simply attempted to develop a test capable of assessing abstract thinking ability.

Like so many of his predecessors in the history of intelligence testing, Terman was decidedly Galtonian in believing intelligence to be genetically determined (Siegle,

2002). Another strong advocate of eugenics and the ability of his tests to "identify bad genes and to eventually rid society of their owners" (Broad & Wade, 1982), Terman offered that "It is safe to predict that in the near future intelligence tests will bring tens of thousands of these high-grade defectives under the surveillance and protection of society. This will ultimately result in curtailing the reproduction of feeble-mindedness and in the elimination of an enormous amount of crime, pauperism and industrial inefficiency." (Terman, 1916). Terman further advocated that "everyone should be tested, as a means not only of weeding out defectives but of channeling acceptable members of society into professions suited to their mental capacities" (Broad & Wade, 1982). Clark (1979) has noted that the Stanford-Binet "originated when no one questioned the belief in fixed intelligence" and that "later revisions are still based on this assumption." It is this assumption, like so many others in intelligence testing, that has only recently come into question.

**Alternatives to g-ocentricism**

When the United States entered World War I, David Wechsler was pursuing a master's degree studying Korsakoff's syndrome (amnesia due to chronic alcoholism). Leaving his studies to join the army, Wechsler was assigned as a member of the Yerkes testing team and was given the task of administering Stanford-Binet tests to recruits who had done poorly on the Army Alpha or Beta – ostensibly to demonstrate the superior predictive validity of Yerkes' own tests (Siegle, 2002). During the course of this project Wechsler recognized that, indeed, the Stanford-Binet frequently did not appropriately assess soldier's true abilities (Fancher, 1985). He also found that scores on certain test items were not reflective of the innate intelligence of test takers, but rather tended to be

more correspondent to the personality and motivational style of the test takers than anything that could reasonably be described as intelligence (Wechsler, 1932). Based on an extensive analysis of children's Stanford-Binet scores Wechsler also found evidence demonstrating intelligence to not be entirely fixed – a radical departure from the dominant genetically determinative perspective of intelligence, which had been central to intelligence testing theories since Galton (Fancher, 1985). Wechsler found that as children aged the variance in their scores diminished; an effect he surmised to be due to environmental factors (Fancher, 1985).

In a further break from the traditional perspectives on intelligence testing Wechsler, who had also previously studied with Spearman, found *g* to be too restrictive a measure of intelligence as it also overlooked factors of both personality and motivation (Wechsler, 1932). Much to Yerke's chagrin Wechsler ultimately advocated the advantages of the Army Alpha and Beta only in limited circumstances, due to its ability to diagnose special abilities and disabilities, but found it to not be appropriate for the assessment of generally intelligence (Fancher, 1985).

In the same year he reported these findings Wechsler was appointed head of psychology at New York's Bellevue Hospital, where his duties would include the testing of thousands of adults. Faced with this challenge Wechsler set himself to developing an intelligence test which was the first to be developed primarily for adults rather than children and which viewed intelligence as multidimensional (Siegle, 2002). As his research showed adult performance on tests to level off in a person's twenties, Wechsler's first challenge was to develop an alternative to the Stern-Terman formula which divided mental age by chronological age. As an alternative, Wechsler based his

scoring on the normal distribution, standardizing the mean score for a given age group to a value of 100 with a standard deviation of 15 (Siegle, 2002). The first Wechsler Bellevue Scale was developed in 1939 and subsequently revised and published as the Weschler Adult Intelligence Scale (WAIS) in 1955.

The original WAIS consisted of eleven subtests, each of which resulted in a separate score. Six of the subtests were modeled after the Army Alpha and, under the heading "verbal skills" assessed vocabulary skills, information, comprehension, arithmetic, digit span and similarities. The remaining five subtests were similar to the Army Beta and, under the heading "performance materials" assessed picture arrangement, picture completion, block design, object assembly and digit symbol substitution. Relying on the scores of individual subtests "In the hands of skillful interpreters, the Wechsler test patterns provide multiperspectived views of the intellectual workings of many different kinds of people" (Fancher, 1985).

While having desiccated the Stanford-Binet version of Binet's test, Wechsler considered his own conception of intelligence and intelligence testing to directly follow both the spirit and philosophy of Binet's original concept of intelligence testing (Siegle, 2002). In summing his perspective on intelligence testing, Wechsler (1969) offered that "general intelligence cannot be equated with intellectual ability, but must be regarded as a manifestation of the personality as a whole . . . factors other than intellectual [ability] enter into our concept of general intelligence, and . . . in everyday practice, we make use of them knowingly or not." Noting that among these factors are drive, persistence, will and preservation, "or in some instances, to aspects of temperament that pertain to interests and achievement" (Wechsler, 1969).

The WAIS has remained considerably more popular with Clinicians and Neuropsychologists than with Industrial / Organizational Psychologists, who have largely continued to rely on instruments more reminiscent of the Stanford-Binet and its focus on general intelligence. This is likely due in large part to the multi-dimensional scoring methodology required of the WAIS, where tests of *g* typically produce a single metric that more readily lends itself to prediction. It is interesting to note in this respect that in arriving at a score for *g* most contemporary intelligence tests actually take a combined approach to both the Stanford-Binet and WAIS methodologies by averaging the group factors representing different content areas (i.e., verbal comprehension, numerical facility, spatial ability), with the variance in the total score being assumed to represent *g*.

While the debate over the adequacy of *g* as a predictor has raged within the psychological community at least since Wechsler's introduction of the WAIS (and arguably to a lesser extent since the introduction of Thurstone's multi-factor theory), the publication of two diametrically different works in the past fifteen years has brought the importance of the various perspectives on intelligence, and intelligence testing, starkly into public view. The first, conceptually aligned with Binet and Wechsler, was Howard Gardner's 1985 book *Frames of Mind.* In it Gardner questions the adequacy of *g* as a construct, proposing in its place an alternative theory of "multiple intelligences." The second, based on a decidedly Galtonian perspective and more aligned with the currently dominant *g*-ocentric approach, has become the one of the most controversial works in the history of psychology; *The Bell Curve: Intelligence and Class Structure in American Life* (Herrnstein & Murray, 1994)[13].

[13] While Jensen's (1972) assertions as to the intellective inferiority of blacks (*Genetics and Education*, New York: Harper & Row) preceded Herrnstein and Murray's (1994) *The Bell Curve*, by over twenty years, it

*The Bell Curve*, written by Harvard Psychologist Richard J. Herrnstein and MIT Political Scientist Charles Murray, begins on the first page with the invocation of Galton's pioneering work as being the philosophical foundation of their own inquiries. According to Herrnstein and Murray, Galton pioneered the modern approach to intelligence testing by seizing on his older cousin Charles Darwin's idea that "the transmission of inherited intelligence was a key step in human evolution, driving our simian ancestors apart from other apes."

In an exhaustive demonstration of convoluted thinking Herrnstein and Murray attempt to substantiate their claim that intelligence is wholly genetically determined and, as a consequence, directly correspondent to race (Herrnstein & Murray, 1994). From what they frame as a position of pure beneficence, Herrnstein and Murray conclude their argument by imploring readers to assume the modern equivalent of *noblesse oblige*, urging those in the upper strata of intelligence (i.e., those of Asian-American or European-American heritage) to care for their less cognitively endowed cousins (i.e., those who are presumably closer evolutionarily to our simian ancestors). Selectively citing nearly a century of research Herrnstein and Murray (1994) find this latter group, whose scores consistently prove to be an entire standard deviation below those of European-Americans, to most predominantly consist of African-Americans.

While a comprehensive consideration of the irrationality of Herrnstein & Murray's arguments are beyond the scope of this paper[14], a succinct analysis of its flaws

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did not receive nearly the same public attention – no doubt due in large part to the relatively greater subjugation of the black community at that time – though it did serve as a touchstone of considerable academic debate.

[14] Several incisive and comprehensive works have been written to repudiate the illogic of Herrnstein and Murray's (1994) work and attempt to mitigate the societal damage it has wrought, including a report commissioned by the American Psychological Association (Neisser, 1996), and the reader is directed to any of these works for a more comprehensive treatment of this subject (Fraser, 1995; Gould, 1995).

was offered by Stephen Jay Gould (Fraser, 1995). Gould makes the point that *The Bell Curve* rests on several untenable premises, and that the arguments it offers "require the validity of four shaky premises, all asserted (but hardly discussed or defended) by Herrnstein and Murray. Intelligence, in their formulation, must be depicted as a single number, capable of ranking people in linear order, genetically based, and effectively immutable. If any of these premises are false, their entire argument collapses."

In considering Herrnstein and Murray's contention of intelligence as being immutable, Gould offers: "For example, if all [of their assertions] are true except immutability, then programs for early intervention in education might work to boost IQ permanently, just as a pair of eyeglasses may correct a genetic defect in vision." A substantial body of evidence supporting governmental programs such as Head Start and the test preparation industry (i.e., Kaplan, Princeton Review) (Sternberg, 1998) seems to invalidate the argument of immutability of individual test scores, while the Flynn Effect[15] (Flynn, 1987) and the findings of Luis Alberto Machado[16] (1979) would seem to negate the likelihood of immutability from a societal perspective. The concept of intelligence as being immutable, a central tenet of both *The Bell Curve* and the *g-ocentric* perspective of intelligence testing, does not find support in the research.

The *g*-ocentric / *Bell Curve* contention that intelligence is genetically based is likewise flawed. To understand why, Gould (1981) offers as an alternative to considerations of intelligence a more innocuous and less politically laden trait, such as a

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[15] The demonstration of a progressive generational rises in intelligence test scores with every successive year after a test is first standardized, the "Flynn Effect" shows mean IQ scores to have increased more than 15 points – a full standard deviation – in the last 50 years, and further shows that the rate of gain may be increasing (Flynn, 1984).

[16] In 1979 Luis Alberto Machado was appointed Minister for the Development of Intelligence for Venezuela. Before losing funding Machado showed dramatic improvements in intelligence scores for school age children participating in a national nutritional and educative programs designed with the specific goal of increasing their intelligence.

consideration of height. While a societal-level height study would likely show a high degree of heritability with correspondent differences between geographical, cultural or ethnic groups, few would deny the effect of changes in dietary patterns on future height. Gould offers "this high heritability within [a group] does not mean that better nutrition might not raise average height . . . in a few generations. Similarly, the well-documented fifteen-point average difference in IQ between blacks and whites in America, with substantial heritability of IQ in family lines within each group, permits no automatic conclusion that truly equal opportunity might not raise the black average enough to equal or surpass white mean." The need – or desirability – of depicting intelligence as a single number and consequently providing a means of ranking people in linear order, is the remaining premises that, according to Gould (1995) would need to be substantiated to support Herrnstein and Murray's conclusions. This premise too has been effectively refuted; initially by Weschler (whose conclusions in this regard were conspicuously ignored by Herrnstein and Murray), but most convincingly by Gardner (1985).

Howard Gardner, a colleague of Herrnstein's in the psychology department at Harvard, has proposed what has widely been regarded as the most provocative perspective on intelligence since Binet (1903). Starting from a radically different perspective than previous intelligence theorists, Gardner (1983) chose to not propose a definition of intelligence, but rather offered a definition of *an* intelligence. "An intelligence," according to Gardner, "is the ability to solve problems, or to create products, that are valued within one or more cultural settings." In questioning the unidimensional perspective of *g*, Gardner (1985) offered:

> While I do not question that some individuals may have the potential to excel in more than one sphere, I strongly challenge the notion of large general powers. To my way of thinking, the mind has the potential to deal with several different kinds of content, but an individual's facility with one content has little predictive power about his or her facility with other kinds of content. In other words, genius . . . is likely to be specific to particular contents: human beings have evolved to exhibit several different intelligences and not to draw variously on one flexible intelligence.

Gardner initially proposed seven different intelligences: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal, though his theory eventually evolved to also include naturalistic, spiritual and existential intelligences (Gardner, 1999). It is interesting to note that of the intelligences initially proposed by Gardner only the first three correspond to traditional Euro-centric conceptions of intelligence and, not coincidentally, are the only facets tested by traditional measures of intelligence (Gardner, 1985). The last two facets proposed by Gardner's original model, interpersonal and intrapersonal intelligence, have since become the foundation of Emotional Intelligence (Salovey & Mayer, 1990).

While Gardner's concept of multiple intelligences has gained considerable currency among intelligence theorists (Neisser, 1996), an inability to reduce these dimensions to a single composite predictor has likely been a major factor in its not having been readily adopted by selection researchers (Murphy, 1996). Conversely, while Herrnstein and Murray's support of a Galtonian, *g*-oriented perspective has been largely

shunned by the general psychological community, the g-oriented approach has remained the dominant perspective among personnel selection practitioners due to its strong predictive abilities (Schmidt & Hunter, 1998).

Public opinion as to the efficacy of intelligence testing has suffered greatly as a consequence of Herrnstein and Murray's book and the subsequent debate it engendered. In their book *Betrayers of the Truth: Fraud and Deceit in the Halls of Science*, Broad and Wade (1982), weighing the available evidence on intelligence testing, offered:

> There is one thing IQ tests measure for certain: performance on IQ tests. Claims that they give a measure of anything beyond that, such as "intelligence," are inferential. In the many capacities of the human mind that probably contribute to what is called intelligence, there are undoubtedly components that are inherited. But whatever is inherited is shaped and reworked and reformulated by the environment in which an individual grows up. The IQ testers of the early twentieth century [and those who continue to cling to traditional measures of intelligence] had a hereditarian bias so strong that it blinded them to the evidence of environmental influence that cried out from the data. All they could see was the reflection of their own dogmatic beliefs which . . . echoed the prejudices of their time and social class.

In an effort to reconcile the unprecedented level of public concern with psychological issues instigated by *The Bell Curve*, the Board of Scientific Affairs (BSA) of the American Psychological Association (APA), in cooperation with the APA Board

on the Advancement of Psychology in the Public Interest, commissioned a Task Force charged with investigating the intelligence debate (Neisser, et al., 1996).

In acknowledging the complexity of the issue, the Task Force admitted that while the psychometric approach to intelligence testing had become the most influential and had generated the most research, it offered that: "many questions [regarding the nature of intelligence] remain unanswered . . . we know much less about the forms of intelligence that tests do not easily assess: wisdom, creativity, practical knowledge, ***social skills***, and the like." [emphasis added] (Neisser, et al., 1996). These same concerns have similarly been expressed by Cascio (1995) and Goldstein, Zedeck and Goldstein (2001). As will be demonstrated through the research presented here, the social skill intelligences to which the Task Force alludes (i.e., those dimensions of intelligence assessed through tests of Emotional Intelligence and Personality) will prove a significant adjunct both in predicting job performance and more fully understanding the breadth of intelligence.

Shade (1982) has argued that the construct of intelligence has been insufficiently understood and operationalized, and that it suffers from an inherent cultural bias which makes reliance on it for hiring decisions not only inherently unfair, but myopic. By predicating hiring decisions solely on evaluations of intelligence Shade (1982) observes that the one standard-deviation difference in intelligence tests demonstrate between Black and White test-takers ignores the absence of any actual differences in workplace performance between group members. Though not offering any empirical substantiation for her claim, Shade contends that this is likely a consequence of Black's employing alternative strategies to occasion success. Where Whites likely are more acculturated to rely on traditional aspects of intelligence, Shade offers anecdotal evidence in support of

the reliance of Blacks on relational skills – a description of which bears a distinct similarity to Mayer and Salovey's construct of Emotional Intelligence.

In advancing Shade's proposition, the research presented here is intended to empirically demonstrate that the ability to employ alternative strategies for achieving organizational success is not limited to members of any particular community. As an alternative to possessing relatively higher cognitive ability, it will be demonstrated that organizational members may rely on aspects of personality and Emotional Intelligence in order to achieve success. The purpose of the research presented here is not to undermine the future use of intelligence tests, but rather to draw attention to the inherent conceptual limitations of *g* and propose alternatives to relying exclusively on supposed measures of intelligence as the sole predictor of organizational success. This research is additionally intended to bring additional attention to the inherent limitations of adopting a unidimensional perspective to intelligence testing. In this respect, it is hoped that this research will expand current understandings of the multiple dimensions of intelligence and resonate with the recommendations of the APA Task Force, which concluded by offering:

> In a field where so many issues are unresolved and so many questions unanswered, the confident tone that has characterized most of the debate on these topics is clearly out of place. The study of intelligence does not need politicized assertions and recriminations; it needs self-restraint, reflection, and a great deal more research. The questions that remain are socially as well as scientifically important. There is no reason to think them unanswerable, but finding the answers will require a shared and

sustained effort as well as the commitment of substantial scientific resources. Just such a commitment is what we strongly recommend.

In advocating that personnel selection researchers not accept *g* as "the final answer" (Goldstein, Zedeck, & Goldstein, 2002), this research is intended to echo the recommendations of the APA Task Force and present the advantages of considering alternative predictors of job performance. In doing so, this research considers the possibility that even if *g* does indeed measure innate intelligence, and not merely the extent of ones cultural assimilation, it is at the very least an incomplete picture of true intelligence, and to an even lesser extent job performance. Whether truly measuring intelligence or simply assessing cultural fit, this research is intended to demonstrate that reliance on *g* as a sole predictor affords a very narrow perspective both of human ability and of performance expectations.

# Chapter IV

## Personality

*An economist is someone who enjoys working with numbers, but lacks the personality to become an accountant.*

*– Anonymous*

Few constructs have come in and out of vogue as frequently and dramatically among personnel selection researchers as personality. Taxonomies of personality have been proposed as a means of differentiation since at least the 1920s (Digman, 1990) and while the lay public generally considers personality to be among the most important psychological considerations in making hiring decisions (Barrick & Mount, 1991), until recently the professional psychological community considered personality to be one of the *least* important areas of study (Roberts & Hogan, 2001). During the 1960s personality fell into such disfavor among selection researchers – no doubt due in large part to the dominance of behavioral psychology and a barrage of articles contending personality to be practically and conceptually irrelevant (Ghiselli & Barthol, 1953; Guion & Gottier, 1965; Mischel, 1968) – that it became virtually impossible to publish personality research in any American Psychological Association (APA) journals or to secure funding for measurement-based personality research from mainstream sources, such as the National Science Foundation (NSF) or National Institute of Mental Health (NIMH) (Roberts & Hogan, 2001). While the cognitive movement, driven in large part by the work of Albert Ellis (1961, 1973) and Aaron Beck (1967, 1976), began to shift the focus of mainstream psychology back from a purely Skinnerian perspective beginning in

the 1960s, selection researchers continued to rebel against personality testing in favor of more readily quantifiable constructs well into the 1980s.

At the same time as research in personality waned among selection researchers, however, interest among the general public – and the business community in particular – grew significantly. This is likely attributable to the correspondent rise of the human relations movement in organizations and the mainstreaming of psychological concepts through a newly created genre of self-help books during this same time period (i.e., from the early 1960s through the early 1990s). Joyce Hogan (1995), in a clever and unusual bit of research, attempted to demonstrate the continued importance considerations of personality have played with employers in making selection decisions by analyzing 8,000 employment advertisements appearing in Sunday newspapers from eight regions of the United States over a four month period. Hogan found specific personality characteristics, such as initiative, integrity and people skills, to be listed at least as often as technical competencies in specifying selection requirements. As economic currents continue to shift to more of a service and relational orientation, the consideration of personality dimensions will doubtless continue to play a significant role in selection decisions.

## What is Personality and How is it Assessed?

Historical definitions of what exactly personality is and what personality assessment instruments purport to measure have been rather diverse. Freud (1901) defined personality as "the integration of the id, the ego, and the superego" while Jung (1932) characteristically extended the definition to include "the integration of the ego, the personal and collective unconscious, the complexes, the archetypes, the persona, and the

anima." Adler (1959) claimed it to be "the individual's style of life, or characteristic manner of responding to life's problems, including life goals" and Murray (1967) considered personality to be "the continuity of functional forms and forces manifested through sequences of organized regnant processes and overt behaviors from life to death." Even among personality theorists, definitions have varied substantially. Allport (1968) defined personality as "the dynamic organization within the individual of those psychophysical systems that determine his characteristic behavior and thought" while Cattell (1965) defined it simply as "that which permits a prediction of what a person will do in a given situation." Irrespective of their philosophical orientation, most contemporary theorists tend to regard personality as an enduring constellation of traits – relatively persistent and consistent patterns of behavior – that manifest across a wide range of circumstances and which can be used as a means of differentiating between individuals.

In assessing personality structures the majority of mainstream personality taxonomies follow a lexical approach similar to one first introduced by Allport and Odbert (1936). In an effort to identify all terms with "the capacity to . . . distinguish the behavior of one human being from that of another" Allport and Odbert categorized all personality relevant terms found in the 1925 edition of Webster's New International Dictionary into one of four domains: traits, states, evaluations or other. The fundamental lexical hypothesis is predicated on the assumption that over time the most important individual differences in human interaction become encoded as single terms into the language of a given culture (Yang & Bond, 1990). Subjecting these terms to factor analysis, the theory contends, therefore produces a "pure" taxonomy, which is untainted

by any *a priori* hypothetical assumptions. Cattell (1947), modified Allport and Ogden's original list and added a number of psychological terms, developing a rather complex taxonomy of over a dozen primary factors[17]. It is interesting to note that while this atheoretical lexical / factorial approach to the development of personality taxonomies was heralded by early personality researchers as its greatest strength (Hall, Lindzey, & Campbell, 1997), it has since come to be largely regarded as its greatest shortcoming (Takemoto-Chock, 1981; Pervin, 1993) – and for nearly the same reasons.

The Big Five, or Five-Factor Model (FFM) first suggested by McDougall (1930) has become the best known and most generally accepted taxonomy of personality. Tupes and Christal (1961) are largely credited with the refinement of the Big Five dimensions into their current form, which they initially labeled Surgency, Agreeableness, Dependability, Emotional Stability, and Culture. In replicating their findings Norman (1963) relabeled the five factors Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Culture.

The FFM was further developed into an assessment instrument by Costa and McCrae (Costa, 1997; Costa & McCrae, 1992a, 1992b, 1995a, 1995b; Costa, McCrae & Dye, 1991; McCrae & Costa, 1983a, 1985a, 1985b, 1987, 1992, 1994, 1998). Having initially developed the three-factor NEO (Neuroticism, Extraversion, and Openness to New Experiences) model based on cluster analysis of the Sixteen Personality Factor Questionnaire introduced by Cattell (1947), in 1985 Costa and McCrae began to examine the convergence of the lexically-based FFM with their NEO inventory and found there to be an underlying five-factor model which subsumed the NEO. Supplementing their

[17] Repeated attempts to replicate the factor structure reported by Cattell have been unsuccessful, and subsequent research consistently revealed an alternative five-factor solution (Fiske, 1949; Tupes & Christal, 1961/1992).

model with two additional factors – Agreeableness and Conscientiousness, the newly developed NEO-PI was the first commercially available model of the Big Five personality factors currently in use. Costa and McCrae have conducted numerous studies demonstrating the robustness and reliability of the NEO-PI (Costa et al., 1991; McCrae & Costa, 1992, 1998) and the FFM has since become the most commonly used taxonomy of personality[18].

While there has been some disagreement over the names and specific content of these five personality dimensions, Barrick, Mount and Judge (2001, p.11) have offered that they can generally be defined as follows. "Extraversion consists of sociability, dominance, ambition, positive emotionality and excitement-seeking. Cooperation, trustfulness, compliance and affability define agreeableness. Emotional stability is defined by the lack of anxiety, hostility, depression and personal insecurity. Conscientiousness is associated with dependability, achievement striving, and planfulness. Finally, intellectance, creativity, unconventionality and broad-mindedness define openness to experience." [sic]

**The Case for Personality as a Predictor**

From the pinnacle of its popularity in the 1960s the use of personality testing in employee selection waned dramatically through the early 1990s. This was no doubt due in large part to the pessimistic conclusions drawn from both qualitative (Guion & Gottier, 1965) and quantitative (Schmitt, Gooding, Noe & Kirsch, 1984) reviews of the

[18] Acceptance of the FFM is by no means universal. For notable exceptions see Eysenck (1991), who contends their to be fewer than five dimensions, Hough & Schneider (1996) or Mershon & Gorsuch (1998), who contend five dimensions to be insufficiently descriptive, or Block (1995), who challenges the conceptual and methodological basis of the FFM altogether.

personality testing literature. The general consensus among selection researchers became one of accepting the concept of personality, while at the same time acknowledging that tests of personality did not demonstrate sufficient predictive validity to warrant their consideration in selection decisions.

The *coup de grace* for personality testing seems to have come from an influential review by Guion and Gottier (1965, p.164) which claimed "[T]here is no generlizable evidence that personality measures can be recommended as good or practical tools for employee selection" – a conclusion that went largely unchallenged for another 25 years. An article by Schmitt et al., (1984) reporting personality tests to be among the least valid types of selection tests, with an overall sample-size weighted correlation of .21, doubtless convincing many of holdout of the veracity of Guion and Gottiere's (1965) conclusions. The moribund trajectory of personality testing continued largely unchecked throughout the 1980s, and the use of personality assessment for purposes of selection appeared to be a nearly lost cause. The final nail in the coffin for personality testing seems to have come from court rulings which found items in personality tests, specifically the MMPI and CPI, to "violate privacy rights and anti-discrimination laws" when administered to job applicants, due to their containing questions "dealing with such sensitive topics as sex, religion, and bodily functions" (*Soroka v. Dayton Hudson Corp., dba Target Stores,* 1 Cal. Rptr. 2d 77, 1991).

The tide of interest in personality began to turn with a study conducted by Barrick and Mount (1991). In re-examining the personality-performance relationships reported in previous studies, they found predictions of predictive validity to have been obscured by the lack of a common framework for organizing the traits that had been used as

predictors. These findings were soon replicated and substantiated by others (Hough, 1992; Mount & Barrick, 1995; Ones, Mount, Barrick, & Hunter, 1994). With renewed confidence in the robustness of the FFM, researcher in personality began again in earnest and personality has returned to the fore as a consideration in selection decisions (Behling, 1998; Digman, 1990; Goldberg, 1993; Hogan, Hogan, & Roberts, 1996; Hogan & Ones, 1997; Hurtz & Donovan, 1998; John, 1990; Mount & Barrick, 1995; Tett, Jackson, & Rothstein, 1991).

According to Roberts and Hogan (2002), the resurgence of interest in personality among psychologists, and among I/O Psychologists in particular occurred for four main reasons.

First, Personality assessment instruments have been convincingly shown to not demonstrate any racial, ethnic or gender biases, nor have they resulted in the adverse impact effects that have plagued cognitive ability assessment instruments. As litigation surrounding selection practices continues to increase, personality assessment has emerged as an attractive alternative criterion for wary organizations.

Second, the development and refinement of the FFM offered a means for organizing and systematizing personality measurements through a comprehensible taxonomy, allowing for the generalizability of findings and research from other studies. Hogan, Hogan and Roberts (1996) have offered that "most personality researchers now agree that the existing personality inventories all measure essentially the same five broad dimensions with varying degrees of efficiency," making the Big Five a "taxonomic answer to the problem of terminological confusion." Others (Cortina, Goldstein, & Davidson, 1996; Kanfer, Ackerman, Murtha, & Goff, 1995; Piedmont & Weinstein,

1993) have similarly credited the FFM as the central reason for the resurgence of interest in personality assessment after a nearly 30 year hiatus from selection research (Guion & Gottier, 1965).

Third, a program for the development of a selection system for use by the U.S. Army in the 1980s (Hough, Eaton, Dunnette, Kamp, & McCloy, 1990), known as Project A, proved rather conclusively that "personality measurement was too important to be overlooked" (Roberts & Hogan, 2002).

Fourth and finally, meta-analyses supporting the construct and predictive validity of various personality dimensions (Barrick & Mount, 1991; Tett, Jackson, & Rothstein, 1991; Mount & Barrick, 1995; Salgado, 1997) proved personality measures to be considerably more valid than had been previously believed.

While lending considerable conceptual support to the assessment of personality, meta-analyses have varied widely in their results. Estimated true correlations between conscientiousness and job performance have ranged from .22 (Barrick & Mount, 1991; Hurtz & Donovan, 1998), to .25 (Salgado, 1997) and as high as .31 (Mount & Barrick, 1995). A meta-analysis by Tett, Rothstein and Jackson (1991) found only emotional stability to display non-zero correlation with performance, and agreeableness and openness to display higher correlation with performance than conscientiousness, while both Salgado (1997) and Anderson and Viswesvaran (1998) found only emotional stability and conscientiousness to display non-zero correlations with job performance.

Conscientiousness and emotional stability have been claimed as being positively correlated with job performance in virtually all jobs (Anderson & Viswevarian, 1998;

Barrick & Mount, 1991; Salgado, 1997; Tett et al. 1991), with Behling (1998) having offered conscientiousness as "one of the most valid predictors of performance across most jobs, second only to general intelligence." Tett (2001) has likewise observed that it is unlikely that there are any positions in which relatively higher levels of conscientiousness would prove detrimental, a point seconded by Barrick, Mount and Judge (2001, p.11) who offered that "Indeed it is hard to conceive of a job where it is beneficial to be careless, irresponsible, lazy, impulsive and low in achievement striving (conscientiousness)." Most researchers have now been satisfied, in fact, that conscientiousness is a generally valid predictor of job performance and that it may well represent the primary, if not sole, personality dimension worthy of consideration for personnel selection (Hurtz & Donovan, 1998)[19].

Studies of personality as a predictor of sales performance have produced inconsistent and inconclusive results (Roberts & Hogan, 2002). Ghiselli and Barthol (1953) showed substantial validity coefficients ($r$ = .36) (though the personality dimensions they assessed were so broadly amalgamated as to make their results largely meaningless (Roberts & Hogan, 2002)). In a meta-analysis by Schmidt, Gooding, Noe, and Kirsch (1984) which showed an uncorrected correlation of .17 for all types of predictors and criteria for sales jobs, personality factors were found to have had the lowest validity coefficient of any predictor group – though Kinder (1993) has since suggested that these findings were tainted due to the improper amalgamation of validity

[19] In a note of caution, Hogan (1995) has offered that even conscientiousness may not be a universally positive attribute for all positions – particularly creative ones. In a study of musicians Hogan found the best musicians, as rated by their peers, to have the lowest scores on conscientiousness. Hogan urges researchers to consider matching Big Five personality dimensions with Holland's (1973, 1985) vocational typology before blithely accepting conscientiousness as being a unilateral predictor of success for all jobs. Hogan stresses "There are jobs where you have to have creativity and innovation. If you select employees based on conscientiousness, you won't come close to getting creative or imaginative workers."

coefficients into a single predictor category (i.e., overall personality). Furnham and Coveney (1996) found extraversion and conscientiousness to be significantly correlated to customer service, and neuroticism to be a clear predictor of poor customer relations. In a meta-analysis evaluating personality as a predictor of both objective and subjective sales performance Vinchur, Schippmann, Switzer, and Roth (1998) found conscientiousness and extraversion to predict both, with validity coefficients of .21 and .31, respectively.

Jobs involving sales and customer service or requiring managerial skills have also demonstrated low but relatively stable validities for agreeableness, openness, and emotional stability ($p_v$s ranging form .12 - .17, respectively) (Hurtz & Donovan, 2000). Hurtz and Donovan (2000) have speculated that the interpersonal component that differentiates these positions from skilled and semiskilled jobs likely accounts for the more stable validities of these personality dimensions. Both conscientiousness and emotional stability have been shown to influence success in teamwork (Hough, 1992; Mount, Barrick & Stewart, 1998) and extraversion has been found to be related to job performance in positions which require a significant interactions with others (Barrick & Mount, 1991; Mount et al. 1998). While a significant increase in telesales in recent years has caused this area to now become the focus of considerable research (Furnham, Jackson, & Miller, 1999; Hakastian, Scratchley, Macleod, Tweed, & Siddarth, 1997; Singh, Goolsby, & Rhoads, 1994; Kalechstein & Nowicki, 1994; Furnham & Miller, 1997; Predmore, 1992; Squires, Torkel, Smither, & Ingate; 1991), there has to date been nothing published with respect to the predictive ability of personality.

In an effort to reconcile the disparate findings of past research and the various meta-analyses examining the personality-performance relationship, Barrick, Mount and Judge (2001) conducted a second-order meta-analysis, assessing the findings of 15 previous meta-analytic studies (11 published articles and 4 conference presentations). Their findings demonstrated conscientiousness to be a valid predictor across performance measures in all occupations and emotional stability to be "a generalizable predictor when overall work performance was the criterion, but its relationship to specific performance criteria and occupations was less consistent than was conscientiousness." Their research further demonstrated that while the remaining Big Five traits (extraversion, openness and agreeableness) did not predict overall performance, each did predict success in specific occupations or related to specific criteria.

When considering the inconsistent findings of personality tests in the prediction of sales positions in particular, it should be considered that the broad range of sales related jobs might be so diverse that they belie meta-analysis. It would seem unlikely that the same personality structures that lend themselves to the success of a used car salesman would engender the same level of success for a stockbroker. While a given personality structure may predict success for any given type of sales position, artificially aggregating all sales positions would likely result in a meaningless jumble of requirements that would so distill positional requirements as to make correlations nearly meaningless. Evidence to support this argument can be inferred from a meta-analysis conducted by Churchill, Ford, Hartley, and Walker (1985). In considering a wide range of possible predictors of different types of sales performance including self-reports, manager and peer ratings, and objective organizational data, they found aptitude and

personal characteristics (i.e., personality) to account for only 2% of the variance in work outcome measures and no single predictor to account for more than 10% of the variance. Based on these findings Churchill et al. postulated that: "the strength of the relationship between major determinants and salespeople's performance is affected by the type of products sold, the specific tasks to be performed, and the type of customer." Meta-analyses across sales organizations would similarly require the comparison of criteria subject to the same challenges. As a consequence it seems likely that while findings from studies in sales organizations may indeed be generalizable, particular attention must be paid to each of the variables described by Churchill.

The research presented here will utilize the IPAT 16PF (Russell & Karol, 2002). The 16PF has compared favorably with other personality measures, including the NEO PI-R, PRF, CPI and MBTI (Conn & Rieke, 1994) and previous research (Costa & McCrae, 1992) has demonstrated both a conceptual and empirical correspondence between the FFM and the Big Five which form the foundation of the IPAT 16PF (Cattell, 1965), as demonstrated in Table 3.

Table 3

| Five Factor Model | IPAT 16PF |
|---|---|
| Extraversion | Extraversion |
| Neuroticism | Anxiety |
| Openness | Tough-Mindedness |
| Agreeableness | Independence |
| Conscientiousness | Self-Control |

The 16PF (Russell & Karol, 2002) utilizes the Big Five taxonomy as a means for grouping more specific primary-level factors into a more readily comprehensible format for laypeople. The additional granularity of the 16PF also provides a mechanism for

making more finite, and consequently meaningful, distinctions between individuals. The level of detail provided by the 16PF means that one extravert (a bold, fearless, high-energy type) could differ considerably from another (a sweet, warm, sensitive type), depending on the extraversion-related primary scale score patterns. The factors and sub-factors, which comprise each of the various dimensions assessed through the 16PF, are described in Tables 4a-4e.

Table 4a

| Extraversion | |
|---|---|
| **Introversion** | **Extraversion** |
| Reserved | Warm |
| Serious | Lively |
| Shy | Socially Bold |
| Private | Forthright |
| Self-Reliant | Group-Oriented |

Table 4b

| Anxiety | |
|---|---|
| **Low Anxiety** | **High Anxiety** |
| Emotionally Stable | Reactive |
| Trusting | Vigilant |
| Self-Assured | Apprehensive |
| Relaxed | Tense |

Table 4c

| Tough-Mindedness | |
|---|---|
| **Tough-Minded** | **Receptive** |
| Warm | Reserved |
| Sensitive | Utilitarian |
| Abstracted | Grounded |
| Open to Change | Traditional |

Table 4d

| Independence | |
|---|---|
| **Accommodating** | **Independent** |
| Deferential | Dominant |
| Timid | Bold |
| Trusting | Vigilant |
| Traditional | Open to Change |

Table 4e

| Self-Control | |
|---|---|
| **Unrestrained** | **Self-Controlled** |
| Lively | Serious |
| Expedient | Rule-Conscious |
| Abstracted | Grounded |
| Tolerates Disorder | Perfectionistic |

As noted previously, the most commonly predictive variables of performance across all sales organizations, and indeed across all organizations, have been conscientiousness and agreeableness (labeled as self-control and independence, respectively, in the 16PF). The research presented here is expected to have similar findings. By utilizing the 16PF it is expected that greater insight will be gained into the particular sub-dimensions within each of these domains that most contributes to their respective predictive abilities.

In concluding this review of the contribution of personality assessment to the prediction of performance, it should be noted that Joyce Hogan (1995, p. 3) has recently brought attention to the potential benefits of considering social skills in conjunction with personality assessments. According to Hogan, "Interpersonal skills can energize or inhibit natural personality tendencies. For example, a naturally introverted person with good interpersonal skills can muster enough extraversion to make a public speech. Likewise, a naturally hostile and aggressive person can appear sweet and charming. As the workplace moves toward teamwork and service oriented jobs, evaluating interpersonal skills becomes increasingly important." According to Hogan, "Interpersonal skills are the icing on the personality cake." The interpersonal skills

Hogan describes are strikingly similar to contemporary conceptualizations of Emotional Intelligence, which will be the subject of the next chapter.

# Chapter V

## Emotional Intelligence

*I suggest that the greatest challenge facing the deployment of human resources is how best to take advantage of the uniqueness conferred on us as the species exhibiting several intelligences.*

*- Howard Gardner; Multiple Intelligences*

Over the past ten years, Emotional Intelligence has risen from relative obscurity to become one of the best known psychological constructs of all times. Despite its extraordinary public popularity, however, few constructs have engendered as much controversy among members of the professional psychological community. Where personality testing received varied receptions from the business and psychological communities, the response to Emotional Intelligence has been positively schizophrenic. Many employers have embraced Emotional Intelligence as a virtual panacea, while a large faction of personnel selection researchers have remained rabidly opposed to its consideration.

The catalyst for the controversy appear to, in large part, have been precipitated by the grossly hyperbolic claims made by Daniel Goleman (1998) in his book, *Emotional Intelligence: Why it can matter more than IQ.* Goleman has come under considerable attack for his work, with even EQ advocates becoming wholly dismissive of him as a "science journalist," whose book amounts to "lively writing, extraordinary claims for the concept and loose description." (Mayer, 2001, p.8) Indeed, attacks on Goleman have come to predominate the discussion of Emotional Intelligence. A feature event billed as

"The Great EQ Debate" at the 2003 annual meeting of the Society for Industrial and Organizational Psychology (SIOP), devolved into little more than a disappointing donnybrook when what should have been a considered and serious discussion gave way to unabashed Goleman-bashing by some of the leading figures in I/O Psychology. The presentation by EQ opponents devolved into little more than a rant, with the participants essentially arguing against the adequacy of the EQ construct based solely on the superficiality of Goleman's treatment of it, and semantic concerns on whether or not it was worthy of the title "intelligence." Virtually no mention was made or acknowledgment offered by those standing in opposition to the construct of the considerable serious research efforts which have been made in researching Emotional Intelligence.

While it is not my intention to defend the reduction of an otherwise serviceable construct to the level of "pop psychology," I find it ironic that the same conference that hosted so petulant a performance would have begun with a Presidential address focusing on the criticality of increasing public awareness in the business community to the potential contribution of I/O Psychology (Ryan, 2003). The attacks levied against Goleman are disturbingly reminiscent of the assaults suffered by Carl Sagan as a consequence of his attempts to popularize science throughout the course of his life. Like Sagan, Goleman has repeatedly been accused by his professional constituency of not being a "real scientist," and of being little more than a parasitic journalist, merely cashing in on the works of others. In defense of the former, I would offer that Sagan may have done more to popularize science than any person in history, and directly influenced the decision to pursue scientific careers of an entire generation in the process – myself

included. As to the latter, had it not been for Goleman's work, it is highly likely that the construct of Emotional Intelligence would be collecting dust on a shelf with the considerable company of even more important concepts in the psychological arsenal. Because of Goleman's work, however, businesses are finally starting to pay serious attention to psychological constructs – for the first time in history. And that can't be an entirely bad thing. As to the adequacy of EQ as a construct, that remains to be seen; and will be the subject of the remainder of this chapter.

**The Popularization of Emotional Intelligence**

One can only speculate as to why the construct of Emotional Intelligence has become as popular as it is. Perhaps it is because its egalitarian nature so strongly resonates with the American ethos of democracy – after all, researchers claim anyone can acquire it or develop it (Salovey & Mayer, 1990). Perhaps its popularity stems from a general distaste with the debate over intelligence and the implications it holds for racial disparity (Goleman, 1995). Or maybe it's just because of how viscerally the concept seems to appeal to the average man (Gibbs, 1995). For whatever the reason, since the publication of Daniel Goleman's first book on the subject, Emotional Intelligence has captured the hearts, minds and imagination of the general public and corporate America alike. Indeed, when the Harvard Business Review (Goleman, 1998) published an article on the subject it attracted a higher percentage of readers than any article published in the past 40 years (Cherniss, 2000). The CEO of Johnson & Johnson was so impressed by the HBR article that he ordered copies of Goleman's book, *Emotional Intelligence*, to be delivered to each of the companies 400 top executives *worldwide* (Cherniss, 2000).

Goleman's invitations to discuss the merits of Emotional Intelligence as a predictor of personal and professional success have afforded him nearly overnight guru status and secured him appearances on programs ranging from CNN and the Lehrer Report to the Today Show and Oprah. Both of his books on the subject have made the New York Times bestseller list, where *Emotional Intelligence* remained for over 80 weeks and still proves to be among the best selling business books of all time. For whatever the reason, the construct of Emotional Intelligence has been taken very seriously by both the general public and our corporate constituents alike (Chollar, 1996; Confrey, 1995; Farnham, 1996; Gibbs, Park & Birnhaum, 1995; Koonce, 1996; Murray, 1996; Nelton, 1996; Shapiro, 1997; Stufft, 1996). If for no other reason, it therefore warrants the serious attention and consideration of I/O Psychologists and selection researchers.

**The History of Emotional Intelligence**

Like nearly everything else about Emotional Intelligence, its roots are somewhat contentious. Mayer (2001) most recently described the evolution of the construct by clustering all previous work into five gross eras. The first period, from 1900 – 1969, he describes as being a time in which Intelligence and Emotion were largely considered separate fields. The next, from 1970 – 1989, represent a period in which the precursors to Emotional Intelligence were developed. The next period, from 1990 – 1993, are described as representing the emergence of Emotional Intelligence, with 1994 – 1997 being a time in which the construct was popularized and broadened. Finally, the period from 1998 to the present, he describes as representing a time of research and institutionalization of the Emotional Intelligence construct.

This overview appears to present a somewhat selective consideration of the precursors of Mayer and Salovey's (1993) own efforts and offers a perspective that is insufficient to understand the current conception of Emotional Intelligence, which has evolved significantly beyond Mayer and Salovery's (1993) own early efforts. In mentioning Goleman only as a source of distraction (and detraction) from serious research, Mischel just once in passing, and completely disregarding the contributions of both Thorndike and Gardner, Mayer and Salovey's account offers little insight into the true breadth and scope of knowledge that have ultimately come to contribute to contemporary research in Emotional Intelligence.

As there does not yet appear to be a comprehensive, unbiased accounts of the history of the development of this construct, the information presented here is drawn from numerous sources and my own reflections.

Most researchers appear to agree that Emotional Intelligence (alternatively referred to as EI or EQ) can be traced as back as far as Thorndike's (1920) proposal of a social intelligence. Suggesting that intelligence could be organized under three broad dimensions (mechanical, abstract, and social), Thorndike tried on and off for nearly twenty years to develop an instrument with which to assess the social dimension of intelligence. Following numerous failed attempts, Thorndike finally expressed his doubts that any verbally derived instrument could ever be developed that would successfully measure social intelligence (Thorndike & Stein, 1937).

Wechsler (1940, p.444), though not attempting to develop an instrument to assess social intelligence himself, agreed with Thorndike as to the centrality of social intelligence and other non-intellective abilities for success in life, offering that:

> The main question is whether non-intellective, that is affective and conative abilities, are admissible as factors of general intelligence. [My contention] has been that such factors are not only admissible but necessary. I have tried to show that in addition to intellective there are also definite non-intellective factors that determine intelligent behavior. If the foregoing observations are correct, it follows that we cannot expect to measure total intelligence until our tests also include some measures of the non-intellective factors.

In considering the entire corpus of research on social intelligence Cronbach (1960) lent further support to Thornkdike's belief that social intelligence might well be immeasurable, offering that "after fifty years of intermittent investigation, social intelligence remains undefined and unmeasured" as his reason for omitting further discussion of the subject from his *Essentials of Psychological Testing.* Cronbach was subsequently joined in this sentiment by a host of others who found social intelligence to be an empirically incoherent construct that, while likely distinct from general intelligence, had not lent itself to being sufficiently empiricised to warrant serious consideration (Brown & Anthony, 1990; Ford & Tisak, 1983; Keating, 1978; Legree & Grafton, 1995; Marlowe, 1986; Riggio, Messamer & Throckmorton, 1991; Schneider, Ackerman, & Kanfer, 1996; Stricker & Rock, 1990; Zaccaro, Gilbert, Zazanis, & Diana, 1995). This lack of success in finding empirical substantiation for social intelligence as a distinct construct was likely due in large part to the incoherence of the construct and the insufficiency of it operationalization (Ford & Tisak, 1983; Marlowe, 1986; Riggio et al., 1991). Riggio and his colleagues described approaches to social intelligence measures as

being haphazard combinations of personality, attitude, and social ability. Similarly empathy, interpersonal knowledge, and social competence have each alternatively been proposed as aspects of social intelligence (Legree & Grafton, 1995; Marlowe, 1986; Schneider et al., 1996, Stricker, 1982).

While research on social intelligence largely waned for the twenty-five years following Cronbach's (1960) observations, two notable attempts to capture the elusive construct were made. Heeding Thorndike's (Thorndike & Stein, 1937) doubts that social intelligence could not be derived through a verbally oriented instrument, Guilford and his colleagues (Hoepfner & O'Sullivan, 1968; O'Sullivan & Guilford, 1975) used cartoons and other nonverbal formats in developing their Six Factor Test of Social Intelligence. Though conceptually promising, the instrument correlated so strongly with general intelligence measures that it cast considerable doubt on the discriminant and incremental validity of the construct as they operationalized it (Walker & Foley, 1973; Zaccaro et al., 1995). Another effort by Ford and Tisak (1983) attempted to measure social intelligence through a behavioral effectiveness criterion. Though they did not develop an instrument that was sufficiently predictive for practical purposes, their instrument did demonstrate sufficient convergent and discriminant validity to inspire subsequent research (Brown & Anthony, 1990; Legree & Grafton, 1995; Marlowe, 1986; Zaccaro et al., 1995).

Aside from these few exceptions, social intelligence received little attention since Thorndike's original work until it was eventually resurrected inferentially through Gardner's (1983) theory of multiple intelligences. While he does not speak to social intelligence per se, among the seven intelligences included in his original model Gardner proposed the existence of both interpersonal (understanding other people) and

intrapersonal (understanding ones self) intelligences, which he refers to collectively as "the personal intelligences" (Gardner, 1983). The definitions of personal intelligence offered by Gardner bear a striking resemblance to Thorndike's original definition of social intelligence and the rational offered by Gardner for the existence of a personal intelligence is conceptually consistent with the argument proffered by Thorndike.

In explaining the inclusion of interpersonal and intrapersonal intelligences in his model, Gardner (1983) offered that "The capacity to know oneself and to know others is as inalienable a part of the human conditions as is the capacity to know objectors or sounds, and it deserves to be investigated no less than these other 'less charged' forms." He went on to say that he felt compelled to include personal intelligences into his model "Chiefly because I feel that these forms of knowledge are of tremendous importance in many, if not all, societies in the world – forms that have, however, tended to be ignored or minimized by nearly all students of cognition[20].

In speaking to the practical importance of including personal intelligences in any effort at developing a comprehensive theory of intelligence, Gardner (1983) notes that "the premium for acting upon one's particular personal intelligence is far greater" than those gains to be had for capitalizing on general intelligence and likewise "the sanctions surrounding pathologies in these areas tend to be far stronger than those that greet disorders of the other intelligences." Gardner's work, which was directed to a lay audience, effectively introduced the importance of personal / social intelligence to the public arena, though he made no effort to develop a means of quantifying or assessing these abilities.

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[20] Gardner (1983) notes "the redoubtable student of intelligence David Wechsler" as a notable exception, who "wrote many years ago about social intelligence."

**Emotional Intelligence in Selection**

Though not explicitly referring to social intelligence, as early as the 1940's the Ohio State Leadership Studies (Hemphill, 1959) proposed "consideration" as an important aspect of effective leadership. Specifically, this research suggested that leaders who were able to establish "mutual trust, respect, and a certain warmth and rapport" with group members proved more effective than those without these same capabilities (Fleishman & Harris, 1962). The Office of Strategic Services (OSS) (1948) similarly, and at about the same time, developed a process of assessment based on the earlier work of Murray (1938) that included the evaluation of non-cognitive (relational/social) in conjunction with cognitive abilities.

The assessment center approach to selection introduced by Bray (1976) in 1956 at AT&T followed the OSS approach and also included the evaluation EI like dimensions including communication skills, sensitivity, initiative, and interpersonal skills in addition to evaluations of task competence (Gowing, in press; Thornton & Byham, 1982). Even among those who question the construct validity of the assessment center process (Sackett & Dreher, 1982; Gaughler & Thornton, 1989), there tends to be a general consensus on the importance of assessing both transactional and relational capabilities in making selection decisions.

**EI as a Distinct Element of Social Intelligence**

Salovey and Mayer (1990) were the first to coin the term *Emotional Intelligence.* Combining the dimensions of intrapersonal and interpersonal intelligences (as Gardner

had previously under the heading personal intelligence), Salovey and Mayer proposed Emotional Intelligence to be a subset of social intelligence "in its capacity to monitor and evaluate others' feelings and emotions and to use that knowledge to guide actions." (Salovey & Mayer, 1990) Emotional Intelligence, according to Salovey and Mayer, is defined as the ability to monitor one's own and other's feelings and emotions, to discriminate among them, and to use that information to guide one's thinking and actions (Salovey & Mayer, 1990). Though attacked on several fronts as being little more than a repackaging of personal or social intelligence, Salovey and Mayer claim both their conceptualization of EI and the measurement instrument they developed (the Multifactor Emotional Intelligence Scale (MEIS)), to be distinct from previous constructs as a consequence of its support, which is "based on a decade of theoretical and empirical work" (Mayer, Salovey, Caruso & Sitarenios, in press).

From the time it was first proposed both Mayer & Salovey's construct of EI and the MEIS have come under considerable attack, with several researchers having objected rather vehemently to the classification of EI abilities as a form of intelligence (Ciarrochi, Chan, & Caputi, 2000; Roberts, Zeidner, & Matthews, 2001). In response to these criticisms Mayer and Salovey (1993) countered that the manner in which they defined Emotional Intelligence – "as involving a series of mental abilities . . . qualifies it as a form of intelligence." They maintain that EI is no different than verbal, mathematical or spatial reasoning skills in being the consequence of cognitive processes.

It is interesting to note in this regard that the American Heritage Dictionary, 3rd Ed. (1994) similarly defines intelligence as: (a) the capacity to acquire and apply knowledge; (b) the faculty of thought and reason; (c) superior powers of mind. By these

definitions, EI does indeed appear to meet at least minimally meet the colloquial standards for being considered an intelligence. For purposes of the research presented here, however, it is recognized that whether or not EI meets the standard of being considered a "true intelligence" is a consequence of the definition to which it is held. Rather than becoming mired in semantics, this research treats the question as moot, recognizing that whether EI truly is a dimension of intelligence or simply a distinct set of skills and/or abilities capable of differentiating performance abilities, it still merits consideration as a predictor.

**Empirical Substantiation for EI**

EI has not yet evolved a significant body of empirical research, particularly when compared with the voluminous research that exists for cognitive ability and even the lesser body of research for personality instruments. This is no doubt due in large part to the relatively recent development of the construct and its reluctant acceptance among many I/O practitioners. Nevertheless, there have been several compelling studies demonstrating the efficacy of EI as a predictor.

In assessing the relationship between EQ and leadership effectiveness among 400 managers (including supervisors, middle managers and senior managers) from 25 different life insurance organizations, Viriyavidhayavongs and Jiamsuchon (2002) found there to be a significant relationship between EQ and various leadership dimensions. Specifically, their research demonstrated "more successful managers and those occupying higher positions had higher levels of EQ." Using the Weisinger (1998) model of EQ, their results demonstrated statistically significant relationships at $p = .000$ between each of the sub-facets of EQ, as well as overall EQ scores, with leadership effectiveness. The

Pearson correlations for the various dimensions assessed were: self-awareness, .65; self-regulation, .59; self-motivation, .62; empathy, .66; social skills, .67; and overall EQ, .72. Regression analysis showed social skills to explain 44.7% of the leadership effectiveness, with the addition of self-awareness R = .71 and adjusted $R^2$ is .503. The inclusion of self-awareness and self-motivation raises R to .721 and the addition of self-regulation brought R to .726 with an adjusted $R^2$ of .522. ANOVA also showed there to be statistically significant differences between managers at various levels, with managers demonstrating higher scores correspondent to their hierarchical level within the organization.

Jae (1997) found the correlation between total EQ on the Bar-On EQi and job performance to be .52 for bank employees, with the Intrapersonal, Interpersonal, Adaptability, Stress Management, and General Mood composite scales demonstrating correlations of .48, .38, .49, .52, and .39 respectively. This research also showed there to be no relationship between cognitive ability and EQ, and cognitive ability to be only weakly related to job performance (r = .07). With respect to dimensions that are tangential but important contributions to performance, Sipsma (2000) showed scores on the EQi to account for approximately 40% of the variance in teaming effectiveness and Curdy (1997) showed EQ to be inversely related to incidences of burn-out.

Research on school performance and learning has been considerably more equivocal. Bar-On and Orme (2000) showed a multiple R of .36 with a probability level of .001 for a sample of 104 between EQ-i scores and teacher evaluations of performance. Newsome, Day and Catano (2000), however, found very different results in using the same EQ instrument to assess the relationship between academic achievement (GPA) and the EQ-i. Their research showed both cognitive ability and personality (i.e., extraversion

and self-control) to be significantly related to academic achievement, but none of the EQ-i factor scores, nor the total EQ-i score, to be significantly related.

In assessing the possibility of an interaction between social skill and general mental ability on job performance and salary, Ferris, Witt and Hochwarter (2001) raised intriguing possibilities regarding the incremental validity of considering both cognitive abilities and EQ dimensions in tandem. While not expressly measuring EQ, the brief instrument constructed by these researchers asked questions which are clearly conceptually consistent with the EQ construct. The seven questions used in this research to determine social skills are included in Table 5.

Table 5

| Questions presented by Ferris, Witt & Hochwarter (2001) in the assessment of social skills: | |
|---|---|
| 1. | I find it easy to put myself in the position of others. |
| 2. | I am keenly aware of how I am perceived by others. |
| 3. | In social situations, it is always clear to me exactly what to say and do. |
| 4. | I am particularly good at sensing the motivations and hidden agendas of others. |
| 5. | I am good at making myself visible with influential people in my organization. |
| 6. | I am good at reading others' body language. |
| 7. | I am able to adjust my behavior and become the type of person dictated by the situation. |

In their analysis, Ferris, Witt and Hochwarter (2001) found social skills and GMA to be independent constructs, as evidenced by their nonsignificant correlation ($r = -.07$). They also found there to be a strong interactive effect between social skill and GMA in predicting overall work performance, core task performance, job dedication, interpersonal facilitation and salary among software engineers.

Another interesting set of finding with respect to EI concerns trainability. Sala (2002) offered evidence for the effectiveness of an EI training program in improving participant's scores through an analysis which included two groups of individuals (twenty and nineteen per group), each of whom participated in year-long coaching and training programs designed to help participants "better identify and address workplace emotional

intelligence issues, and provide support for participants as they work to raise their emotional intelligence competencies." Both groups showed increases that were statistically significant ($p < .05$) for multiple sub-dimensions.

While there has not yet been any substantive research conducting regarding the efficacy in considering EI as a predictor of success among salespeople, by nature of their associated duties these positions would seem to logically require the demonstration of both intrapersonal and interpersonal intelligence. While not necessarily labeled as such, hosts of studies have demonstrated the necessity of interpersonal and intrapersonal skills for success in sales positions (Austin, 1954; Arvey, Miller, Gould, & Buruch, 1987; Baehr & Williams, 1968; Baogozzi, 1978; Baier & Dugan, 1957; Bray & Campbell, 1968; Burroughs & White, 1996; Chapple & Donald, 1947; Churchill, Ford, Hartley, & Walker, 1985; Cook & Manson, 1926; Cotham, 1968; Lamont & Lundstrom, 1977; Gallup, 1926; Vinchur, Schippmann, Switzer & Roth, 1998).

**Choosing Among EI Instruments**

The MEIS defines the intra- and interpersonal intelligences collectively represented within EI as manifesting in four component parts including; (1) perception, appraisal and expression of emotion; (2) emotional support for thinking; (3) understanding and analyzing emotions and applying emotional knowledge; and (4) reflective regulation of emotions to promote educational and emotional growth (Mayer & Salovey, 1993). While the Mayer and Salovey construction of EI is conceptually similar to most of the major EI instruments that have subsequently been developed, the facets they posit are by no means universal.

Goleman's (1995) model includes: Self-Awareness; Self-Regulation; Motivation; Empathy; and Social Skills while Cooper and Sawaf (1997), in their popular book *Executive EQ*, rested their model of EI on four entirely different skill sets, including: emotional literacy (the knowledge of one's own emotions and how they function); emotional fitness (which includes emotional hardiness and flexibility); emotional depth (emotional intensity and growth potential); and emotional alchemy (the ability to use emotion to spark creativity). The Emotional Judgment Inventory (EJI) (Bedwell, 2003) utilizes seven dimensions, including: Being Aware of Emotions; Identifying Own Emotions; Identifying Others' Emotions; Managing Own Emotions; Managing Others' Emotions; Using Emotions in Problem Solving; and Expressing Emotions Adaptively. The Bar-On EQi (Bar-On, 1995) assesses five composite scales and fifteen subscales (see Table 6):

Table 6

| Intrapersonal Scales | Interpersonal Scales | Adaptability Scales | Stress Management Scales | General Mood Scales |
|---|---|---|---|---|
| • Emotional Self Awareness<br>•Assertiveness<br>•Self-Regard<br>•Self-Actualization<br>•Independence | •Interpersonal Relationship<br>•Social Responsibility<br>•Empathy | •Problem Solving<br>•Reality Testing<br>•Flexibility | •Stress Tolerance<br>•Impulse Control | •Happiness<br>•Optimism |

There is little consistency among the various models of EI currently available and researchers are left to choose among the best of what are often very different alternatives. It can be argued that the general antipathy among most EI researchers (no doubt driven in large part by the prospect of such a potentially lucrative markets for the instruments they subsequently develop) has significantly inhibited research, as the lack of a consensus on operational definitions precludes collaboration, comparisons and meta-analyses.

As none of the instruments flowing from the five major conceptual models of EI described above have accumulated sufficient data to substantiate a compelling case for the use of one in preference to the others, the decision of which instrument to use is often arbitrary and based on the preferences of the individual researcher. For purposes of the research presented here the EJI (Bedwell, 2003) was chosen for a number of reasons. There is presently no empirical support for either the Gardner (1995) or the Cooper and Sawaf (1997) models, which immediately ruled out their use. Despite having more scales and subscales than any of the other instruments, the Bar-On EQi (1997) has been found to correlate unfavorably highly with several personality dimensions, thereby reducing its discriminant validity (Davies, Stankov & Roberts, 1998; Dawda & Hart, 2000; Newsom, Day, & Catano, 2000). The MSCEIT (the current version of the original MEIS), is based in part on the interpretation of the facial expression of caricatures. In testing with a small pilot population from the organization which hosted the research presented here, this approach was found to have low face validity among potential research subjects in a corporate setting.

The EJI (Bedwell, 2003), the instrument ultimately chosen for this research, was found to be psychometrically and conceptually superior to each of the other commercially available instruments. The EJI consists of 80 items representing seven sub-dimensions (Being Aware of Emotions, Identifying Own Emotions, Identifying Others' Emotions, Managing Own Emotions, Managing Others' Emotions, Using Emotions in Problem Solving, and Expressing Emotions Adaptively). Reliability estimates for the sub-dimensions range from .73 to .88 and test-retest correlations for each of the sub-scales ranged from .64 to .87. Correlations between each of the EJI sub-dimensions and the

WPT were low, ranging from .01 to .21, demonstrating the likelihood of discriminant validity. While research on the predictive validity of the EJI is just beginning, it has demonstrated considerable promise.

A concurrent validity study of the Activity Staff in a group of homes for individuals with physical disabilities and chronic mental illness showed significant correlations between the EJI and several job performance dimensions, as demonstrated in Table 7. Bedewell (2002) concluded that: "these results suggest that emotional intelligence, as assessed by the EJI, is useful in predicting job performance in some jobs, particularly those jobs that require intensive interpersonal interactions." The nature of sales positions would infer the expectation of similar results.

Table 7
Correlations Between the EJI and Job Performance (Bedwell, 2002)

| | PR | ED | LI | RR | DM | OC | WC | JK | OP | SO | EC | TW | RS | OA | RH | TP | CP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Being Aware of Emotions | .20 | .18 | .14 | .16 | .17 | .12 | **.26** | .13 | **.28** | -.08 | -.04 | .14 | **.24** | **.27** | .18 | **.27** | .15 |
| Identifying Own Emotions | .18 | .21 | .17 | .13 | .13 | .11 | .20 | .07 | .19 | .04 | .03 | .17 | .19 | .17 | .21 | .22 | .15 |
| Identifying Others' Emotions | .16 | .18 | .09 | **.25** | .08 | .23 | **.30** | **.29** | .21 | .02 | -.03 | .17 | **.28** | **.26** | .15 | **.30** | .20 |
| Managing Own Emotions | **.25** | .22 | .10 | -.10 | .12 | -.02 | .19 | .08 | .17 | -.04 | -.02 | .04 | .05 | .10 | .14 | **.24** | .05 |
| Managing Others' Emotions | .14 | **.25** | .08 | .10 | .13 | .05 | **.33** | .05 | **.26** | -.04 | -.12 | .14 | .21 | .17 | .14 | **.26** | .08 |
| Using Emotions in Problem Solving | .13 | .15 | .15 | .22 | **.29** | .20 | **.35** | .19 | **.27** | .19 | .11 | **.31** | **.37** | **.28** | .21 | **.27** | **.27** |
| Expressing Emotions Adaptively | **.30** | **.34** | **.31** | **.24** | .21 | .05 | .23 | .17 | .18 | .12 | .04 | .21 | **.33** | **.35** | **.31** | **.32** | **.24** |

Note: $n = 67$; Correlations greater than .23 are significant at $p < .05$, correlations greater than .31 are significant at $p < .01$.
PR = Professionalism, ED = Effort with Personal Discipline, LI = Listening, RR = Relationships with Residents, DM = Decision Making and Judgment, OC = Oral Communication, WC = Written Communication, JK = Job Knowledge, OP = Organization/Planning, SO = Safety Orientation, EC = Emotional Control, TW = Teamwork, RS = Relationship with Supervisor, OA = Overall Performance, CP = Contextual Performance

# Chapter VI

## The Current Study

*In theory, there is no difference between theory and practice. In practice, there is.*

*– Yogi Berra*

This study considers the benefits of utilizing multi-faceted predictors (i.e., cognitive ability, personality and emotional intelligence), to explain the multidimensional performance requirements of sales positions (i.e., net sales, teaming ability, customer service skills). Vinchur, Schippmann, Switzer and Roth (1998, p. 586) have offered that: "the sales job is deserving of special attention for its importance, prevalence, and unique characteristics. Effective selling is critical to the success of economic organizations. Improvements in productivity, personnel, product quality, and efficiency would be pointless if the product or service could not be placed in the hands of the consumer," and that "[t]here are aspects of the sales job that make unique demands on an employee and may contribute to a pattern of validity coefficients different from other jobs." Attending to the differences in requirements for salespeople becomes all the more important when considering that the Bureau of Labor Statistics (1997) estimates that there will be nearly six million people employed in sales jobs by 2005. Hunter, Schmidt and Judiesch (1990) offer that the payoff for selecting successful salespersons may be greater than for other occupations due to the large standard deviation of employee output (insurance sales applicants demonstrated a 120% output mean standard deviation, and other sales jobs were also relatively high at 48%, compared with the 40% standard deviation difference

seen in jobs on average). Despite the obvious importance to attending to salesperson selection, and the considerable investments companies make in attempting to improve their sales forces, "there has been relatively little research in salesperson selection in recent years" (Vinchur, Schippmann, Switzer and Roth, 1998, p. 587).

This research is also intended to demonstrate alternatives to cognitive ability as a predictor of job performance, and specifically of sales performance. While past research has indeed substantiated the predictive validity of cognitive ability as a predictor of net sales, sales ability is not the only aspect of performance that merits consideration in making selection decisions. Depending on the structure of the sales force, selecting individuals high in teaming ability can substantially contribute to a competitive advantage for the organization. Contrasting an individual with relatively higher sales who prospers at the expense of his comrades with another who, although a relatively lower producer, contributes to the development of an environment more conducive to the success of his fellows makes the value of teaming abilities readily apparent (e.g., an individual who sells $1,000,000 annually at the expense of his peers, who as a consequence of his undermining them only earn $500,000 each is less valuable to an organization that one who earns only $750,000, but contributes to a climate which lends itself to his peers selling an equivalent amount). Similarly, customer service orientation becomes an important consideration for virtually all sales organizations. Contrast an individual here who "burns customers" to gain a short term advantage to those whose actions lead to considerably longer lifetime customer value. While each of these three performance dimensions (nets sales, teaming ability and customer service orientation) have shown to be generalizable across a wide range of sales positions (Hunter and

Hunter, 1984; Vinchur, Schippman, Switzer, & Roth, 1998), most selection instruments consider either net sales alone or an aggregate of multiple factors which, as explained in Chapter 2, is not the most efficacious strategy for making selection decisions.

In considering that there are multiple job performance criteria worthy of consideration, it becomes apparent that no single predictor will be equally efficacious for all performance domains. This research demonstrates that alternative strategies for success prove to be as or more valid than cognitive ability, depending upon which particular dimension of job performance is being assessed. Those who are relatively lower in cognitive ability, it will be demonstrated, may achieve success on a par with their "cognitively superior" colleagues through a combination of personality and Emotional Intelligence capabilities. Likewise it will be shown that cognitive ability is not nearly as effective a predictor of teaming skills or customer service than are personality and Emotional Intelligence.

Consider by example that even in academia, where intellective ability is valued above all else, we have all at some time known an otherwise brilliant colleague who, but for failings of their personality, interpersonal, or intrapersonal skills, never realized their full potential or received the recognition they might otherwise deserve. It seems obvious that even in positions that require relatively high intellective ability then, intelligence may be a necessary but not sufficient criterion for success. Similarly, in positions requiring relatively lower levels of cognitive ability, it would seem likely that while intelligence might provide a distinct advantage, it will not wholly compensate for relative shortcomings in personality, interpersonal or intrapersonal skills. While previous research has concentrated on demonstrating the differential validity and uniqueness of the

contributions of these constructs (Schmidt & Hunter, 1998; Roberts & Hogan, 2001; Mayer, Salovey & Caruso, 2000), there has been little research exploring the possibility of their complementarity.[21]

In examining the claims levied by advocates of each of the various predictors (i.e., cognitive ability, personality and EI), for the hypothesized reasons for their pet predictors success, it becomes apparent that each camp speaks to a limited (and different) dimension of job performance expectations. GMA advocates invariably confine themselves to discussions of the intellective challenges of work (Schmidt & Hunter, 1998), personality theorists stress the need for being conscientiousness and having other desirable personality characteristics (Roberts & Hogan, 2001), and EI researchers tend to focus almost exclusively on the social dimensions of organizational life (Mayer, Salovey & Caruso, 2000). Each camp explicitly or implicitly ignores that each of these dimensions is important when one considers the gestalt of job performance and organizational success. Realizing this, it does not seem to be too much of a logical leap to infer that while intelligence may indeed contribute to superior performance, relatively higher capabilities on each of these non-cognitive dimensions would not only lend incremental validity to intelligence, but might even compensate for relatively lower levels of GMA, and thereby provide individuals with alternative strategy for achieving organizational success.

By way of example, contrast the brilliant, yet abrasive, calloused and unempathic clinical psychologist with a perhaps less intellectively gifted, yet warm, compassionate and empathic counterpart. The first would not necessarily be any more or less capable

[21] For notable exceptions see Schmidt and Hunter (1998), who considered the incremental validity which could be added to GMA by pairing it with each eighteen non-cognitive factors.

than the other – they would simply draw on different talents and strengths to achieve their goals.[22] Likewise, while each of the three dominant dimensions considered by selection researchers (i.e., GMA, Personality, EI) are undoubtedly important, holding any one as being the only, or even the most important, dimension of success seems myopic and naïve. Job performance, and the jobs of salespeople in particular, are better understood as requiring a constellation of very different capabilities, each requiring a different set of KSAPs. As such, relying on any unidimensional predictor, no matter how predictive, will clearly offer only a limited perspective on performance.

This view seems to be supported by Brown and Bruner (2001), who have offered that while a considerable body of research has been generated in an effort to better understand individual salespeople and the differences between them (Szymanski, 1998), the two main meta-analyses that summarized the results of these efforts (Churchill, Ford, Hartley & Walker, 1985; Ford, Walker, Churchill & Hartley, 1987) indicated no one factor to consistently explain a large amount of the variability between the performance of salespeople. Brown and Bruner (2001) attribute these results to the considerable differences that exist between different types of sales jobs (e.g., telemarketing vs. retail vs. solution development). While each of these positions would seem to require very different skills, it is doubtful that incumbents could rely solely and exclusively on their cognitive skills to perform optimally in any of them.

Research by Mount, Barrick and Ones (1995) has similarly demonstrated the value of considering general mental ability and personality in combination, while Witt, Burke, Barrick and Mount (2002) examined the combination of general mental ability

[22] While I would not presume him to be more or less intellectively gifted, I would offer Albert Ellis and Carl Rogers as archetypes for thinking about some of these differences.

with social skills. Vinchur, Schippmann, Switzer and Roth (1998) considered cognitive ability and various sub-dimensions as predictors of success in sales positions and, while finding modest to moderate effects for both, summed their recommendations for further research by offering that "research is needed in the area of incremental validity; that is, how do these predictors [including cognitive ability and sub-dimensions of the Big 5], successful singly, work in combination with one another?

The research proposed here continues this work, as well as the work of Mount, Barrick and Ones (1995) and Witt, Burke, Barrick and Mount (2002), in offering an alternative to the reductionistic, positivistic, and unitary perspectives on selection predictors and criterion that have come to dominate the research literature[23]. Specifically, this research will attempt to validate the following hypotheses:

*Hypothesis 1:* Cognitive Ability will prove to be highly predictive of Net Sales

*Hypothesis 2:* Personality and Emotional Intelligence will prove to be predictive of Net Sales, though not to the same extent as Cognitive Ability

*Hypothesis 3:* Cognitive Ability will not prove to be as successful a predictor of either Teaming Ability or Customer Service as Emotional Intelligence or Personality

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[23] Christopher Simpson (1994, p. 19) describes the positivistic approach as being untenable in social science research: "Positivism has traditionally been based in part on taking complex, unmeasurable phenomena and breaking them up into discrete parts, measuring those parts, and bit by bit building up a purportedly objective understanding of the phenomena as a whole." A story told by Viktor Frankl (Yalom, 1980, p. 22) is illustrative of the fundamental error inherent to this approach. "Two neighbors were involved in a bitter dispute. One claimed that the other's cat had eaten his butter and, accordingly, demanded compensation. Unable to resolve the problem, the two, carrying the accused cat, sought out the village wise man for a judgment. The wise man asked the accuser, 'How much did the cat eat'? 'Ten pounds' was the response. The wise man placed the cat on the scale. Lo and behold! It weighted exactly ten pounds. '*Mirabile dictu!*' he proclaimed. 'Here we have the butter. But where is the cat?'"

*Hypothesis 4:* Aspects of both Personality and Emotional Intelligence will lend incremental validity to Cognitive Ability in predicting Net Sales

*Hypothesis 5:* The incremental validity gained from Emotional Intelligence and Conscientiousness (and possibly one or more additional personality sub-dimensions), will prove to be as predictive of Net Sales as Cognitive Ability.

Substantiation of these hypothesis would demonstrate that those with relatively lower levels of cognitive ability (*g*) may employ alternative strategies for achieving Net Sales results by relying on relatively higher levels of Emotional Intelligence and aspects of their Personality (e.g., Conscientiousness).

These hypotheses best lend themselves to testing by multiple regression analysis (Cohen & Cohen, 1983; Pedhazur, 1997; Newton & Rudestam, 1999), and the proposed models for each are further explicated as follows:

| Hypothesis | Model |
|---|---|
| **H1:** Cognitive Ability predictive of Net Sales | (Constant)<br>Cognitive Ability |
| **H2a:** Conscientiousness predictive of Net Sales | (Constant)<br>Conscientiousness |
| **H2b:** Agreeableness predictive of Net Sales | (Constant)<br>Agreeableness |
| **H2c:** Conscientiousness and Agreeableness predictive of Net Sales | (Constant)<br>Conscientiousness<br>Agreeableness |
| **H2d:** Emotional Intelligence predictive of Net Sales | (Constant)<br>Emotional Intelligence |
| **H3a:** Cognitive Ability predictive of Teaming Ability | (Constant)<br>Cognitive Ability |
| **H3b:** Cognitive Ability predictive of Customer Service | (Constant)<br>Cognitive Ability |
| **H3c:** Emotional Intelligence predictive of Teaming Ability | (Constant)<br>Emotional Intelligence |
| **H3d:** Emotional Intelligence Predictive of Customer Service | (Constant)<br>Emotional Intelligence |
| **H3e:** Conscientiousness Predictive of Teaming Ability | (Constant)<br>Conscientiousness |
| **H3f:** Conscientiousness Predictive of Customer Service | (Constant)<br>Conscientiousness |
| **H3g:** Agreeableness Predictive of Teaming Ability | (Constant)<br>Agreeableness |
| **H3h:** Agreeableness Predictive of Customer Service | (Constant)<br>Agreeableness |
| **H4a:** Conscientiousness lends incremental validity to Cognitive Ability in predicting Net Sales | (Constant)<br>Cognitive Ability<br>Conscientiousness |
| **H4b:** Agreeableness lends incremental validity to Cognitive Ability in predicting Net Sales | (Constant)<br>Cognitive Ability<br>Agreeableness |
| **H4c:** Conscientiousness and Agreeableness lend incremental validity to Cognitive Ability in predicting Net Sales | (Constant)<br>Cognitive Ability<br>Conscientiousness<br>Agreeableness |
| **H4d:** Emotional Intelligence lends incremental validity to Cognitive Ability in predicting Net Sales | (Constant)<br>Cognitive Ability<br>Emotional Intelligence |
| **H5a:** Conscientiousness and Emotional Intelligence in combination are as predictive of Net Sales as Cognitive Ability | (Constant)<br>Conscientiousness<br>Emotional Intelligence |
| **H5b:** Agreeableness and Emotional Intelligence in combination are as predictive of Net Sales as Cognitive Ability | (Constant)<br>Agreeableness<br>Emotional Intelligence |
| **H5c:** Conscientiousness, Agreeableness, and Emotional Intelligence in combination are as predictive of Net Sales as Cognitive Ability | (Constant)<br>Conscientiousness<br>Agreeableness<br>Emotional Intelligence |

# Chapter VII

## Method

*If you eliminate the impossible, whatever is left,*
*no matter how improbable, must be the truth.*

- *Sherlock Holmes*

### Sample

The data for this research was collected during the course of developing a selection instrument for telesales representatives (i.e., inbound sales) for the Canadian operations center of a United States based manufacturing organizations. Participation in this process was entirely voluntary. A memorandum sent to each of the organizations 162 sales representatives asked for their assistance in developing a new selection instrument, which would provide the company with the ability "to be able to select new associates capable of performing at the same outstanding level of performance as those already working as part of our Canadian Operations Team." The members of the Canadian Operations Center take considerable pride in having maintained the organizations highest worldwide records for sales and service since beginning operations several years ago, and this no doubt accounted for the large study participation rate of 147 out of 162 representatives (91% of the entire population). Participants were offered no other inducements for participation, nor were they in any way sanctioned for non-participation.

Respondents included 44 (30%) men and 103 (70%) women, which is representative of the overall population. Respondents averaged 38 years in age ($SD$ = 10.07) and had approximately 2.5 years of organizational tenure ($SD$ = 2.89), which was

also consistent with the overall population. The participants in this study represented an extremely culturally diverse group, though specific distributions were unavailable due to Canadian laws, which prohibit the collection of demographic data pertaining to race and ethnicity for purposes of employment. This study was approved by the Institutional Review Board (IRB) of the City University of New York, Graduate School and University Center.

## Measures

***Job performance.*** As the first step in developing a selection assessment instrument an extensive job analysis was conducted. Interviews were conducted with numerous key stakeholders from the organization, including Human Resource recruiters, highly successful incumbents and their direct supervisors, operation center managers, customers, and several officers of the corporation including the Senior Vice President of Human Resources, Senior Vice President of Marketing and Sales, the Chief Operating Officer, and the CEO/President. In addition to these interviews researchers followed a job shadowing process with several highly successful incumbents, analyzed and elementized recordings of 135 successful sales calls, and analyzed a considerable body of archival information pertaining to performance indicators for the assessed population. The conclusion of this process was the identification of three distinct variables that collectively accounted for job performance in this position: net sales, teaming ability and customer service skills.

***Net sales.*** Net sales were determined by average monthly sales. Reported figures are reported here as standardized scores (*z-scores*) to protect the

financial confidentiality of the organization and range from –2.79 to 3.85 ($M = .0$, $SD = 1.0$). This range represents an actual difference of several hundred thousand dollars between high and low performing sales representatives and makes clear the importance of even minimal improvement to the selection process. The hosting organization is in the process of considerably expanding their sales force and anticipated hiring fifty additional representatives each year for the next three years, in addition to replacing those lost through attrition. Improving the validity of their selection process by as little as an additional .05 (e.g., from .23 to .28) was projected to result in additional earnings of approximately $15 million annually. Improving the selection process was consequently viewed by the organization as a strategic imperative, accounting for the considerable resources they dedicated to its development and their profound interest in the results.

***Teaming Ability.*** Teaming ability was assessed by asking front-line supervisors to each evaluate their direct reports abilities on an 8 item, 7-point Likert-type scale ranging from 1 (Highest) to 7 (Lowest), for each of the following statements: (a) Gets along with others; (b) Is respectful of co-workers; (c) Is a "team player"; (d) Contributes to the success of other associates; (e) Is pleasant to work with; (f) Is considerate of others; (g) Respects the needs and contributions of others; (h) Relates with co-workers in a positive and professional manner.

These questions were derived through the aforementioned job analysis and then subjected to an iterative process of evaluation by organizational subject matter experts (SMEs) to determine the construct, content and face validity of the final collection of questions. The final model demonstrated high level of internal consistency ($\alpha = .96$).

***Customer Service.*** Customer service skills were assessed through a similar process as that described for teaming ability. Front-line supervisors evaluated their direct reports a 5 item, 7-point Likert-type scale ranging from 1 (Highest) to 7 (Lowest), for each of the following statements: (a) Courteous, pleasant and friendly; (b) Professional and efficient; (c) Helpful and patient; (d) Knowledgeable about our products and services; (e) Consistently identifies and meets customer's needs. These questions were derived through the same job analysis described previously and then subjected to an iterative process of evaluation by organizational subject matter experts (SMEs) to determine the construct, content and face validity of the final collection of questions. The final model demonstrated high level of internal consistency ($\alpha = .91$).

***Demographics.*** Organizational tenure, age, and the gender of participants were obtained through self-reports and confirmed by an examination of personnel records.

***Cognitive Ability.*** The Wonderlic Personnel Test (WPT), Form IV (Wonderlic Personnel Test, 1992) was used to measure cognitive ability (*g* or GMA). This 50-item, 12-minute test, which assesses vocabulary, arithmetic reasoning and spatial relations, is

presently the most commonly used measure of GMA in general use. WPT scores were consistent with published findings for the level and position being assessed ($M = 21.87$, $SD = 5.42$).

***Personality***. The IPAT 16PF was used to measure personality dimensions. Average completion time for this 185-item test is approximately 35 to 50 minutes and is scored by the publisher. The 16PF compares favorably with the NEO-PI-R and assesses each of the Big Five personality dimensions, as described in Table 8.

Table 8

| Five Factor Model | IPAT 16PF |
|---|---|
| Extraversion | Extraversion |
| Neuroticism | Anxiety |
| Openness | Tough-Mindedness |
| Agreeableness | Independence |
| Conscientiousness | Self-Control |

The Global Factor Scale Descriptors and Primary Factor Scale Descriptors are included in Tables 9 and 10.

Table 9
Global Factor Scale Descriptors

| Factor | Left Meaning | Right Meaning |
|---|---|---|
| Extraversion | Introverted, Socially Inhibited | Extraverted, Socially Participating |
| Anxiety | Low Anxiety, Unperturbed | High Anxiety, Perturbable |
| Tough-Mindedness | Receptive, Open-Minded, Intuitive | Tough-Minded, Resolute, Unempathic |
| Independence | Accommodating, Agreeable, Selfless | Independent, Persuasive, Willful |
| Self-Control | Unrestrained, Follows Urges | Self-Controlled, Inhibits Urges |

Table 10
Primary Factor Scale Descriptors

| Factor | Left Meaning | Right Meaning |
|---|---|---|
| Warmth | Reserved, Impersonal, Distant | Warm, Outgoing, Attentive to Others |
| Reasoning | Concrete | Abstract |
| Emotional Stability | Reactive, Emotionally Changeable | Emotionally Stable, Adaptive, Mature |
| Dominance | Deferential, Cooperative, Avoids Conflict | Dominant, Forceful, Assertive |
| Liveliness | Serious, Restrained, Careful | Lively, Animated, Spontaneous |
| Rule-Consciousness | Expedient, Nonconforming | Rule-Conscious, Dutiful |
| Social Boldness | Shy, Threat-Sensitive, Timid | Socially Bold, Venturesome, Thick-Skinned |
| Sensitivity | Utilitarian, Objective, Unsentimental | Sensitive, Aesthetic, Sentimental |
| Vigilance | Trusting, Unsuspecting, Accepting | Vigilant, Suspicious, Skeptical, Wary |
| Abstractedness | Grounded, Practical, Solution-Oriented | Abstracted, Imaginative, Idea-Oriented |
| Privateness | Forthright, Genuine, Artless | Private, Discreet, Non-Disclosing |
| Apprehension | Self-Assured, Unworried, Complacent | Apprehensive, Self-Doubting, Worried |
| Openness to Change | Traditional, Attached to Familiar | Open to Change, Experimenting |
| Self-Reliance | Group-Oriented, Affiliative | Self-Reliant, Solitary, Individualistic |
| Perfectionism | Tolerates Disorder, Unexacting, Flexible | Perfectionistic, Organized, Self-Disciplined |
| Tension | Relaxed, Placid, Patient | Tense, High Energy, Impatient, Driven |

The descriptive statistics for each of the primary factors (Table 11) show the items to have been normally distributed within the examined population. Correlations between personality dimensions and both Emotional Intelligence and GMA support that they are independent constructs (Table 12).

Table 11
Descriptive Statistics for Personality ($N = 143$)

| OBSERVED VARIABLES | DESCRIPTIVE STATISTICS | | | | | |
|---|---|---|---|---|---|---|
| | **M** | **SD** | Minimum | Maximum | Weight in Scoring Equation | Correlation with Net Sales |
| **Extraversion (Extraverted / Introverted)** | | | | | | |
| ▪ Reserved (-) / Warm (+) | 6.72 | 1.41 | 3 | 9 | .3 | .087 |
| ▪ Serious (-) / Lively (+) | 6.07 | 1.88 | 2 | 9 | .3 | -.139 |
| ▪ Shy (-) / Socially Bold (+) | 6.31 | 1.59 | 3 | 9 | .2 | -.238** |
| ▪ Private (+) / Forthright (-) | 5.05 | 1.76 | 2 | 10 | .3 | -.119 |
| ▪ Self-Reliant (+) / Group-Oriented (-) | 5.35 | 1.58 | 1 | 9 | .3 | .010 |
| **Anxiety (Anxious / Unperturbed)** | | | | | | |
| ▪ Emotionally Stable (+) / Reactive (-) | 5.69 | 1.40 | 2 | 8 | .4 | .217* |
| ▪ Trusting (-) / Vigilant (+) | 5.74 | 1.69 | 1 | 9 | .3 | -.252** |
| ▪ Self-Assured (-) / Apprehensive (+) | 5.16 | 1.52 | 2 | 9 | .4 | .003 |
| ▪ Relaxed (-) / Tense (+) | 4.55 | 1.40 | 2 | 8 | .4 | -.167 |
| **Tough-Mindedness (Tough-Minded vs. Receptive)** | | | | | | |
| ▪ Warm (+) / Reserved (-) | 6.72 | 1.41 | 3 | 9 | .2 | .087 |
| ▪ Sensitive (+) / Utilitarian (-) | 5.63 | 1.38 | 3 | 9 | .5 | -.054 |
| ▪ Abstracted (+) / Grounded (-) | 5.28 | 1.49 | 2 | 10 | .3 | -.247** |
| ▪ Open to Change (+) / Traditional (-) | 5.73 | 1.53 | 1 | 10 | .5 | -.105 |
| **Independence (Independent vs. Accommodating)** | | | | | | |
| ▪ Deferential (-) / Dominant (+) | 5.67 | 1.44 | 3 | 9 | .6 | -.170 |
| ▪ Timid (-) / Bold (+) | 6.31 | 1.59 | 3 | 9 | .3 | -.238** |
| ▪ Trusting (-) / Vigilant (+) | 5.74 | 1.69 | 1 | 9 | .2 | -.252** |
| ▪ Traditional (-) / Open to Change (+) | 5.73 | 1.53 | 1 | 10 | .3 | -.105 |
| **Self-Control (Self-Controlled vs. Unrestrained)** | | | | | | |
| ▪ Lively (+) / Serious (-) | 6.07 | 1.88 | 2 | 9 | .2 | -.139 |
| ▪ Expedient (-) / Rule-Conscious (+) | 5.45 | 1.38 | 2 | 9 | .4 | .391** |
| ▪ Abstracted (+) / Grounded (-) | 5.28 | 1.49 | 2 | 10 | .3 | -.247** |
| ▪ Tolerates Disorder (-) / Perfectionistic (+) | 5.91 | 1.66 | 1 | 9 | .4 | .084 |

** Significant at the .01 level (2-tailed)
* Significant at the .05 level (2-tailed)

## Correlation Matrix

Table 12

**Means, Standard Deviations, and Intercorrelations for All Variables**

| | Variable | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Net Sales[a] | 0.00 | 1.00 | ---- | | | | | | | | | | | | |
| 2. | Teaming Ability | 4.46 | 1.26 | .03 | (.96) | | | | | | | | | | | |
| 3. | Customer Service | 4.29 | 1.25 | .09 | .79** | (.91) | | | | | | | | | | |
| 4. | General Mental Ability | 21.87 | 5.42 | .32** | .06 | .14 | (.88) | | | | | | | | | |
| 5. | Emotional Intelligence | 51.07 | 4.95 | .27** | .18* | .22* | .13 | (.68) | | | | | | | | |
| 6. | Independence | 5.96 | 1.41 | -.28** | .04 | -.03 | -.08 | .29** | (.45) | | | | | | | |
| 7. | Self Control | 5.55 | 1.43 | .30** | .05 | .04 | -.05 | .05 | -.14 | (.63) | | | | | | |
| 8. | Extraversion | 6.38 | 1.49 | -.04 | .12 | .03 | -.06 | .32** | .36** | -.22** | (.46) | | | | | |
| 9. | Anxiety | 4.92 | 1.61 | -.21* | .01 | .02 | -.14 | -.39** | -.01 | -.20* | -.31** | (.24) | | | | |
| 10. | Tough Mindedness | 5.19 | 1.38 | .15 | -.01 | .02 | -.08 | -.22** | -.42** | .43** | -.29** | -.06 | (.40) | | | |
| 11. | Gender[b] | 0.70 | 0.46 | -.13 | -.01 | .02 | .01 | .13 | .01 | -.12 | .18* | .06 | -.31** | ---- | | |
| 12. | Age | 37.92 | 10.07 | .09 | -.12 | -.05 | .12 | .07 | -.07 | .09 | -.19* | -.12 | -.03 | .12 | ---- | |
| 13. | Tenure | 2.54 | 2.89 | -.08 | -.16 | -.08 | -.07 | -.01 | -.02 | -.13 | -.02 | .01 | -.07 | .24** | .49** | ---- |

*Note.* Internal reliability estimates (αs) are presented in parenthesis along the diagonal.

[a] Converted to *z*-scores [b] Coded as 0 = male, 1 = female

* $p < .05$ ** $p < .01$

***Emotional Intelligence***. The Bedwell Emotional Judgment Inventory (EJI) was used to assess Emotional Intelligence. This 80-item untimed test addresses seven dimensions, which are described as follows (Bedwell, 2002):

**Being Aware of Emotions**: Individuals scoring high on this scale are more likely than most people to indicate that they are emotionally sensitive. They report believing their own and others' emotions are valuable. These individuals also tend to devote more of their mental resources than most people to attending to and being conscious of one's own and others' feelings through both verbal and nonverbal cues. Individuals who score low on this scale do not attend to emotions, either their own or those of the people around them. In addition, they are not generally as concerned with the feelings of others as most people. They may feel that emotions are less important than facts and logic, that emotions confuse the real issues, and/or that they do not have the time to focus on emotions.

**Identifying Own Emotions**: Individuals scoring high on this scale are generally clear about how they feel at any given time. In addition, they tend not to experience confusion between similar types of emotions such as sadness and disappointment. Individuals scoring low on this scale report that they are often not clear about how they feel. They may also experience emotions without knowing why they are feeling the way they

do. In addition, they may have trouble distinguishing between similar emotions such as anger and frustration.

**Identifying Others' Emotions**: Individuals scoring high on this scale report being confident about their assessments of the feelings of people around them. These individuals experience little confusion about others' emotions. Low scorers are often unclear about how people around them feel. They report not being good at interpreting how other people are feeling and are often unsure of their assessments of others' feelings.

**Managing Own Emotions**: High scorers report having strategies to make themselves feel better after a bad experience. In addition, they are able to adjust how they feel better than most people. That is, they can construct both negative and positive feelings rather easily in order to alter their mood. These individuals are also more adept at maintaining their mood for extended periods of time than most people. Low scorers tend to stay focused on the events which were upsetting to them. They also have difficulty thinking about pleasant events after they are upset. These individuals report having difficulty changing how they feel and not being able to move on after an unpleasant event.

**Managing Others' Emotions**: Individuals scoring high on this scale are skilled at influencing how other people feel. They may deliberately use

verbal and nonverbal cues to regulate the moods of others. They report a tendency to making others feel comfortable and relaxed. In addition, they are likely to try and cheer other people up if they notice that they are in a bad mood. Low scorers are less able to bring about a change in how others feel. They report having less success in influencing people's emotions in the past. As a result, they may not make many attempts to do so in the future.

**Using Emotions in Problem Solving**: Individuals scoring high on this scale report that they identify and incorporate emotional information into everyday tasks involving planning, interpersonal interactions, motivation, decision making, and problem-solving. These individuals tend to recognize when and how their emotional experiences influence their performance. They may also attempt to create mood states that facilitate the task(s) on which they are focusing. Low scoring individuals on this scale typically do not understand how their emotions affect their day-to-day activities. They may not consider how they feel prior to beginning a difficult task or making an important decision. As a result, these individuals tend not to integrate their feelings into problem solving and planning activities.

**Expressing Emotions Adaptively**: Individuals scoring high on this scale adaptively communicate how they feel more often. Here, adaptive is

defined as express ing those emotions which facilitate a desired outcome. These individuals let others know how they feel and, when necessary, express their negative reactions to the behaviors of others. Individuals scoring low on this scale tend to believe that emotions are disruptive and report keeping their feelings to themselves. However, these individuals may have difficulty masking their emotions and are likely to display many of the emotions they are experiencing without regard to appropriateness of the context. They may also not be aware of the effect this will have on those around them.

The descriptive statistics for each of these factors (Table 13) show the items to have been normally distributed within the examined population. Correlations between personality dimensions and both Emotional Intelligence and GMA support that they are independent constructs (Table 12).

Table 13
Descriptive Statistics for Emotional Intelligence ($N$ = 136)

| OBSERVED VARIABLES | DESCRIPTIVE STATISTICS | | | | |
|---|---|---|---|---|---|
| | **M** | **SD** | Minimum | Maximum | Correlation with Net Sales |
| Being Aware of Emotions | 53.19 | 7.59 | 30 | 68 | .235** |
| Identifying Own Emotions | 53.08 | 9,60 | 30 | 70 | .239** |
| Identifying Others' Emotions | 47.38 | 7.61 | 22 | 63 | .320** |
| Managing Own Emotions | 48.33 | 10.29 | 18 | 70 | .205* |
| Managing Others' Emotions | 58.14 | 6.53 | 37 | 70 | .206* |
| Using Emotions in Problem Solving | 53.11 | 9.06 | 28 | 77 | .160 |
| Expressing Emotions | 43.64 | 7.72 | 25 | 68 | -.088 |

** Significant at the .01 level (2-tailed)
* Significant at the .05 level (2-tailed)

***Sample Size.*** The most generally accepted rule of thumb for approximating the appropriate sample size required for multiple regression (Newton & Rudestam, 1999; Cohen & Cohen, 1983; Pedhazur, 1997) is to choose the larger of either the sample required for testing the multiple correlation ($N \geq 50 + 8k$), where k is the number of dependent variables), or the results of the formula for testing individual predictors ($N \geq 104 + k$). This rule assumes an alpha level of .05, a power of .8, and a medium effect size. Given this formula, the sample size required for the analyses presented here ranges from 50 + 8(3) = 74 and 104 + 3 = 107. The final sample of 147 exceeds the required sample size in either case.

## Results

***Hypothesis 1: Cognitive Ability will prove to be highly predictive of Net Sales.*** As indicated in the preceding literature review, cognitive ability was expected to be highly predictive of net sales. These expectations were confirmed, as demonstrated in Tables 14, 15 and 16 (H1, Model 1). Cognitive Ability and Net Sales show a correlation of .32 ($p > .01$). These findings are consistent with past research (Hough, Eaton, Dunnette, Kamp & McCloy, 1991; Hunter, 1986; Hunter and Hunter, 1984; Ree & Earles, 1991, 1992; Schmidt, Ones & Hunter, 1992; Vinchur, Schippman, Switzer, & Roth, 1998) and confirm the efficacy of Cognitive Ability as a predictor of Net Sales. Table 17 starkly demonstrates the differences in average annual sales[24] for relatively low, average and high levels of Cognitive Ability (defined as scores within, below and above -1.0 and 1.0

[24] The actual annual sale amounts have been masked through the uniform application of a randomly selected common multiplier between .90 to 1.10 to prevent disclosure of the actual revenues generated by the host organization and still maintain a relatively close correspondence to actual sales volume.

standard deviations from the mean; Stone & Hollenbeck, 1989). It becomes clear from these and previous findings that, *ceteris paribus*, individuals employed in sales positions are able to capitalize on relatively higher levels of cognitive ability to outperform their less cognitively gifted peers. The rub, of course, is that people are never truly *par* – the effect of which will be demonstrated through the remaining hypotheses presented here.

Table 14

| Hypothesis | Pearson | Significance | Decision | Hypothesis |
|---|---|---|---|---|
| **H1:** Cognitive Ability predictive of Net Sales | .32 | .01 | Reject $H_0$ | Supported |
| **H2a:** Personality (Self Control) predictive of Net Sales | .30 | .01 | Reject $H_0$ | Supported |
| **H2b:** Personality (Independence) predictive of Net Sales | -.28 | .01 | Reject $H_0$ | Supported |
| **H2c:** Personality (Anxiety) predictive of Net Sales | -.21 | .05 | Reject $H_0$ | Supported |
| **H2d:** Emotional Intelligence predictive of Net Sales | .27 | .01 | Reject $H_0$ | Supported |
| **H3a:** Cognitive Ability predictive of Teaming Ability | .06 | Not Significant | Can Not Reject $H_0$ | Supported |
| **H3b:** Cognitive Ability predictive of Customer Service | .14 | Not Significant | Can Not Reject $H_0$ | Supported |
| **H3c:** Emotional Intelligence predictive of Teaming Ability | .18 | .05 | Reject $H_0$ | Supported |
| **H3d:** Emotional Intelligence Predictive of Customer Service | .22 | .05 | Reject $H_0$ | Supported |
| **H4a:** Personality lends incremental validity to Cognitive Ability in predicting Sales | N/A | .000 | Reject $H_0$ | Supported |
| **H4b:** Emotional Intelligence lends incremental validity to Cognitive Ability in predicting Sales | N/A | .000 | Reject $H_0$ | Supported |
| **H5:** Personality (Self Control) and Emotional Intelligence in combination predictive of Net Sales | N/A | .000 | Reject $H_0$ | Supported |
| **H5a:** Personality (Independence) and Emotional Intelligence in combination predictive of Net Sales | N/A | .000 | Reject $H_0$ | Validated |

Table 15: Coefficients of Multiple Regression Models*

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Significance |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| 1 (Constant) | -1.300 | .347 | | -3.746 | .000 |
| GMA | 6.023 | .015 | .325 | 3.898 | .000 |
| 2 (Constant) | -2.584 | .463 | | -5.580 | .000 |
| GMA | 6.365 | .015 | .343 | 4.338 | .000 |
| Self Control | .218 | .055 | .312 | 3.941 | .000 |
| 3 (Constant) | -1.458 | .588 | | -2.479 | .014 |
| GMA | 5.947 | .014 | .321 | 4.155 | .000 |
| Self Control | .203 | .054 | .290 | 3.763 | .000 |
| Independence | -.160 | .054 | -.229 | -2.965 | .004 |
| 4 (Constant) | -4.231 | .744 | | -5.689 | .000 |
| GMA | 6.788 | .013 | .377 | 5.385 | .000 |
| Self Control | .196 | .046 | .294 | 4.221 | .000 |
| Independence | -.198 | .048 | -.300 | -4.112 | .000 |
| Emotional Intelligence | 5.635 | .014 | .295 | 4.035 | .000 |
| 5 (Constant) | -2.330 | .492 | | -.047 | .962 |
| Self Control | .198 | .057 | .281 | 3.466 | .001 |
| Independence | -.181 | .057 | -.256 | -3.149 | .001 |
| 6 (Constant) | -2.711 | .854 | | -3.175 | .002 |
| Emotional Intelligence | 5.334 | .017 | .275 | 3.217 | .002 |
| 7 (Constant) | -3.062 | .795 | | -3.852 | .000 |
| Self Control | .183 | .051 | .272 | 3.552 | .001 |
| Independence | -.237 | .053 | -.353 | -4.440 | .000 |
| Emotional Intelligence | 6.800 | .015 | .350 | 4.405 | .000 |

*Dependent Variable: Sales in *z*-scores

Table 16: Descriptive Statistics for Multiple Regression Model Summary*

| Model | *R* | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | Df1 | Df2 | Sig. F Change |
| 1 | .325[a] | .105 | .098 | .94002 | .105 | 15.197 | 1 | 129 | .000 |
| 2 | .450[b] | .202 | .190 | .89118 | .202 | 16.219 | 2 | 128 | .000 |
| 3 | .504[c] | .254 | .236 | .86523 | .254 | 14.401 | 3 | 127 | .000 |
| 4 | .651[d] | .423 | .404 | .73218 | .423 | 22.564 | 4 | 123 | .000 |
| 5 | .396[e] | .157 | .144 | .92529 | .157 | 12.005 | 2 | 129 | .000 |
| 6 | .275[f] | .075 | .068 | .92686 | .075 | 10.352 | 1 | 126 | .002 |
| 7 | .534[g] | .285 | .268 | .82128 | .285 | 16.646 | 3 | 125 | .000 |

* Dependent Variable: Sales in *z*-scores

a. Predictors: (Constant), GMA
b. Predictors: (Constant), GMA, Self Control
c. Predictors: (Constant), GMA, Self Control, Independence
d. Predictors: (Constant), GMA, Self Control, Independence, Emotional Intelligence
e. Predictors: (Constant), Self Control, Independence
f. Predictors: (Constant), Emotional Intelligence
g. Predictors: (Constant), Self Control, Independence, Emotional Intelligence

Table 17

Average Annual Sales

| | General Mental Ability | | |
|---|---|---|---|
| | Low | Average | High |
| *z-score* | -.4535 | .0445 | .4342 |
| Dollars | $719,496 | $819,482 | $916,488 |

***Hypothesis 2: Personality and Emotional Intelligence will prove to be predictive of Net Sales, though not to the same extent as Cognitive Ability.*** Also consistent with past research (Barrick & Mount, 1991; Hurtz & Donovan, 1998; Salgado, 1997; Mount & Barrick, 1995; Tett, Rothstein & Jackson, 1991), both conscientiousness and agreeableness proved to be significantly correlated with Net Sales, demonstrating correlations of .30 ($p > .01$) and -.28 ($p > .01$), respectively. Behling's (1998) observations of conscientiousness as being "one of the most valid predictors of

performance across most jobs, second only to general intelligence" seems to be substantiated by these findings, as does Barrick, Mount and Judge's (2001) contention of the near universality of conscientiousness as a predictor of performance. The finding of a positive relationship between sales and agreeableness (though not to the same extent as cognitive ability, with $r = -.28$) was also expected, and is consistent with previous findings by Hurtz and Donovan (2000). Hypotheses 2a and 2b were thus supported.

Though not anticipated, anxiety proved to be negatively correlated with net sales at -.21 ($p > .05$). While this finding is likely specific to the particular position and organization assessed, it does further the case for the predictive ability of personality factors in general. This finding also supports the contention of Churchill et al. (1985, p.183) that "the strength of the relationship between major determinants and salespeople's performance is affected by the type of products sold, the specific tasks to be performed, and the type of customer." Part of the difficulty in assessing the predictive ability of personality factors in general may be their idiosyncratic predictive capabilities specific to particular organizations, positions, and cultures (with the possible exception of conscientiousness, as noted previously). This possibility is, of course, an inherent limitation to the meta-analytic approach in general, but should serve as a particular caution to selection researchers who are, after all, most frequently charged with predicting performance for a given organization, and not all organizations in general.

Supporting Hypothesis 2d, Emotional Intelligence proved to be predictive of Net Sales with a correlation of .27 ($p > .01$) and Beta of .275 ($p > .002$). Table 18 impressively demonstrates the differences in average annual sales for relatively low,

average and high levels of Emotional Intelligence (defined as scores within, below and above -1.0 and 1.0 standard deviations from the mean; Stone & Hollenbeck, 1989).

**Table 18**

Average Annual Sales

| | Emotional Intelligence | | |
|---|---|---|---|
| | Low | Average | High |
| *z-score* | -.5928 | .0570 | .4719 |
| Dollars | $738,824 | $809,244 | $902,292 |

While the research supporting the predictive validity of Emotional Intelligence is still relatively nascent, these finding do clearly correspond to the conceptual contentions underpinning the construct. Individuals who are relatively higher in EI would be expected to more effectively identify and manage their own and others' emotions (Mayer, 2001; Mayer & Salovey, 1993; Salovey & Mayer, 1990). While not specifically addressing EI, many studies have shown that the interpersonal and intrapersonal skills related to EI are critical to overall success in sales (Austin, 1954; Arvey, Miller, Gould, & Buruch, 1987; Baehr & Williams, 1968; Baogozzi, 1978; Baier & Dugan, 1957; Bray & Campbell, 1968; Burroughs & White, 1996; Chapple & Donald, 1947; Churchill, Ford, Hartley, & Walker, 1985; Cook & Manson, 1926; Cotham, 1968; Lamont & Lundstrom, 1977; Gallup, 1926; Vinchur, Schippmann, Switzer & Roth, 1998). The few empirical studies of EI that have been conducted have similarly shown that positions with greater relational (as contrasted with task) responsibilities demonstrate a higher correlation between success and EI (Bedwell, 2002; Viriyavidhayavongs & Jiamsuchon, 2002). Sipsma (2000) similarly showed EI scores to account for approximately 40% of the variance in teaming effectiveness, and Ferris, Witt and Hochwarter (2001) showed there

to be a strong correspondence between social skill and interpersonal facilitation – a dimension of job performance they found to be critical for software engineers.

Though not quite as highly correlated to Net Sales as Cognitive Ability, Emotional Intelligence did prove to be even more highly correlated than had been expected. The substantial significance of Emotional Intelligence can likely be attributed to the considerable intercorrelations which were hypothesized to exist between Net Sales and both Teaming Ability and Customer Service Orientation. These findings will be discussed further with respect to Hypotheses 3, 4 and 5.

With a correlation of .32, Cognitive Ability did indeed prove to be a superior predictor to both Emotional Intelligence (.27) and the various dimensions of Personality that were considered (Conscientiousness .30, Agreeableness -.28, and Anxiety -.21) (Table 12), though these differences were not significant. Hypothesis 2a, 2b, 2c, and 2e, were thus supported. Considering both Conscientiousness and Agreeableness in combination resulted in a correlation of .396 with Net Sales, supporting Hypothesis 2d.

***Hypothesis 3: Cognitive Ability will not prove to be as successful a predictor of either Teaming Ability or Customer Service as Emotional Intelligence or Personality.***

Though both Teaming Ability and Customer Service Orientation are vital to overall performance in a sales position (Schneider & Bowen, 1995), it was hypothesized that neither would be strongly correlated to Cognitive Ability. These findings would be consistent with previous research (Avis, 2002; Neuman, 1999) and would seem to make sense. The ability to get along with others, whether they are colleagues or customers, is clearly a non-intellective ability. Gardner (1982, 1983, 2000) and Sternberg (1985, 1999)

have long maintained that these abilities represent dimensions of intelligence not sufficiently captured by standard intelligence tests.

As expected, the regression for Cognitive Ability was not significant to either Teaming Ability (Table 19) or Customer Service Orientation (Table 20), with correlations of .06 and .14, respectively, thereby supporting Hypothesis 3a and 3b.

Table 19: Coefficients of Multiple Regression Models*

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Significance |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| 1 (Constant) | 2.141 | 1.112 | | 1.925 | .056 |
| Emotional Intelligence | 4.538 | .022 | .184 | 2.117 | .036 |
| 2 (Constant) | 3.928 | .670 | | 5.862 | .000 |
| Self Control | 5.245 | .079 | .058 | .663 | .508 |
| Independence | 4.134 | .077 | .047 | .537 | .592 |
| 3 (Constant) | 4.208 | .447 | | 9.404 | .000 |
| GMA | 1.333 | .020 | .058 | .669 | .505 |

*Dependent Variable: Teaming Ability

Table 20: Coefficients of Multiple Regression Models*

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Significance |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| 1 (Constant) | 1.601 | 1.103 | | 1.452 | .149 |
| Emotional Intelligence | 5.395 | .021 | .216 | 2.497 | .014 |
| 2 (Constant) | 4.190 | .674 | | 6.216 | .000 |
| Self Control | 3.605 | .080 | .040 | .453 | .651 |
| Independence | -2.03 | .077 | -.023 | -.262 | .794 |
| 3 (Constant) | 3.615 | .441 | | .8202 | .000 |
| GMA | 3.293 | .020 | .144 | 1.678 | .096 |

*Dependent Variable: Customer Service

In contrast, Emotional Intelligence did prove to be significantly correlated to both teaming ability ($r = .18$, $p < .05$) and Customer Service Orientation ($r = .22$, $p < .05$), supporting Hypothesis 3c and 3d. These findings are consistent with the expectations elucidated for Hypothesis 2, and are also consistent with research demonstrating the importance of being able to effectively identify and manage ones own and others'

emotions (Mayer, 2001; Mayer & Salovey, 1993; Salovey & Mayer, 1990). Similarly, this dimension of performance may account for part of the considerable influence interpersonal and intrapersonal skills have been demonstrated to have on overall success in sales (Austin, 1954; Arvey, Miller, Gould, & Buruch, 1987; Baehr & Williams, 1968; Baogozzi, 1978; Baier & Dugan, 1957; Bray & Campbell, 1968; Burroughs & White, 1996; Chapple & Donald, 1947; Churchill, Ford, Hartley, & Walker, 1985; Cook & Manson, 1926; Cotham, 1968; Lamont & Lundstrom, 1977; Gallup, 1926; Vinchur, Schippmann, Switzer & Roth, 1998). As discussed previously, these findings are also consistent both with Viriyavidhayavongs and Jiamsuchon's (2002) findings of supervisor effectiveness, for whom team building is a critical task, as well as for Sipsma's (2000) demonstration of EI as accounting for approximately 40% of the variance in teaming effectiveness. Likewise, Ferris, Witt and Hochwarter (2001) demonstration of the correspondence between social skill and interpersonal facilitation would seem to generalize to developing relations both among team members and with customers.

Surprisingly, examined dimensions of Personality (i.e., Conscientiousness, Agreeableness) did not prove predictive of either Teaming Ability or Customer Service, failing to support Hypotheses 3e, 3f, 3g, and 3h. While additional research would be called for to more definitively explain the absence of a relationship between these dimensions, it may be that people simply have different preferences for the personality types they prefer to associate with. If personality dimensions are indeed normally distributed in the population, perhaps people simply have individual preferences for associating with individuals whose personalities manifest along the complete spectrum of these personality sub-continua. While I may prefer to associate with individuals high in

agreeableness, another person might find their personality to be Pollyanna, saccharine, or even disingenuous.

***Hypothesis 4: Aspects of both Personality and Emotional Intelligence will lend incremental validity to Cognitive Ability in predicting Net Sales.*** Being effective in a sales position (and, it could be argued, in almost every position) requires more than purely intellective capabilities. Incumbents must be able to work well with their peers, understand and address the needs of their customers, and constructively contribute to their working environment. While these non-intellective abilities are clearly vital to successful performance, they just as clearly cannot be assessed through measures of Cognitive Ability. A consideration of these capabilities was therefore expected to lend incremental validity to Cognitive Ability in its ability to predict Net Sales. These expectations were substantiated.

Remarkably, these variables have not previously been considered in combination. Indeed, Witt, Burke, Barrick and Mount (2002) recently expressed their considerable surprise at the "paucity of research" addressing the interactive effects of even the most intuitively related personality factors (i.e., conscientiousness and agreeableness) or the consideration of any combinatorial predictors, with their research being the first to even consider, let alone demonstrate, an interaction between personality variables. This study furthers the research of Witt, et al. and demonstrates the value of considering these predictors in combination

Cognitive Ability, with a correlation of .325 explained 11% of Net Sales. When Self Control is added, R is .450 and adjusted $R^2$ is .202, accounting for 19% of the variance. When both Self Control and Independence are added, R is .504 and $R^2$ is .254,

accounting for 23.6% of the variance. Adding Emotional Intelligence results in an R of .651 and an $R^2$ of .423, accounting for 40.4% of the variance. In sum, Hypotheses 4a-d were therefore all supported. As predictive as Cognitive Ability is of Net Sales, both Emotional Intelligence and the examined aspects of Personality (i.e., Conscientiousness and Agreeableness) lent significant incremental validity. The low intercorrelation between these variables would also seem to support the contention that they each account for a unique source of variance. While Cognitive Ability indeed proves to be an excellent predictor of sales, it also clearly accounts for just a small part of overall sales ability.

***Hypothesis 5: The incremental validity gained from Emotional Intelligence and Conscientiousness will prove to be as predictive of Net Sales as Cognitive Ability.*** As demonstrated in Tables 15 and 16 (Model 5), Self Control and Independence in combination account for 14.4% of the variance in Net Sales ($R = .396$, $R^2 = .157$) and Emotional Intelligence (Model 6) accounts for 6.8% of the variance ($R = .275$, $R^2 = .075$). When considered in combination (Model 7), these personality and EI variables account for 26.8% of the variance in performance, with R of .534 and $R^2$ of .285. This demonstrates a clear alternative to the consideration of GMA (with an R of .325) as a predictor of Net Sales ability. The impact of including additional variables in the prediction of Net Sales, however, is most dramatically illustrated through cross tabulations of Cognitive Ability, Emotional Intelligence and Personality.

Tables 21 and 22 vividly demonstrate the importance of considering combinatorial predictors. Contrasting Individuals who are relatively low, average and high in Cognitive Ability and who have relatively low scores in Emotional Intelligence

shows an incremental increase of $95,765 and $75,952 respectively as individuals move from low to average and from average to high in their levels of Emotional Intelligence. The difference for individuals who are relatively low in GMA in moving from relatively low to high scores in Emotional Intelligence is an astonishing $171,717. This same patterns occurs for average and relatively high levels of GMA, with total differences between those with relatively low and relatively high levels of EI being $177,654 and $299,900, respectively, which would seem to indicate that EI plays an increasing important role in maximizing sales ability as GMA increases. Perhaps even more interestingly, however, we see that there is a substantial difference even between those who are relatively high in GMA, yet low in EI ($817,248) and those who have only average GMA scores, but are high in EI ($898,953). Indeed, even for those relatively high in GMA there is a substantial difference in annual sales between those who are relatively low and average in EI (a $92,164 increase correspondent to EI scores) and between those who are average and relatively high in EI (a $215,034 increase correspondent to EI scores). Those who are high in both GMA and EI (annual sales of $1,032,282) clearly outperform those who are average or low on either dimension.

Table 21

**Average Annual Sales (z-score)**

| | | Emotional Intelligence | | |
|---|---|---|---|---|
| | | Low | Average | High |
| GMA | Low | -1.2584 | -.4932 | .0922 |
| | Average | -.6289 | .1179 | .3693 |
| | High | .2408 | .8309 | 1.0427 |

Table 22

**Average Annual Sales ($)**

| | | Emotional Intelligence | | |
|---|---|---|---|---|
| | | Low | Average | High |
| GMA | Low | $645,531 | $731,758 | $732,382 |
| | Average | $741,296 | $817,924 | $898,953 |
| | High | $817,248 | $909,412 | $1,032,282 |

Similar findings, though not quite as dramatic, were found in contrasting GMA and Personality factors by quartile score, as demonstrated in Tables 23 and 24.

Table 23

**Average Annual Sales ($)**

| | | Self Control | |
|---|---|---|---|
| | | Lower Quartile | Upper Quartile |
| GMA | Lower Quartile | $58,721 | $61,739 |
| | Upper Quartile | $74,359 | $75,003 |

Table 24

**Average Annual Sales ($)**

| | | Independence | |
|---|---|---|---|
| | | Lower Quartile | Upper Quartile |
| GMA | Lower Quartile | $61,892 | $63,155 |
| | Upper Quartile | $75,596 | $82,021 |

The effect of personality variables becomes obvious when considering cross tabulations of GMA, EI and Personality facets in combination, as demonstrated in Tables 25 and 26 below. These findings support and further previous research of Ferris, Witt and Hochwarter (2001) demonstrating the incremental validity gained when considering cognitive ability and social skills in tandem, as well as Witt, Burke, Barrick and Mount's

(2002) demonstration of the incremental validity gained from considering personality dimensions in combination. Collectively, these findings support Hypothesis 5a-c.

Table 25

**Average Annual Sales ($)**

| | | **Emotional Intelligence** | |
|---|---|---|---|
| | | Lower Quartile | Upper Quartile |
| GMA | Lower Quartile | ↓ $54,574 | ↓ ---------- |
| | | ↑ $57,459 | ↑ $61,575 |
| | Upper Quartile | ↓ $72,009 | ↓ $74,764 |
| | | ↑ $74,385 | ↑ $82,972 |

↑ = Upper Quartile Scores for Conscientiousness
↓ = Lower Quartile Scores for Conscientiousness

Table 26

**Average Annual Sales ($)**

| | | **Emotional Intelligence** | |
|---|---|---|---|
| | | Lower Quartile | Upper Quartile |
| GMA | Lower Quartile | ↓ $53,471 | ↓ ---------- |
| | | ↑ $58,841 | ↑ $65,738 |
| | Upper Quartile | ↓ $67,533 | ↓ $79,832 |
| | | ↑ ---------- | ↑ $84,586 |

↑ = Upper Quartile Scores for Independence (Reverse Code of Agreeableness)
↓ = Lower Quartile Scores for Independence (Reverse Code of Agreeableness)

# Chapter VIII

## Discussion

*The time when an exact psychology of business life will be presented as a closed and perfected system lies very far distant.*

*Hugo Münsterberg, Psychology and Industrial Efficiency (1913)*

### Purpose of the Study

This study was intended to demonstrate alternatives to cognitive ability as a predictor of job performance. Contrary to previous research, which heralded *g* as "the single best predictor of performance across all organizations and positions" (Hough, Eaton, Dunnette, Kamp, & McCloy, 1991; Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, 1992, 1993; Schmidt, Ones, & Hunter, 1992), this study demonstrated that depending on the aspect of performance being considered, cognitive ability is in fact not the single best predictor of job performance. Though the efficacy of cognitive ability as a predictor of "overall performance" has been clearly established by previous research, this study demonstrated that a more realistic consideration of performance from a multi-dimensional perspective (e.g., Net Sales, Teaming Ability and Customer Service Orientation) necessitated the consideration of multi-faceted predictors (e.g., GMA, Personality, Emotional Intelligence) to account for the true variance in performance abilities. In the present case, while GMA was predictive of Net Sales, it was not predictive of either Teaming Ability or Customer Service, both of which tend to be of considerable importance to sales organizations.

This research was also intended to demonstrate that while cognitive ability is indeed highly predictive of some performance dimensions (e.g., Net Sales), individuals are able to employ alternative strategies for success even in these limited areas. Specifically, those who are relatively low in GMA, but who demonstrate relatively higher levels of conscientiousness, agreeableness and/or Emotional Intelligence than their peers, are able to produce Net Sales on a par with those relatively higher in GMA. Those with relatively higher scores on Personality and/or EI scores and relatively lower GMA scores were also able to consistently outperform those with relatively higher levels of GMA in the areas of Teaming Ability and Customer Service. These findings are consistent with, and seem to substantiate, Shade's (1982) contention that cognitive ability may be only one of several means by which individuals achieve professional success.

## Summary and Conclusions

Cognitive Ability proved to be highly predictive of Net Sales. Emotional Intelligence, while not proving as predictive of Net Sales, was highly predictive of both Teaming Ability and Customer Service. Cognitive Ability proved to not be predictive of either Teaming Ability or Customer Service. When combined with the personality dimensions of conscientiousness and agreeableness, Emotional Intelligence proved to be as valid a predictor of Net Sales as Cognitive Ability. Each of the five research hypotheses were consequently verified.

It appears from this research that individuals are able to achieve successful performance outcomes through a myriad of different strategies. An incumbent in the examined organization may rely either on his or her intelligence alone, or on a

combination of the appropriate personality dimensions and relatively high interpersonal and intrapersonal abilities to achieve success. The most successful performers tended to rely on a combination of these capabilities, which seems reasonable. Individuals who are relatively high in intellective ability but lack the requisite personality and EI skills are unlikely to succeed in a sales position, while pure intelligence can, on the other hand, serve an individual in making up for relative shortcomings in either the match of their personality to organizational need or in EI abilities.

## Contributions of the Study

This research demonstrates the possibility of developing alternative predictors, and various combinations of predictors, when building selection systems. In addition, by offering an alternative means of assessing capabilities, this research demonstrates the possibility of developing non-discriminatory selection instruments without compromising predictive validity. When considering the inherently discriminatory nature of cognitive ability tests and the dubious theoretical and conceptual grounds on which they are founded, the findings of this research are of particular importance to identifying means of reducing adverse impact. By demonstrating the differential ability of various predictors to predict different dimensions of performance, it is also hoped that this research will draw much needed additional attention to the consideration of performance from a multi-dimensional perspective.

## Limitations of the Study

There were three primary limitations to this study. The first concerns the evaluation of Customer Service abilities. These were obtained through supervisory assessments, which are at best a surrogate for direct measures of performance. While a supervisor's perception of the extent to which an individual is meeting these requirements may well be an important consideration in its own right, extensions of this research would do well to evaluate perceptions of service abilities directly from customers. The second limitation, typical to studies of this type, is around sample size. Though the data obtained was quite rich (i.e., multiple predictors and criterion were assessed for each employee), a larger sample would certainly have been preferable. The third limitation comes from the possibility of this organization being so absolutely unique as to render these findings completely idiosyncratic, and consequently non-generalizable. Though this possibility seems remote, these findings will be more strongly substantiated once similar analyses been conducted in multiple organizations.

## Directions for Future Research

I would suggest five areas of opportunity for future research. First, considerable additional research should be conducted concerning the construct validity of Emotional Intelligence. Research in this area is still in its infancy and until a coherent perspective of the construct can be developed, real progress in establishing EI as a legitimate predictor cannot be made. To study whether or not EI effectively predicts performance, researchers must first be certain that such measures are meaningful and psychometrically sound. Additional research is also needed to assess the predictive ability of existent EI

instruments across multiple populations reflecting a wide range of industries, occupational levels, and job types. Second, replications of the research presented here in other sales organizations to determine the extent to which these same variables truly account for variance in performance in all sales positions would lend considerable additional understanding to the expectations of sales positions in general. Third, further exploration of the interactive effect of cognitive ability, EI and personality should be undertaken. Fourth, while Canadian law prevented the consideration of demographic data pertaining to race and ethnicity, it would be interesting to see if the Black-White difference in cognitive ability testing can be overcome by conjunctively considering both personality and Emotional Intelligence.

Fifth and finally, it is becoming increasingly clear that the entire conception of intelligence testing merits serious reconsideration. Ask two-dozen prominent theorists to define intelligence and, like Sternberg and Detterman (1986), you will likely receive "two-dozen somewhat different definitions." The prevailing definition of intelligence seems to be that although we cannot define it, "we know it when we see it." From a scientific standpoint such a response is wholly unacceptable. Experimentation without sufficient operationalization is just bad science. Indeed, as every high school student learns, the very first step in the scientific method is a clear and precise definition of the variables under consideration. Intelligence, lauded as "the single best predictor of performance across all organizations and positions" (Hough, Eaton, Dunnette, Kamp, & McCloy, 1991; Hunter, 1986; Hunter & Hunter, 1984; Ree & Earles, 1991, 1992, 1993; Schmidt, Ones, & Hunter, 1992), is afforded no such clarity. With such ambiguity regarding the definition of the construct of inquiry, to expect an instrument portending to

measure these same capabilities to demonstrate construct validity seems little more than wishful thinking.

While subjecting assessment instruments that allegedly measure intelligence to scientific proofs is laudable, it is a secondary step in establishing the validity of the construct. Scientific pursuits are, by their very nature, Aristotelian in their approach. Founded in empiricism and experimentation, the central focus of scientific inquiry is to prove the existence or absence of a given phenomena, effect or condition. Though the scientific method is undoubtedly invaluable, experimentation and demonstration cannot tell us what something is; they can only tell us what things are true of it (Seeskin, 1987). Before relying on measurements of intelligence in making selection decisions, it seems both reasonable and prudent to define what intelligence truly is and whether our current instruments are capable of capturing those capabilities.

In light of the findings presented here, I must concur with Goldstein, Zedeck and Goldstein (2002) that it seems illogical for selection researchers to not at least consider alternative predictors before accepting *g* as "the final answer."

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