THE USE OF PERSONALITY PROFILES IN PERSONNEL SELECTION:

AN EXPLORATION OF ISSUES ENCOUNTERED IN PRACTICAL

APPLICATIONS

A Dissertation

by

MATTHEW LARRENCE SHELTON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree
of

DOCTOR OF PHILOSOPHY

August 2004

Major Subject: Counseling Psychology

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Approved as to style and content by:

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August 2004

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ABSTRACT

The Use of Personality Profiles in Personnel Selection:

An Exploration of Issues Encountered in Practical

Applications. (August 2004)

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The purpose of this study was to explore the issues

that are typically encountered when using personality

instruments for personnel selection. Cattell's Sixteen

Personality Factor Questionnaire (16PF) was used in the

study to predict job performance in a small team-based

manufacturing organization. Issues including the utility of

the 16PF in this setting, the bandwidth fidelity argument

(to use narrow or broad traits), and whether job-specific

versus company-wide profiles provide better prediction

success were addressed. The usefulness of the

organization's current selection process of using the 16PF

to generate interview questions was also investigated.

Results indicate that the 16PF can be a useful tool

for personnel selection in this setting and that the 16PF

was able to correctly classify if an applicant was going to

be successful over 86% of the time. Evidence for using narrow factors instead of broad factors was also presented, and the benefits of using job specific profiles were discussed. The limitations of this study were addressed, which included conducting this type of research with relatively small sample sizes. Additionally, this study provides suggestions for additional research in the future.

DEDICATION

This dissertation is dedicated to my grandfather, Okley Kinder. He has taught me the power of perseverance through the many obstacles that he has overcome throughout his lifetime and how he has always approached new challenges in his life with unbridled optimism about the future. These values have always helped me get through the challenges in my own life. Thank you for your love and support.

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CHAPTER I

INTRODUCTION

The use of personality measures in the area of personnel selection has received much attention in the literature. This practice can be traced to Hull's work in the 1920s. In *Aptitude Testing* (1928) Hull introduced the idea of matching human traits with job requirements. Cronbach and Gleser (1965) further advocated the use of psychological tests for employment selection in their book *Psychological Tests and Personnel Decisions*. Cronbach and Gleser believed that the use of psychological testing can be a very beneficial and cost effective way of selecting employees. Holland (1973) explained, in his principle of congruence, that people who resemble coworkers will tend to perform well, be satisfied, and stay on the job. These early works have stimulated a large body of research pertaining to the use of personality measures for personnel selection.

_____

This dissertation follows the style and format of the *Journal of Counseling Psychology.*

The use of personality factors as predictors of job performance was on the decline until the early 1990s (Hogan, Hogan, & Roberts, 1996). Until that time, personality factors failed to demonstrate statistical validation of their predictive effectiveness. This began to change with the publication of a series of meta-analyses indicating that personality factors might indeed be valid predictors of job performance (Barrick & Mount, 1991; Tett, Jackson, & Rothstien, 1991). Barrick and Mount (1991) found that measures of conscientiousness predict supervisors' ratings of job performance (r = .23). Tett et al. (1991) found even higher validity coefficients when using measures of intellect and agreeableness to predict job performance (r = .27 and .33 respectively). Other researchers have found mean validity coefficients as high as r = .50 for predicting rated performance in service jobs (McDaniel & Frei, 1998). Ones and Viswevaran stated, "There is now overwhelming validity evidence from this literature suggesting that earlier reviews of the personality-job performance relationships which found very little, if any, validity for personality variables were premature" (1996, p. 612).

Research regarding the use of personality measures for selection purposes continues to grow and the findings from these studies have been applied to a broad array of practical applications. Personality measures have been used for selection purposes in military, education, religious, and service organizations, as well as in a wide range of other work environments. Using personality measures for selection purposes has been applied to both small and large organizations. They have been used to select entry-level positions all the way up to CEOs of major corporations. Some organizations use traditional personality measures, while others rely on measures that were developed especially for business and organizational applications.

Of course in using personality measures there are some issues that need to be addressed. First, there is the issue of making sure that the personality traits assessed are correlated to some measure of performance. The construct of performance must be carefully determined and clearly defined. It must be decided whether performance will be judged by evaluating how effectively certain tasks are performed or if it will be a broader construct such as how an individual interacts with other members of the organization and contributes to the overall organizational

goals. Also, decisions of whether to use broad personality traits or narrow, more specific personality traits must also be determined. Each of these decisions will be highly influenced by the goals of the organization, the structure of the organization, and the specific job-related variables that apply to that particular job within that unique organizational setting. Finally, there are legal and ethical issues that must be addressed when using personality measures for selection.

The present study will attempt to address each of these issues and explore their applications in a relatively small, team-based manufacturing setting. It will chronicle this organization's adaptation of a selection model to its own unique environment and examine the success and pitfalls in their personnel selection approach. This small manufacturing company has some unique characteristics, but also presents many of the obstacles that other small organizations encounter when trying to implement a selection protocol that incorporates personality measures.

Research Questions

The following three research questions will be addressed in the current study:

1. How useful is the 16PF in predicting job performance in a small team-based organization?

2. In team-based organizations, should job specific or organizational-wide profiles be used for personnel selection?

3. Which type of personality traits (narrow or broad) are the best predictors of job performance?

4. Is the organization's current selection procedure, in which the 16PF is only used to generate interview questions, effective?

CHAPTER II

REVIEW OF THE LITERATURE

Personality measures are now used in many different settings as selection tools. Inwald and Brockwell (1991) used the Inwald Personality Inventory (IPI) and Minnesota Multiphasic Personality Inventory (MMPI) to predict performance for government security personnel as rated on a Four-point global performance scale by their immediate supervisor. The employees were rated after nine and twelve months of employment. They found that the MMPI could accurately predict employees' performance ratings 74.3% of the time ($p < .001$) and that the IPI could accurately predict the ratings 69.7% of the time ($p < .001$). Furthermore, they found that the IPI and MMPI could also be used together to accurately predict employee performance ratings 77.2% percent of the time ($p < .001$). This study illustrates the usefulness of personality testing in the field of personnel selection for security personnel.

Schmidt and Hunter (1998) reviewed the past 85 years of research findings in the area of personnel selection methods and conducted a meta-analytical study of prior findings. They concluded that a combination of integrity

tests and tests of general mental ability (GMA) were the strongest predictors of future job performance across occupations. They found that the combination of a GMA test and an integrity test produced a composite validity of .65. Additionally, they found that the combination of a GMA test and a structured interview produced a composite validity of .63. They found similar results when using performance in a job-training program as a criterion (.67 for a GMA test and an integrity test and .59 for a GMA test and a structured interview). They urge practitioners to use selection measures with the highest predictive validity and warn that failure to do so can have a substantial impact on productivity. They state, "In economic terms, the gains from increasing the validity of hiring methods can amount over time to literally millions of dollars" (1998, p.273).

The 16PF for Personnel Selection

Bartram (1992) notes that the Sixteen Personality Factor Questionnaire (16PF) is being increasingly used for employee selection purposes. He successfully used the 16PF to examine differences between managers and the general population in the United Kingdom. Statistically significant differences were found on all 16 scales (absolute t (4014)

> 13 in all cases, *p* <.001). Furthermore, Herman and Usita
(1994) conducted a study that used the 16PF to predict the
appropriateness of volunteers in the Big Brothers/Big
Sisters Organization. Appropriateness was based on review
of files and staff ratings. They conducted a stepwise
discriminant analysis and found that Apprehensive vs. Self-
Assured (O), Perfectionistic vs. Tolerates Disorder (Q3),
Dominant vs. Deferential (E), Abstract-Reasoning vs.
Concrete-Reasoning (B), Rule-Conscious vs. Expedient (G),
and High Anxiety vs. Low Anxiety (AX) were all predictive
of appropriateness. The discriminant function yielded an
over-all correct classification rate of 79.4% (N = 143,
canonical correlation = .54, Wilks λ = .70).

Batram (1995) conducted a study that used the 16PF and
Eysenck Personality Inventory (EPI) to predict training
outcomes in flying. The predictive validity of the study
was lower than expected (uncorrected composite validities
in the region of *r* = .20 - .30), but it was proposed that
the effects of range restriction were considerable with
this population. Wakcher, Cross, and Blackman (2003)
suggest that due to the high-risk nature of the occupation
of being a pilot, this population likely self-selects

itself and that there is a very consistent *pilot profile.*
Additionally, Batram found that the 16PF was better at
distinguishing between groups (e.g., officers vs. NCOs)
than the EPI. Overall, the 16PF accounted for larger
proportions of the criterion variance than the EPI and all
variance accounted for by the EPI was also accounted for by
the 16PF. Furthermore, Bartram purports that the 16PF has
some additional advantages over the EPI. The 16PF's greater
complexity and length makes the test less transparent to
the applicant and, therefore, less susceptible to faking.
The 16PF also has none of the medical questions found on
the EPI.

There is currently a large body of research that
correlates different scores on the scales of the 16PF with
many different occupations. Traditionally, this information
has been used in vocational psychology to help individuals
in occupational exploration (Cattell, Eber, & Tatsuoka,
1970). The manual for the 16PF reports a large number of
ideal profiles for a wide variety of occupations. This can
be very useful from the individual's point of view, but
employers are interested in how successful that individual
will be in their particular organization after the person
is hired. This requires organizations to go the extra step

and use empirical data to develop their own *ideal profile* for a particular job. Matching job applicants' personality profiles with an *ideal profile* developed from successful current employees will allow the organization to select potential employees with the greatest likelihood of succeeding within that organization.

It should be noted that the term *ideal profile* is being used here to describe the *ideal profile* for individuals who are high performers in a given job. The term is not being used in the context of describing an ideal fit of an applicant into the organizational culture or environment. This distinction is critical in the area of personnel selection. In practice, if an organization were attempting to develop a selection protocol that selected employees who fit their organizational culture, that organization would first have to administer the personality instrument to their current employees and develop an *ideal organizational profile.* Then when future applicants applied to the organization, their personality profiles would be compared to the *ideal organizational profile* to see how good of a fit they were. The problem is that if an organization only hires applicants who resemble their current employees, the organization may therefore, be

discriminating against applicants who do not resemble the current employee profile. This issue is avoided by linking personality characteristics to job performance. Consequently, the organization is simply using personality factors to help select the candidate who will best perform the job.

The Five Factor Model/The Big Five

Digman (1990) conducted a thorough review of the history of the Big Five. He indicated that early researchers in the 1920s and 1930s began to develop personality factors based on the organization of language. This research continued to develop through the 1960s when Norman (1963) developed a five factor taxonomy that eventually became know as Norman's Big Five. Since that time there has been over forty years of systemic trait research that has generated five broad constructs that have become the "Big Five" as they are now known (Extraversion, Emotional Stability, Agreeableness, Conscientiousness, and Openness to Experiences). Digman stated, "It now appears quite likely that what Norman (1963) offered many years ago as an effort 'toward an adequate taxonomy for personality attributes' has matured into a theoretical structure of

surprising generality, with stimulating links to psycholinguistics and cross-cultural psychology, cognitive theory, and other areas of psychology" (1990, p. 418).

It should be noted that the Big Five Model (BFM)developed out of a lexical tradition whereas the Five Factor Model (FFM) had its origins in a cluster analytic study of Cattell's 16PF (Davis & Million, 1999). The five domains of the BFM are compared to the FFM in Table 1. Although there are differences between the two models, for simplicity and parsimony, the term BFM will be used interchangeably with the FFM, both terms referring specifically to the FFM used in the NEO-PRI.

Table 1

Normal Personality Domain	
Lexical "Big Five" Model	Five-Factor Model
1. Surgency (or Extraversion)	1. Extraversion
2. Agreeableness	2. Agreeableness
3. Emotional Stability (vs. Neuroticism)	3. Neuroticism
4. Conscientiousness	4. Conscientiousness
5. Intellect (or Culture)	5. Openness to Experience

Costa and McCrae (1992) developed the Five Factor Model (FFM) of personality traits as part of their development of the NEO-PI. Their five factors were: Neuroticism, Extroversion, Openness, Agreeableness, and Conscientiousness. These have become the most commonly used implementation of the Big Five. Since Costa and McCrae's original proposal of the FFM, there has been a vast amount of research using these five global traits for the purpose of personnel selection, which includes a large body of meta-analytic studies that support the relationship between the Big Five and job performance criteria (Barrick & Mount, 1991; Salgado 1997; Tett, Jackson, & Rothstein, 1991; Vincher, Schippmann, Switzer & Roth, 1998). Barrick and Mount originally found that Conscientiousness was "consistently a valid predictor for all occupational groups studied and for all criterion types" (1991, p.18). There has been such a volume of research conducted in the area that Barrick, Mount, and Judge (2001) call for a moratorium on meta-analytic studies that investigate the link between the FFM personality traits and performance. They summarize 15 meta-analytic studies and conclude that conscientiousness is a valid predictor across performance measures in all areas, and that emotional stability

appeared to be a generalizable predictor when overall work performance was the criterion, but its relationship to specific work criteria and occupations was less consistent than conscientiousness.

It should be noted that not all researchers agree that the construct of conscientiousness might be the 'g' of personality and the best predictor of performance in most occupational areas. Robertson et al. (2000) conducted a study that examined the relationship between conscientiousness and managerial performance. They suggest that some of the qualities associated with the low-end of the conscientiousness scale (i.e., nonconforming, rebellious, and unconventional) are, at least some of the time, linked to managerial success. It is unlikely that managers who have extremely low scores on conscientiousness would be successful as managers, but modest tendencies towards some of these features may well be useful. In a sample of 437 managers in the United Kingdom, Robertson et al. found no relationship between conscientiousness and job performance (r = .09). Instead, they found a negative correlation between conscientiousness and job promotability (r = -.20, p <.001, two-tailed) where both job performance and promotability were determined by supervisor ratings. It

is suggested that although conscientiousness may be linked to performance in many occupations, there is evidence that it should not be considered the 'g' of personality related to job performance. There are still other researchers that call into question the statistical methodology of the meta-analysis (Schmidt, Gooding, Noe, & Kirsh, 1984; Hermelin & Robertson, 2001). Schmidt, Ones, and Hunter point out several inconsistencies in the statistical methodology of some of the meta-analytical findings and suggest, "different decisions by meta-analysts (e.g., about which studies to include) can result in somewhat different final numerical results (correlation and effect size estimates)" (1992, p.628). However, they purport that most differences are not in the numerical results, but in the substantive interpretations of results, which is not a fault of the procedure itself.

Salgado (2003) reported that there are currently over fifteen inventories that have been specifically developed within the Five Factor Model (FFM) framework and used in organizational settings. He urges the adaptation of these FFM-based instruments as opposed to non-FFM-based instruments. He found that Conscientiousness and Emotional Stability (low end of Neuroticism scale) showed higher

operational validity when assessed by FFM-based instruments than by non-FFM-based inventories. Considering that the results of the meta-analytical studies mentioned above suggest that these two factors may be the strongest link between personality and performance, this is strong evidence to support the use of FFM-based instruments in personnel selection.

There is also a significant body of research linking the FFM to other work-related criteria such as absenteeism and counterproductive behaviors (Judge, Martochio, & Thoresen, 1997; Salgado, 2002). Judge et al. (1997) found that in a sample of 89 non-academic university employees, the control variables and the Big Five traits accounted for 30% of the variance in absence. Conscientiousness and extroversion were the strongest predictors, but part of that relationship was mediated through absence history. Salgado conducted a meta-analysis that examined the relationship between the FFM and counterproductive behaviors. He did not find a strong relationship between any of the five factors and absenteeism (r = -.06 to .08) or accident rates (r = -.09 to -.08), but did find that conscientiousness (r = .26), and agreeableness (r = .20) were valid predictors of deviant behaviors (e.g., theft,

drug and alcohol use). Salgado also found that the lack of

turnover was predicted by all of the five personality

dimensions. Emotional stability was the best predictor of

lack of turnover with an operational validity of *rho* = .35

(*rho* = *r* corrected for criterion reliability and range

restriction in predictor), followed by conscientiousness

with an operational validity of *rho* = .31, and

agreeableness with *rho* = .22. The data suggest that the FFM

cannot only be used to predict performance, but also

behaviors that are considered to be detrimental to

productivity.

The Bandwidth-Fidelity Argument

There has been much discussion of the issue of

bandwidth-fidelity within the literature pertaining to

personnel selection and personality factors (Hogan &

Roberts, 1996; Ones & Viswesvaran, 1996; Paunonen,

Rothstein, & Jackson, 1999). The crux of this dilemma is

whether researchers and practitioners should use narrow or

broad traits when using personality factors to predict

performance. Murphy describes this dilemma: "In

psychological testing, there is an 'inevitable' trade-off

between attaining a high degree of precision in measurement

of any one attribute or characteristic, and obtaining information about a large number of characteristics" (1993, p. 139). The bandwidth-fidelity trade-off argument states that broad, global, constructs should be able to predict broad criteria with moderate validity. Conversely, narrow, specific constructs should be able to predict specific criteria with maximal validity (Ones & Viswesvaran, 1996). This would suggest that narrow constructs would be preferred by practitioners who have the goal of selecting job applicants who will perform better at specific job-related tasks.

Other researchers have argued that this bandwidth-fidelity argument is just a statistical artifact and broader traits should be used (Hogan & Roberts, 1996; Ones & Viswesvaran, 1996). This position supports the current climate of moving towards the Big Five personality factors that have become widely accepted in the field of industrial organizational psychology (Cascio, 1998). The Big Five typology is extremely useful to researchers in that it provides a common terminology to discuss and research personality factors and it allows for the combination of data from many different studies. This is a critical component of theory development and testing (Ones &

Viswesvaran, 1996). By limiting the scope of these instruments to standardized global factors, it lays the corner stone for meta-analytic reviews of the research. Thus, meta-analytically focused researchers who may be more concerned with theory building often have very different views than practitioners regarding the appropriate level of analysis.

Ashton (1998) suggests that broad factor supporters use the argument that test manuals indicate that the Big Five traits have higher reliabilities than do the narrow subscales, but that this actually follows directly from psychometric theory. He indicated that any group of positively intercorrelated subscales will produce a composite scale whose reliability exceeds that of the average of those subscales. Ashton argues that despite the increase in reliability, it does not follow that the broad scales will be a better predictor of a given criteria than all of the narrow scales that constitute the broad scales. He explores this issue in a study where he uses the scales from the Jackson Personality Inventory as predictors of performance with a sample of 127 entry-level employees. He found that two narrow traits, Responsibility and Risk Taking scales, had higher validities than the Big Five

dimensions with respect to job performance. He used a self-reported measure of involvement in delinquent workplace activities as his performance measure. The correlation of the unit-weighted sum of the Responsibility and Risk Taking scales was $r = -.45$, while he found the two most powerful broad factors (agreeableness and conscientiousness) to have a unit-weighted sum correlation of $r = -.38$. No other factor yielded a statically significant correlation with delinquency. Although the narrow factors were found to be only slightly better predictors, this study provides clear evidence that narrow factors should not be ignored simply because they are not as useful in meta-analytical research.

Contextual and Task Performance

Another pertinent issue in the job performance literature is the difference between contextual and task performance. Borman and Motowidlo defined task performance as "the effectiveness with which job incumbents perform activities that contribute to the organization's technical core either directly by implementing part of its technological process, or indirectly by providing it with needed materials of services" (1997, p. 99). For example, the task performance dimensions for the job of a

firefighter include performing rescue operations, conducting salvage operations, and applying ventilation procedures. Each one of these specific tasks relates to the individual's overall job performance.

Borman and Motowidlo (1997) argue that contextual performance is fundamentally different from task performance. Contextual performance does not support the technical performance directly, but instead, it creates and maintains the psychological, social, and organizational environment in which the task performance takes place (Borman & Motowidlo, 1993; Hogan, Rybicki, Motowidlo, & Borman, 1998). Contextual performance involves such behaviors as volunteering to participate in tasks that are not formally part of the job and working with others within the organization to get tasks completed. Contextual performance is similar to the concept of *organizational citizenship behavior* (OCB), which was originally introduced by Smith, Organ, and Near (1983). Borman, Penner, Allen, and Motowidlo (2001) purport that an important distinction between task performance and contextual performance is that task activities vary across jobs and citizenship activities are similar across jobs.

Many researchers have also found empirical evidence that supports the distinction between contextual and task performance. Conway (1996) conducted a study using a multitrait-multirater analysis that provided construct validity in the task/contextual performance distinction. He found higher correlations for dimensions within a domain (.70 and .70 for task and contextual performance) than between domains (mean correlation = .55). Motowidlo and Van Scotter (1994) explored how each domain related to an overall rating of performance. They found that the correlation between task performance and overall performance ratings was .43. The correlation between contextual performance and overall performance ratings was .41. This evidence lends support to the idea that task and conceptual performance are both related to overall performance.

Hurtz and Donovan (2000) conducted a meta-analysis that examined the relationship between the Big Five and contextual performance. This study was conducted by partitioning performance into the following categories: task performance, job dedication, and interpersonal facilitation. They found that conscientiousness predicted all three of the performance dimensions equally well ($p_v =$

.15 - .18) and the same was found for emotional stability

(p_v = .15 - .16). However, agreeableness emerged as a

potentially valid predictor, predicting interpersonal

facilitation just as well as conscientiousness and

emotional stability. The authors suggest that the

relationship between personality and performance may be

more complex and not as strong as other researchers have

suggested. They purport that factors other than

conscientiousness may have an impact on performance

depending on the type of job and the importance of

contextual factors. They strongly urge that more research

be conducted in this area. Mount, Barrick, and Stewart

(1998) found similar results and concluded that

conscientiousness, agreeableness, and emotional stability

are positively related to performance in jobs involving

interpersonal interactions. Their findings also suggest

that emotional stability and agreeableness are more

strongly related to performance in jobs that involve

teamwork (r = .27 and r = .33, respectively) than in jobs

that do not (r = .12 and r = .13, respectively).

RIASEC Theory

There is also a large body of research that focuses on how occupational identities and work environment affect performance (Fritzsche, Powell, & Hoffman, 1999; Hogan & Shelton, 1998). Holland (1973) classified people and work environments as six types: realistic (R), investigative (I), artistic (A), social (S), enterprising (E), and conventional (C). Holland purports that both people and work environments can be classified using his taxonomy and that people tend to seek out work environments that are congruent with their personalities. Person-environment congruence is expected to lead to positive outcomes for the individual, such as greater work achievement and job satisfaction. Hogan and Shelton (1998) purport that people choose their occupations based on their personalities, and employer's appraisals of their performance are influenced by how well those identities are conveyed to them.

Fritzsche, McIntire, and Yost (2002) conducted a study that explored the value of using Holland's personality and work environment types as a moderator to improve predictions of the personality-performance relationship. They found that across all participants, personality accounted for only 2-3% of the variance in performance, but

when the data were analyzed by RIASEC type, they accounted for more than 9% of the variance. Results indicated that agreeableness was a better predictor of performance in investigative, artistic, and social environments than in realistic, enterprising, and conventional environments. Conscientiousness appears to best predict performance in social and investigative environments. This adds additional support to the argument against viewing conscientiousness as the 'g' of the personality-performance relationship and suggests that individual and job-environment interaction needs to be explored further to better understand its impact on performance.

Situational Constraints

There is a growing body of research that looks at the role that situational constraints play in job performance. Situational constraints are those aspects of a job that are outside of the control of the employee. In their early work in this area, O'Connor et al. (1984) operationally defined situational constructs to include job-related information, tools and equipment, materials and supplies, budgetary support, required services and help from others, task preparation, time availability, and work environment.

O'Connor et al. found that situational constraints correlated $-.12$ ($p < .001$) with overall performance. These correlations were much lower than expected. More recent studies have begun to call these early results into question. Villanova (1996) argues that most of the findings from these early studies are contaminated by poor research design. For example, Villanova calls into question the exclusive use of single-panel designs and poorly developed self-report constraint information. In another study, Kane (1997) attempted to control for some of the deficiencies in the early research and found that a perceived constraint measure explained 69.7% of the variance in the performance measure. It would appear that situational constraints may play a larger role in performance measures then previously thought.

This is an important development in terms of personnel selection. The goal in constructing a personnel selection battery is to make a strong connection between pre-employment selection measures and performance. If performance were artificially suppressed due to external factors, it would have a direct effect on this relationship. The amount of situational constraint is obviously job specific. Certain jobs where there is a lot

of autonomy, such as outside sales, may have few situational constraints, while other jobs, such as working on an assembly line, may have significant situational constraints. Additionally, Kane (1997) purports that situational constraints vary between different tasks within a particular job. Performance on some tasks may receive little or no influence from situational constraints while performance on other tasks may be almost totally dictated by situational constraints. Therefore, researchers in personnel selection should be aware of the impact of situational constraints for each measure of performance that they use.

Score Correcting

The issue of how to best control for participants trying to present themselves in the best possible light needs to be taken into consideration when discussing personality-based selection instruments. Hogan and Hogan (1992) suggest that the possibility that personality measures are susceptible to dissimulation is probably the most frequently cited criticism regarding the use of personality measures in applied settings. Hough et al. (1990) found that a faking response set failed to moderate

the relationship between a personality measure and job performance. They conclude that correcting for faking is not necessary when using personality measures for selection purposes.

Christiansen et al. (1994) conducted a study that specifically examined how faking influenced a selection model based on the 16PF. Their study examined the results of 495 assessment center candidates in a large forestry products organization. They used both the Krung approach and the partialling approach to correction. They found that all multiple correlations were within the .36 to .39 range, regardless of whether a correction for faking was used or not. The authors conclude that corrected scores should not be used and that if faking is suspected, it is better advised to use the faking scales as predictors in a multiple regression equation along with other relative traits.

Legal Issues

There are numerous legal issues that arise when using personality measures as pre-employment selection tools. Cascio (1998) points to several key case law decisions that affect the employee selection process. The Supreme Court

found in *Griggs v. Duke Power Company* (1971) that any given requirement for employment has to be related to job performance. The Supreme Court went on to find in *Albemarle Paper Co. v. Moody* (1974) that organizations not only have to show that a pre-employment test is relevant for employees at that organization in general, but the test is relevant for the specific job for which that applicant applied. Therefore, an organization can legally use any measure, including personality measures, as long as that organization empirically proves that the measure is related to the performance of the specific job that the applicant is applying for. All organizations are required to empirically validate any selection measure if any subgroup's performance on the measure is less than 80% of the level of the highest performing subgroup.

A second issue that arises when using personality measures for selection purposes is whether or not the measure meets the guidelines set forth by the American Disabilities Act of 1990 (ADA). As noted by Cascio, "Section 102 (c)(3) of the ADA specifies that an employer may not 'conduct medical examinations or make inquiries about the existence, nature, or severity of a disability of a job applicant until after making a conditional offering

of employment, and then only when the results of the

medical examination are job related" (1994, p. 199).

Therefore, if a personality measure's primary purpose is to

diagnose psychological disorders, it may be problematic to

use that instrument for pre-employment selection purposes.

Inwald and Resko (1995) purport that certain tests

such as the Minnesota Multiphasic Personality Inventory

(MMPI), because of their diagnostic nature and their

prominence in medical settings, should not be used as a

pre-employment selection instrument. But what about other

personality measures, such as the Sixteen Personality

Factor Questionnaire (16PF) and the Myers-Briggs Type

Indicator (MBTI), which are sometimes used in medical

settings but differ from the MMPI in that they are less

diagnostic of psychopathology in nature and were developed

to be used with normal populations instead of clinical

populations? Inwald and Resko (1995) argue that any

instrument used in any medical setting is in direct

violation of the ADA guidelines. Cascio (1994) takes a

slightly more moderate stance on the issue. He argues that

the important issue is the intended use of the results of

the measure. Cascio states that employers should be able to

use a broad range of personality measures during pre-

employment screening "as long as the purpose of the
assessment is to predict necessary, job-related behavior,
rather then to diagnose disability" (1994, p. 200). To be
safe, practitioners should be vigilant in following any
regulations made by the Equal Employment Opportunity
Commission (EEOC) or any relevant legal case decisions.

Posthuma (2002) makes the argument that selection
procedures, such as personality tests, can be used even if
they have an adverse impact on a particular group, as long
as the employer can justify the selection procedure. He
provides a detailed legal framework of how to justify the
use of a selection procedure with adverse impact. He
stated:

In general, the Guidelines (*Uniform Guidelines for
Employee Selection*) require employers to collect data
to determine if their selection practices have adverse
impact. If there is adverse impact, the Guidelines
state that selection practices should be both
validated and evaluated for fairness to the extent
feasible. The Guidelines also specify how test
validation should proceed. Finally, the Guidelines
indicate that test users should consider the

usefulness of alternative tests, which may reduce

adverse impact (2002, p. 62).

Posthuma further suggests that changes mandated by federal

legislation and the courts, along with professional

organizations such as APA and SIOP updating their testing

guidelines, may prompt the EEOC to consider revising its

guidelines in the near future.

Statement of Problem

All of the issues discussed thus far regarding the use

of personality testing for selection are relevant in

applied settings. The organization in this study has made

some unique attempts to use personality testing in their

selection process while staying within legal boundaries.

How the organization uses personality instruments differs

significantly from common practice. This organization has a

consultant administer the 16PF to perspective employees.

However, instead of using the test results to determine if

the perspective employee has personality traits that are

empirically related to performance, they have the

consultant generate a list of applicant-specific, job-

relevant interview questions that are then used by the

organization during a subsequent interview. These

behaviorally-based questions help the hiring manager probe areas of potential concern (e.g., low group orientation or low rule consciousness).

It is not the purpose of this study to explore the legality of this strategy, rather, this company's selection process provides a unique set of data that allow for the examination of the effectiveness of their approach to selection testing. It also allows for the comparison of such a process to empirically-based approaches such as profile matching.

The study will first address the broad question of how useful personality measures, specifically the 16PF, are in predicting job performance in a small manufacturing setting. Although this study focuses on a small manufacturing setting that emphasizes a team-based work environment, which differentiates it from most other studies in the literature, this part of the study should still be viewed as a basic replication study. The organizational culture and structure is primarily focused on contextual performance in that all production activities are done through a team-based approach. As mentioned before, there is significant evidence supporting the use of personality measures in predicting job performance,

including contextual performance. Since the relationship between personality and job performance appears to be rather robust, it is hypothesized that the 16PF will be able to identify differences in successful and unsuccessful press operators' personality profiles. It is felt that the 16PF addresses a wide range of personality factors that are relevant towards job performance and, therefore, will be able to identify differences in successful and unsuccessful employees. If this hypothesis is supported, this study will add further support to the link between personality and performance in the personnel selection literature.

The second research question that will be addressed concerns the use of personality measures in a team-based organization. It is widely accepted that if personality measures are going to be used for selection purposes, they need to be linked to specific job-related behaviors (Cascio, 1998; Robertson & Smith, 2001). Typically, this involves linking personality characteristics to specific work-related behaviors for a particular job title. It seems logical that different sets of personality characteristics could be linked to performance on different types of jobs. How does this logic apply to an organization that is team-based where the stated primary performance goal for all of

its employees is being a "good" team member? Should the organization still look for a job-specific personality profile or should they attempt to develop an organization-wide personality profile? It is hypothesized, due to situational constraints and other job-specific variables, that greater differences in personality profiles between successful and unsuccessful employees will be found when contrasting job-specific profiles. If validated, this would provide support for the current practice of developing job-specific profiles even when the performance criteria are not job specific.

The third research question that this study addresses is the bandwidth-fidelity question discussed earlier. The design of the 16PF allows for the unique opportunity to not only examine the instrument's utility as a selection tool, but also to compare narrow and broad traits. The 16PF reports on sixteen narrow factors and five global factors (described later). This study will examine which type of traits (narrow or broad) are better predictors of job performance. It is hypothesized that the narrow scales will prove to be better predictors of performance in this setting. If this hypothesis is supported, it will provide additional evidence that narrow factors should not

arbitrarily be rejected in favor of broad factors due to the recent wave of meta-analytical research focusing on the Big Five. It will lend support to the practice of using narrow factors if it can be proven that they are, in fact, better predictors in a particular setting.

The final issue that the study will address is whether or not the organization's current selection procedures, in which personality measures are given only to help generate interview questions, are effective. It is hypothesized that using this non-empirically based method of administering personality measures for selection purposes will not be a valid means of selection. This will be determined through a backwards cross-validation procedure. If this hypothesis is supported, it will further strengthen the argument that empirical validation studies are a critical component when using personality measures for selection purposes.

CHAPTER III

METHOD

The purpose of this study was to examine the ability of the 16PF to discriminate between successful and unsuccessful employees in a small, team-based manufacturing organization. As part of this analysis the issue of whether broad or narrow personality traits serve as better predictors of job performance, along with the issue of whether or not company-wide profiles are appropriate when used in team-based organizations was addressed. Additionally, the study examined the effectiveness of the company's current selection procedures.

Participants

The participants in this study were prospective employees who were tested as part of their application for employment procedures at a mid-western manufacturing company. Over a three-year time period 363 applicants (275 male and 88 female) were tested. Of these 363 applicants, 129 (103 male and 26 female) were selected for employment with the organization. Appendix A lists all of the jobs that applicants applied for and the percentage of applications that correspond with each of those jobs. The

company produces printed plastic packaging materials, which
involves the use of multiple large-scale industrial
printing presses. The primary entry-level job applicants
were applying for was the Assistant Press Operator (APO)
position, the job for which 211 of the 363 applicants
tested were applying. The size of the final group of
participants who were hired and analyzed in the Assistant
Press Operator comparisons was 80 employees (76 male and 4
female). A power analysis for a zero-order correlational
analysis with N = 80 yielded a power (1-β) of .4367 (α=.05,
r = .20). A power analysis for all hired employees (N =
129) yielded a power (1-β) of .6323 (α = .05, r = .20).
Finally, a power analysis for the entire applicant pool (N
= 363) yielded a power (1-β) of 97.24 (α=.05, r = .20)
(Buchner, Faul, & Erdfelder, 1997). The r = .20 level was
chosen based on Batram's (1995) findings of r's in the .20
to .30 range using the 16PF. Job requirements varied by
position. There were no minimum educational requirements
for the job of Assistant Press Operator, so applicants had
a wide range of educational backgrounds. The sample sizes
for each of the groups that will be compared are presented
in Table 2.

Table 2.

Sample Sizes for Each Comparison

Group	Level	N	Research Question
Successful Employees	Job-Specific	28	1,2,3
Unsuccessful Employees	Job-Specific	17	1,2,3
Successful Employees	Company-Wide	50	1,2,3,4
Unsuccessful Employees	Company-Wide	27	1,2,3,4
Hired Applicants	Company-Wide	129	4
Not Hired Applicants	Company-Wide	234	4

Instruments

Sixteen Personality Factor Questionnaire. The Sixteen
Personality Factor Questionnaire (16PF) is an instrument
that provides a total of twenty-four scales, which include
sixteen primary factor scales, five global scales, and
three validity scales (Russell & Karol, 1994). Cattell
developed the 16PF through factor analysis of questions
that were believed to be related to personality. He
identified 16 traits he considered to be "primary" to human
personality (Mitchell, 1985). The scales are: reserved vs.
warm (A), concrete reasoning vs. abstract reasoning (B),
reactive vs. emotionally stable (C), deferential vs.
dominant (E), serious vs. lively (F), expedient vs. rule-
conscious (G), shy vs. socially bold (H), utilitarian vs.
sensitive (I), trusting vs. vigilant (L), grounded vs.
abstracted (M), forthright vs. private (N), self-assured
vs. apprehensive (O), traditional vs. open to change (Q1),

group-oriented vs. self-reliant (Q2), tolerates disorder vs. perfectionistic (Q3), and relaxed vs. tense (Q4). The five global scales are Extroverted vs. Introverted (EX), High Anxiety vs. Low Anxiety (AX), Tough-Minded vs. Receptive (TM), Independent vs. Accommodating (IN), and Self-Control vs. Unrestrained (SC). The 16PF also includes three validity scales: impression management (IM), infrequency (INF), and acquiescence (ACQ). The 16PF contains 187 items and requires from 25 to 50 minutes to complete. The 16PF can be scored using male, female, or combined norms. In this case, the company had previously chosen to use the combined norms and, therefore, that data will be used in the current analysis. Hofer and Eber (2002) note that the 16PF has been included in over 2100 publications since 1974.

The 16PF is better suited for personnel selection purposes than some of the other personality inventories such as the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) because it is primarily concerned with measuring personality attributes of normal rather than pathological populations (Walsh & Betz, 1995). Since the 16PF was designed to be used with normal populations, it is

conceptually better suited for use in organizational settings.

The 16PF was originally published in 1949. One of its main strengths is that it is a well-established research instrument that has withstood the test of time. There is a vast body of research supporting both validity and reliability issues with the 16PF. Items on the most recent edition, the fifth edition, have been revised to update language, remove ambiguity, and diminish unnecessary length. Items were also reviewed for gender and racial bias (Rotto, 1995). For the fifth edition, which was published in 1994, data indicate test-retest reliability coefficients of scores from the 16PF for a two-week period were very good for the global factors (ranging from .84 to .91). Test-retest reliability coefficents for scores on the primary factors ranged from .69 to .91. At the two-month interval, test-retest reliability dropped to a mean of .78 for scores on the global factors and a mean of .70 for scores on the primary factors. Internal consistency was calculated with Cronbach's coefficient alpha and values ranged from .64 to .85 with a mean .74. The standard error of measurement is within an acceptable range given the purpose and scope of the test (McLellan, 1995).

The five global factors on the 16PF were developed through factor analysis of the primary scales (Russell & Karol, 1994). These global factors have traditionally been called "second-order" factors in the 16PF literature. Cattell (1993) argues that although the global factors on the 16PF were developed long before the advent of the "Big Five," the two line up relatively well. Conn and Rieke (1993) found the NEO Personality Inventory (NEO-PI) Neuroticism dimension lines up with the 16PF Anxiety factor (r = .75); the two Extroversion dimensions also correlate well (r = .65); the NEO-PI Conscientiousness dimension corresponds to the 16PF Self-Control (r = .66); the NEO-PI Openness to Experience factor corresponds to the low end (sensitivity, intuitive, open to change, imaginative) of 16PF Tough-Mindedness (r = .56); and the NEO-PI Agreeableness factor correlates with the low end (Accommodating) of the 16PF Independence (r = .42).

Job Performance

Employees were classified as successful employees or unsuccessful employees based upon whether or not they were a current employee or had been involuntarily terminated. This method was chosen due to inconsistencies and constant

changes in other types of performance records the company collected. This approach for classification may be considered vague in some situations, but is well suited for this particular setting because of the organization's termination procedures. The organization has worked very closely with a legal consultant to develop a strict termination policy. Involuntary termination must be based on very specific criteria that are related to individual and team performance. Employees are given an Unacceptable Performance Notification (UPN) if they are not in compliance with company standards. A UPN can be classified as a major or minor violation. Two minor violations or one major violation is cause for dismissal.

Involuntarily terminated employees were chosen to represent the unsuccessful group after talking with company management. Management reported that the economic environment in the community where the company is located was thriving during the period of time when the data were collected and that the company actually had difficulty remaining fully staffed. It was common for employees to leave because another near-by company offered them higher wages. Management indicated that employees who left voluntarily typically included some high performers and,

thus, were not a good sample of unsuccessful employees; whereas, all employees who were involuntarily terminated were considered to be unsuccessful by management. Therefore, success in this study is defined as not being involuntarily terminated.

Procedure

The company contracted an outside consultant to administer the 16PF to all qualified job applicants from 1997 until 2000. A qualified applicant is an applicant who has passed the company's initial screening interview that focuses mainly on criteria such as relevant work history and references. The 16PF test results have been archived by the organization's human resources manager along with employment records. This information was made available for the purpose of this study.

All data were collected through the human resources manager and entered by the researcher for analysis. Data were collected in a manner where only a representative from the company had any direct contact with the personnel records to assure that complete confidentiality was ensured. The only data that were collected were the gender of the applicant, the job title for which they applied,

whether or not they were selected for employment, their current employment status (i.e, currently employed, voluntarily terminated, involuntarily terminated), and scores from the 16PF profile. Each profile was assigned an anonymous identification number and the researcher never had any contact with the actual employees or any documentation that included their names or identifying information. Profile analysis was used to detect differences between the personality profiles of each of the groups. Data analysis was conducted using the SPSS and SAS statistical packages.

Data Analysis

There are many ways in which personality profiles have been dealt with in the literature (Edwards, 1993; Stevens 1986; von Eye 1990). Some measures call for the aggregation of profiles into groups, such as high and low performers, and then the examination of the differences between the profiles. This approach is what Stevens (1986) refers to as a profile analysis, and is best suited for examining differences between two or more naturally occurring groups. There are several different approaches that researchers can employ to analyze profile data (von Eye, 1990; Waller &

Meehl, 1998), but due to the sample size restraints that often occur in practical applications, many researchers and practitioners alike use what is known as profile similarity indices (PSI) when comparing different groups of profiles (Edwards, 1993, 1994).

Edwards (1993) argues that the term PSI is a broad term that is used to describe an approach that compares profiles on two different levels. One of these categories consists of indices that are derived from the sum of the differences between profile elements. For example, D^2 represents the sum of the squared differences between the profile elements. This does not indicate the direction of any of the differences for any of the elements. The second category of PSIs consists of indices representing the correlation between two profiles. Each of these statistics gives information about the profiles that are independent of one another. It is critical that both of the procedures be conducted because having both pieces of information is the only way in which the profile can be looked at as a whole. For example, if a researcher chose only to use the mean difference in comparing two profiles, there is a possibility that the mean differences of each of the scales would be exactly the same, but the shape of the two

profiles could be radically different. This is because the mean differences do not take into account on which scales the differences occur. Thus, both methods must be used. Ideally, the profile of a good job applicant would have a high correlation with the "good performance" profile and have a low mean difference.

The previous approach to analyzing profiles is often used in predicting future job performance for job applicants. Arthur, Woehr, and Graziano suggest that this approach is very useful in the person-organizational fit framework in that it takes into account the "totality of an applicant's personality" (1997, p. 12). This approach is ideally suited for a study that is comparing profiles from two groups of participants who are classified by a categorical variable such as the classification of successful and unsuccessful employees.

In this study, all of the applicants were first classified by the job they were applying for and whether or not they were hired. Next, all hired employees were classified by their employment status: current employee, voluntary termination, or involuntary termination. All 16PF data were entered and mean profiles for the following

groups were generated using both the five global factors and the sixteen narrow factors:

1. Hired Applicants
2. Non-Hired Applicants
3. Hired Assistant Press Operator Applicants
4. Non-Hired Assistant Press Operator Applicants
5. Current Employees
6. Involuntarily Terminated Employees
7. Current Assistant Press Operators
8. Involuntarily Terminated Assistant Press Operators

The results from those profiles were analyzed in a series of paired comparisons and the first three research questions were answered by the following sets of comparisons: Successful vs. Unsuccessful (company-wide) and Successful vs. Unsuccessful (APO). Separate profiles were developed using both the sixteen narrow factors and the five broad factors.

First, a descriptive correlation was conducted, which involves graphically superimposing one group's profile over the other, visually inspecting the shape of the profiles, and then calculating the correlation of the means of the two groups on each of the scales. If the 16PF is differentiating between the two profiles, then there should be noticeable differences in the overall general shape of the two profiles and the correlations should be low. Next, the differences on each of the scales were assessed by

calculating the effect size (*d*) for the scores from the two groups on each of the scales. The effect sizes were calculated using the pooled standard deviations. After the effect sizes were calculated, they were corrected for unreliability using the formula purposed by Hunter and Schmidt (1990). The formula corrects for unreliability by dividing the effect size by the square root of the reliability coefficient (*r*) listed the 16PF manual. The 16PF manual only provides reliability coefficients for the 16 narrow factors so the reliability coefficients for the broad factors had to be computed using the procedure described by Mosier (1943) from: the primary scale intercorrelation matrix; the primary factor alphas; and the second-order factor score weights. The reliability coefficients for the broad factors are presented in Table 3. These results are similar to what Bartram (1992) found when using a prior version of the 16PF.

Table 3

Broad Factor Reliability Coefficients

Broad Factors	Alpha	Bartram Results
Extraversion	0.90	0.90
Anxiety	0.89	0.92
Tough-Mindedness	0.81	0.71
Independence	0.79	0.89
Self-Control	0.85	0.82

If the profiles of the two groups are different then the shape of the two profiles will be different and the effect sizes on each of the scales will be large. The average of the absolute effect sizes (mean of corrected |d|) from each of the individual scales will be calculated so that the difference in the sixteen-factor comparison can be compared to the difference in the five-factor comparison. This was critical in answering the third research question regarding broad and narrow traits.

Finally, a logistic regression was performed in which each of the scales from the 16PF were used as predictors with current job status (successful employee vs. involuntarily terminated employee) as outcome. A logistic regression was conducted for each of the comparisons and addresses how well the factors as a whole predict success.

The same analytical procedure was used to answer the fourth research question that examines the company's current selection process. A backwards cross-validation procedure was conducted to see how well the current selection procedure discriminated between successful and unsuccessful employees. The profiles of all applicants who were hired were compared first to the profiles of employees who were successful and then to profiles of unsuccessful

employees. If the current selection procedure is effective,
the profiles of applicants who were hired should be similar
to the profiles of successful employees and be dissimilar
to profiles of unsuccessful employees. Profiles of
applicants that were not hired should be similar to
unsuccessful employees and dissimilar to successful
employees. This model is presented in Figure 1. If all four
of these tenets are met, then it will provide evidence that
the company's current selection process of generating
interview questions from the results of the 16PF is
effective.
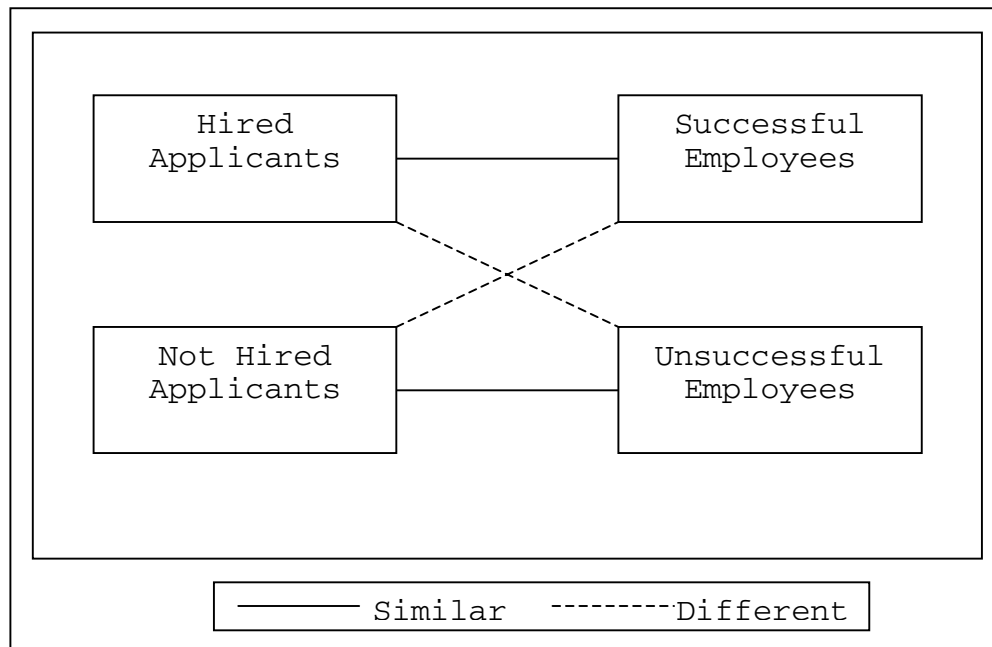
Figure 1. Ideal Cross Validation Results

CHAPTER IV

RESULTS

This chapter presents the statistical results obtained from the research data. The first three research questions (which are all inter-related) will be addressed in the first part of the data analysis and the fourth research question will be addressed in the second part of the analysis. The results are organized in this manner because the first three research questions are answered by comparing the same sets of data (successful vs. unsuccessful employees) on both the broad and narrow factors, comparing both job-specific and company-wide profiles. The second stage of the analysis will examine the utility of the organization's current selection procedures.

Research Questions One, Two, and Three

According to the first hypothesis, the 16PF should be able to predict differences between successful and unsuccessful employees. This question was addressed by analyzing the profiles of employees who were considered to be successful versus the profiles of employees who were involuntarily terminated (unsuccessful). The second hypothesis states that job-specific profiles should be able

to discriminate better between successful and unsuccessful employees than company-wide profiles. The third hypothesis suggests that the sixteen narrow factors will be more effective than the five broad factors in discriminating between high and low performers. All of these questions will be answered by the following comparisons:

    1. Assistant Press Operators (APO)
        a. Successful vs. Unsuccessful (16 Factors)
        b. Successful vs. Unsuccessful (5 Factors)
    2. All Employees (company-wide)
        c. Successful vs. Unsuccessful (16 Factors)
        d. Successful vs. Unsuccessful (5 Factors)

Job Specific Sixteen Factor Comparison. The first step in the profile comparison was to create a graphical representation of the means of the two groups (Appendix B). It was hypothesized that the shape of the two graphs would be different. If true, the correlation between the two profiles should be low and the effect sizes should be large. An examination of the graphed results reveals that the overall shape of the two profiles was found to be similar and the means are highly correlated (r = .92). The descriptive statistics and effect sizes are presented in Table 4. The involuntarily terminated group scored higher on all but four scales across the profile (Scales B, C, G, and Q3). Successful employees tend to be more trusting,

relaxed, organized, and emotionally stable, while unsuccessful employees tend to be more suspicious, tense, flexible, and reactive. The average of the absolute d values were calculated as an overall measure of how well the sixteen factors as a whole differentiated between the two groups (mean of corrected $|d| = 0.37$).

Next a direct logistic regression analysis was performed on job status as outcome and personality factors as predictors: the sixteen narrow personality factors from the 16PF. Analysis was performed using the binary logit model in SAS. Each of the assumptions outlined by Tabachnick and Fidell (2001) were checked and problems were found with convergence. There was evidence of multicollinearity and the analysis could not be completed. Results showed that a complete separation of data points was detected and, therefore, the validity of the model fit is questionable. The N for this comparison was 45 assistant press operators with only 17 in the involuntarily terminated group. The small sample size, particularly in the involuntarily terminated group, is likely contributing to these results. It should be noted that this is the only comparison where the assumptions were not met and the logistical regression could not be conducted.

Table 4

Descriptive Analysis: 16 Narrow Factors (APO)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for d Lower	Upper	Corrected d	r
A					-0.14	-0.74	0.47	-0.17	-0.07
Successful	5.18	1.66	1	9					
Unsuccessful	5.41	1.66	4	9					
B					0.16	-0.44	0.76	0.18	0.08
Successful	4.57	2.10	2	10					
Unsuccessful	4.24	1.92	1						
C					0.50	-0.12	1.10	0.57	0.24
Successful	7.64	1.37	5	9					
Unsuccessful	6.94	1.44	5	9					
E					-0.20	-0.80	0.41	-0.25	-0.10
Successful	6.04	2.10	2	10					
Unsuccessful	6.41	1.37	3	8					
F					-0.33	-0.93	0.28	-0.39	-0.16
Successful	6.00	1.39	4	9					
Unsuccessful	6.53	1.94	2	9					
G					0.17	-0.43	0.77	0.20	0.09
Successful	7.29	1.63	4	9					
Unsuccessful	7.00	1.73	4	9					
H					-0.40	-1.00	0.21	-0.43	-0.20
Successful	6.75	1.86	3	9					
Unsuccessful	7.47	1.66	4	9					
I					0.06	-0.55	0.66	0.07	0.03
Successful	3.25	1.08	1	6					
Unsuccessful	3.18	1.38	1	7					
L					-0.80	-1.41	-0.16	-0.93	-0.37
Successful	5.11	1.50	2	9					
Unsuccessful	6.35	1.62	4	9					
M					-0.35	-0.96	0.26	-0.41	-0.18
Successful	4.18	1.64	2	7					
Unsuccessful	4.76	1.64	3	8					
N					-0.25	-0.85	0.36	-0.29	-0.12
Successful	4.54	1.73	1	9					
Unsuccessful	4.94	1.39	2	7					
O					0.04	-0.56	0.64	0.05	0.02
Successful	4.00	1.33	2	7					
Unsuccessful	3.94	1.89	1	7					
Q1					-0.38	-0.98	0.24	-0.48	-0.19
Successful	4.79	1.34	2	8					
Unsuccessful	5.29	1.31	3	7					
Q2					-0.01	-0.61	0.60	-0.01	-0.00
Successful	3.46	1.43	1	7					
Unsuccessful	3.47	1.23	2	5					
Q3					0.55	-0.07	1.15	0.65	0.26
Successful	7.32	1.19	5	9					
Unsuccessful	6.47	2.00	2	9					
Q4					-0.71	-1.31	-0.07	-0.82	-0.33
Successful	2.43	1.43	1	6					
Unsuccessful	3.65	2.15	1	8					

Job-Specific Five Factor Comparison. Next the same analysis was conducted using the five global factors on the 16PF to compare the same two groups (successful and involuntarily terminated). It was again hypothesized that the shape of the two graphs would be different. If true, the correlation between the two profiles should be low and the effect sizes should be large. The graphical presentation of the means of the two groups is presented in Appendix C. An examination of the graphed results reveals that the overall shape of the two profiles were again found to be similar and the means are highly correlated (r = 0.94). The descriptive statistics and effect sizes are presented in Table 5. The involuntarily terminated group scored higher on three of the five scales (Scales EX, AX, and IN). Successful employees tend to be less anxious, more self-controlled, and more accommodating, while unsuccessful employees tend to be more anxious, unrestrained, and independent. Again, the average of the absolute d values was calculated as an overall measure of how well the five factors as a whole differentiated between the two groups (mean of corrected $|d|$= 0.50).

Table 5

Descriptive Analysis: Five Broad Factors (APO)

Variable	Mean	SD	Range *Lower*	*Upper*	*d*	95% Confidence Interval for *d* *Lower*	*Upper*	Cor-rected *d*	*r*
EX					-0.14	-0.74	0.47	-0.15	-0.07
Successful	6.75	1.21	9	4					
Unsuccessful	6.94	1.68	5	10					
AX					-0.75	-1.36	-0.12	-0.80	-0.35
Successful	2.68	1.28	1	5					
Unsuccessful	3.88	2.03	1	7					
TM					0.22	-0.39	0.82	0.24	0.11
Successful	7.43	1.43	3	10					
Unsuccessful	7.12	1.45	4	10					
IN					-0.59	-1.19	0.03	-0.66	-0.28
Successful	5.93	1.59	3	9					
Unsuccessful	6.76	1.03	4	8					
SC					0.61	-0.02	1.21	0.66	0.29
Successful	7.36	1.31	4	9					
Unsuccessful	6.53	1.46	3	9					

Next a direct logistic regression analysis was performed on job status as outcome and the five personality factors as predictors: the five global factors from the 16PF. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell (2001) were met. There were no missing data and parameter estimates were in good range. Therefore, there was no need to conduct the EM Correlations procedures suggested. None of the cells have an expected frequency that is less than five. Therefore, there is no restriction on the goodness-of-fit criteria to evaluate this model. The assumption of linearity in the logit was met and all of the predictors were found to be non-significant when

interactions among them were examined. The SAS analysis shows that there is no problem with convergence, nor are the standard errors for parameters exceedingly large. Therefore, no multicollinearity is evident. Finally, there was adequate model fit, therefore there is no need to search for outliers in the solution.

A test of the full model with all five predictors against a constant-only model was not statistically reliable, X^2 (5, N = 45) = 10.66, p = .0584, which means all of the predictors as a set, do not distinguish between assistant press operators who were successful and those who were involuntarily terminated.

Table 6 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the five predictors. According to the Wald criterion, none of the five factors reliably predicted success at the p < .05 level.

Table 6

Logistic Regression Analysis of Success as a Function of the Five Broad Factors from the 16PF (Press Operator)

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
EX	-0.18	2.25	0.84	0.66	1.06
AX	-0.02	0.04	0.98	0.79	1.21
TM	-0.13	1.26	0.88	0.70	1.10
IN	-0.04	0.16	0.96	0.78	1.18
SC	-0.13	1.08	0.88	0.69	1.12

Organization-Wide Sixteen Factor Comparison. The same analytical process was used to compare the profiles between successful employees and involuntarily terminated employees across the company as a whole. It was again hypothesized that the shape of the two groups would be different. If true, the correlations between the two profiles should be low and effect sizes should be large. The graphical presentation of the means of the two groups is presented in Appendix D. An examination of the graphed results reveals that the overall shape of the two profiles was again found to be similar and the means are highly correlated (*r* = 0.93). The descriptive statistics and effect sizes are presented in Table 7. The involuntarily terminated group scored higher on nine of the sixteen scales (Scales E, F, G, H, I, L, M, N and Q4). Successful employees tend to be more trusting, relaxed, forthright, and emotionally stable, while unsuccessful employees tend to be more suspicious, tense, private, and reactive. Again, the average of the absolute *d* values was calculated as an overall measure of how well the sixteen factors as a whole differentiated between the two groups (mean of corrected |*d*|= 0.31).

Table 7

Descriptive Analysis: 16 Narrow Factors (Company-Wide)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for d Lower	Upper	Cor- rected d	r
A					0.19	-0.29	0.65	0.23	0.09
Successful	5.50	1.95	1	9					
Unsuccessful	5.15	1.75	2	9					
B					0.40	-0.08	0.86	0.45	0.19
Successful	5.18	2.15	2	10					
Unsuccessful	4.37	1.84	1	8					
C					0.40	-0.08	0.87	0.45	0.19
Successful	7.62	1.32	5	9					
Unsuccessful	7.07	1.47	4	9					
E					-0.19	-0.65	0.28	-0.23	-0.09
Successful	5.76	2.07	2	10					
Unsuccessful	6.11	1.48	3	8					
F					-0.13	-0.60	0.34	-0.15	-0.06
Successful	6.10	1.37	4	9					
Unsuccessful	6.30	1.68	2	9					
G					-0.08	-0.54	0.39	-0.09	-0.04
Successful	7.10	1.57	4	9					
Unsuccessful	7.22	1.58	4	9					
H					-0.10	-0.57	0.37	-0.11	-0.05
Successful	6.86	1.82	3	9					
Unsuccessful	7.04	1.72	4	9					
I					-0.05	-0.52	0.42	-0.06	-0.03
Successful	3.72	1.70	1	10					
Unsuccessful	3.81	1.78	1	8					
L					-0.66	-1.13	-0.17	-0.77	-0.30
Successful	4.88	1.71	2	9					
Unsuccessful	6.00	1.66	3	9					
M					-0.34	-0.81	0.13	-0.40	-0.16
Successful	4.16	1.57	2	7					
Unsuccessful	4.70	1.59	2	8					
N					-0.46	-0.93	0.02	-0.53	-0.22
Successful	4.56	1.70	1	9					
Unsuccessful	5.30	1.44	2	8					
O					0.12	-0.35	0.59	0.14	0.06
Successful	4.18	1.38	1	7					
Unsuccessful	4.00	1.59	1	7					
Q1					-0.03	-0.50	0.44	-0.04	-0.02
Successful	5.28	1.65	2	9					
Unsuccessful	5.33	1.36	3	8					
Q2					-0.27	-0.74	0.20	-0.31	-0.13
Successful	3.76	1.67	1	9					
Unsuccessful	4.22	1.72	2	8					
Q3					0.28	-0.19	0.75	0.33	0.14
Successful	7.12	1.37	4	9					
Unsuccessful	6.70	1.68	2	9					
Q4					-0.55	-1.02	-0.07	-0.63	-0.26
Successful	2.66	1.35	1	6					
Unsuccessful	3.52	1.89	1	8					

Next, a direct logistic regression analysis was performed on job status as outcome and the sixteen narrow personality factors from the 16PF as predictors. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell (2001) were again met. A test of the full model with all sixteen predictors against a constant-only model was statistically reliable, X^2 (16, N = 77) = 32.52, p < .05, indicating that all the predictors, as a set, reliably distinguish between employees of the organization who were successful and those who were involuntarily terminated. Prediction success was impressive with an 86.1% overall success rate.

Table 8 shows regression coefficients, Wald statistics, odds ratios, and 99% confidence intervals for odds ratios for each of the five predictors. According to the Wald criterion, Factors H, L, and Q4 of the sixteen factors reliably predicted success at the p < .05 level. The odds ratio for H is 2.643 indicating that even a slight change on this scale would have a large impact on the odds of being classified into a particular category.

Table 8

Logistic Regression Analysis of Success as a Function of the Sixteen Narrow Factors from the 16PF (Company-Wide)

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
A	-0.29	1.40	0.75	0.46	1.21
B	-0.29	1.95	0.75	0.50	1.12
C	0.13	0.11	1.14	0.54	2.41
E	0.03	0.02	1.03	0.69	1.54
F	0.22	0.75	1.25	0.76	2.06
G	0.25	1.12	1.28	0.81	2.02
H	0.97	8.38	2.64	1.37	5.11
I	0.34	1.91	1.41	0.87	2.28
L	0.63	4.81	1.88	1.07	3.30
M	0.29	0.92	1.33	0.74	2.39
N	0.37	2.02	1.45	0.87	2.43
O	-0.26	0.96	0.77	0.46	1.30
Q1	0.10	0.16	1.11	0.67	1.85
Q2	0.47	3.26	1.60	0.96	2.67
Q3	-0.12	0.20	0.89	0.52	1.50
Q4	0.53	4.35	1.69	1.03	2.79

Organization-Wide Five Factor Comparison. The analysis was again repeated to compare the profiles between successful employees and involuntarily terminated employees using the five factors. It was hypothesized that the shape of the two graphs would be different. If true, the correlation between the two profiles should be low and the effect size should be large. The graphical presentation of the means of the two groups is presented in Appendix E. An examination of the graphed results reveals that the overall shape of the two profiles was again found to be similar and the means are highly correlated (*r* = 0.99). The descriptive statistics and effect sizes are presented in Table 9. The

successful group scored higher on three of the five scales (Scales EX, AX, and IN). Successful employees tend to be less anxious, more self-controlled, and more extroverted, while unsuccessful employees tend to be more anxious, unrestrained, and introverted. The average of the absolute d values was calculated as an overall measure of how well the five factors as a whole differentiated between the two groups (mean of corrected $|d|= 0.30$).

Table 9

Descriptive Analysis: Five Broad Factors (Company-Wide)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for d Lower	Upper	Cor- rected d	r
EX					0.25	-0.22	0.72	0.26	0.12
Successful	6.84	1.65	3	10					
Unsuccessful	6.41	1.76	3	10					
AX					-0.63	-1.10	-0.14	-0.67	-0.29
Successful	2.78	1.23	1	5					
Unsuccessful	3.70	1.84	1	7					
TM					0.02	-0.45	0.49	0.02	0.01
Successful	6.92	1.70	2	10					
Unsuccessful	6.89	1.53	3	10					
IN					-0.24	-0.70	0.23	-0.27	-0.12
Successful	5.96	1.68	3	10					
Unsuccessful	6.33	1.30	3	8					
SC					0.28	-0.19	0.75	0.30	0.14
Successful	7.16	1.32	4	9					
Unsuccessful	6.78	1.40	3	9					

A direct logistic regression analysis using the binary logit model in SAS was performed on job status as outcome and the five personality factors as predictors: the five global factors from the 16PF. All of the assumptions mentioned by Tabachnick and Fidell (2001) were met. A test

of the full model with five global predictors against a

constant-only model was not statistically reliable, X^2 (5,

N = 77) = 8.45, p = 0.1331, indicating that all the

predictors, as a set, do not reliably distinguish between

employees of the organization who were successful and those

who were involuntarily terminated.

Table 10 shows regression coefficients, Wald

statistics, odds ratios, and 99% confidence intervals for

odds ratios for each of the five predictors. According to

the Wald criterion, none of the five factors reliably

predicted success at the p < .05 level.

Table 10

*Logistic Regression Analysis of Success as a Function of
the Five Broad Factors from the 16PF (Company-Wide)*

Variable	B	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	Lower
EX	-0.14	0.61	0.86	0.60	1.25
AX	0.34	3.09	1.42	0.96	2.09
TM	0.08	0.19	1.08	0.76	1.52
IN	0.24	1.60	0.88	0.88	1.83
SC	-0.07	0.12	0.61	0.61	1.41

Additional Analysis

Due to the fact that the data for the job-specific

comparison on the sixteen factors did not converge and,

therefore, could not be analyzed through a logistical

regression, it was determined that the data from the

sixteen factor group would be re-analyzed using only the
five strongest predictors. This will not only provide
valuable information for answering the first three research
questions, the selection of the five strongest narrow
factors will have the added benefit of being able to be
directly compared to the five broad traits without having
to be weighted due to differing numbers of predictors.
Tabachnick and Fidell suggest selecting the strongest
predictors and that "an additional run is prudent to
evaluate the predictors in the model" (2001, p.559). The
five strongest factors from both the job-specific and
company-wide comparisons are listed in Table 11. These
factors were selected because they had the highest odds
ratios. It should be noted that factors H, L, and Q4 are
present in both groups and the other two variables differ
between the two groups.

Table 11

Five Strongest Narrow Predictors (Based on Odds Ratios)

Job-Specific (APO)	Company-Wide
H – Social Boldness	H – Social Boldness
Q1 – Openness to Change	L – Vigilance
L – Vigilance	Q4 – Tension
Q4 – Tension	Q2 – Self-Reliance
G – Rule-Consciousness	N – Privateness

Job Specific Five Best Narrow Factor Comparison. The first step in the profile comparison was to create graphical representation of the means of the two groups (Appendix F). It was hypothesized that the shape of the two graphs would be different. If true, the correlation between the two profiles should be low and the effect sizes should be large. An examination of the graphed results reveals that the overall shape of the two profiles was found to be similar and the means are highly correlated (r = 0.96). The descriptive statistics and effect sizes are presented in Table 12. The unsuccessful group scored higher on all but scales G. Successful employees tend to be more trusting, relaxed, and shy, while unsuccessful employees tend to be more suspicious, tense, and socially bold. The average of the absolute d values was calculated as an overall measure of how well the five factors as a whole differentiated between the two groups (mean of corrected $|d|$= 0.57).

A direct logistic regression analysis was performed on job status as outcome and the five personality factors as predictors: the five best narrow factors from the 16PF. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell (2001) were again met. A test of the full model with five

predictors against a constant-only model was statistically reliable, X^2 (5, N = 45) = 19.51, $p < 0.5$, indicating that all the predictors, as a set, reliably distinguish between employees of the organization who were successful and those who were involuntarily terminated. Prediction success was impressive with an 85.1% overall success rate.

Table 12

Descriptive Analysis: Best Five Narrow Factors (APO)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for d Lower	Upper	Cor- rected d	r
G					0.17	-0.43	0.77	0.20	0.85
Successful	7.29	1.63	4	9					
Unsuccessful	7.00	1.73	4	9					
H					-0.40	-1.00	0.21	-0.43	-0.20
Successful	6.75	1.86	3	9					
Unsuccessful	7.47	1.66	4	9					
L					-0.80	-1.41	-0.16	-0.93	-0.37
Successful	5.11	1.50	2	9					
Unsuccessful	6.36	1.62	4	9					
Q1					-0.38	-0.98	0.24	-0.48	-0.19
Successful	4.79	1.34	2	8					
Unsuccessful	5.29	1.31	3	7					
Q4					-0.71	-1.31	0.07	-0.82	-0.33
Successful	2.43	1.43	1	6					
Unsuccessful	3.65	2.15	1	8					

Table 13 shows regression coefficients, Wald statistics, odds ratios, and 99% confidence intervals for odds ratios for each of the five predictors. According to the Wald criterion, Factors H, L, and Q4 of the five factors reliably predicted success at the $p < .05$ level. The odds ratio for Factors H and L (2.19 and 2.38) indicate that even a slight change on either of those two scales

would have a large impact on the odds of being classified

into a particular category.

Table 13

*Logistic Regression Analysis of Success as a Function of
the Five Best Narrow Factors from the 16PF (APO)*

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
G	0.05	0.03	1.05	0.64	1.73
H	0.78	5.80	2.19	1.22	4.12
L	0.87	6.48	2.38	1.22	4.65
Q1	0.37	1.40	1.45	0.78	2.69
Q4	0.50	3.90	1.65	1.00	2.70

Company-Wide Five Best Narrow Factor Comparison. The

first step in the profile comparison was to create a

graphical representation of the means of the two groups

(Appendix G). It was hypothesized that the shape of the two

graphs would be different. If true, the correlation between

the two profiles should be low and the effect size should

be large. An examination of the graphed results reveals

that the overall shape of the two profiles was found to be

similar and the means are highly correlated (r = 0.98). The

descriptive statistics and effect sizes are presented in

Table 14. The involuntarily terminated group scored higher

on all of the scales. Yet, successful employees tend to be

more trusting, relaxed, and forthright, while unsuccessful

employees tend to be more suspicious, tense, and private.

The average of the absolute *d* values was calculated as an

overall measure of how well the five factors as a whole

differentiated between the two groups (mean of corrected

$|d| = 0.47$).

Table 14

Descriptive Analysis: Best Five Narrow Factors (Company-Wide)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for d Lower	Upper	Corrected d	r
H					-0.10	-0.57	0.37	-0.11	-0.05
Successful	6.86	1.82	3	9					
Unsuccessful	7.04	1.72	4	9					
L					-0.66	-1.13	-0.17	-0.77	-0.30
Successful	4.88	1.71	2	9					
Unsuccessful	6.00	1.66	3	9					
N					-0.46	-0.93	0.02	-0.53	-0.22
Successful	4.56	1.70	1	9					
Unsuccessful	5.30	1.44	2	8					
Q2					-0.27	-0.74	0.20	-0.31	-0.13
Successful	3.76	1.67	1	9					
Unsuccessful	4.22	1.72	2	8					
Q4					-0.55	-1.02	-0.07	-0.63	-0.26
Successful	2.66	1.35	1	6					
Unsuccessful	3.52	1.89	1	8					

    A direct logistic regression analysis was performed on

job status as outcome and the five personality factors as

predictors: the five best narrow factors from the 16PF.

Analysis was performed using the binary logit model in SAS.

All of the assumptions mentioned by Tabachnick and Fidell

(2001) were again met. A test of the full model with five

predictors against a constant-only model was statistically

reliable, X^2 (5, N = 77) = 23.15, *p* < .05, indicating that

all the predictors, as a set, reliably distinguish between employees of the organization who were successful and those who were involuntarily terminated. Prediction success was impressive with an 80.7% overall success rate. It should be noted that this is a slight decrease from the 86.1% overall success rate found when using all sixteen narrow factors.

Table 15 shows regression coefficients, Wald statistics, odds ratios, and 99% confidence intervals for odds ratios for each of the five predictors. According to the Wald criterion, Factors H, L, and Q2 all reliably predicted success at the $p < .05$ level. The odds ratios for Factors H and L (2.07 and 1.84) once again indicate that even a slight change on either of those two scales would have a large impact on the odds of being classified into a particular category.

Table 15

Logistic Regression Analysis of Success as a Function of the Five Best Narrow Factors from the 16PF (Company-Wide)

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
H	0.73	7.78	2.08	1.24	3.47
L	0.61	8.09	1.85	1.21	2.81
N	0.39	3.29	1.47	0.97	2.24
Q2	0.42	4.02	1.53	1.01	2.32
Q4	0.36	3.34	1.43	0.97	2.10

Summary of the Findings for the First Three Research
Questions

The results for the first three research questions are presented in Table 16. These include comparisons between the successful and unsuccessful Assistant Press Operators and employees in general for both the sixteen narrow factors and the five broad factors. Results indicate that the five broad factors were not able to differentiate between successful and unsuccessful employees at the $p <$ .05 level in either the job-specific or company-wide comparison, although they did somewhat better when used in the job-specific comparison. Unfortunately, the sixteen narrow factors could not be calculated at the job-specific level, but were statistically significant at the $p < 0.5$ level when used company-wide. Furthermore, when selecting the five narrow factors which were the best predictors from the 16 narrow factors, both the job-specific and company-wide comparisons were statistically significant at the $p < 0.5$ level. The factors H, L, and Q4 appear to be important factors at both the job-specific and company-wide levels.

Table 16

Summary of Results from the First Three Research Questions

Groups	Chi Squared (X^2)	Percent Concordant	Factors Sig. at $p<.05$ level	Mean of Corrected $|d|$	r
Job-Specific (APO)					
16 Factors	**	***	**	0.37	0.92
*5 Narrow Factors	19.51 (p=0.0015)	85.1%	H, L, and Q4	0.57	0.96
5 Broad Factors	10.66 (p=0.0584)	***	None	0.50	0.94
Company-Wide					
16 Factors	32.52 (p=0.0085)	86.1%	H, L, and Q4	0.31	0.93
*5 Narrow Factors	23.15 (p=0.0003)	80.7%	H, L, and Q2	0.47	0.98
5 Broad Factors	8.45 (p=0.1331)	***	None	0.30	0.99

*   Five strongest predictors from the 16 narrow factors.
**   Model did not converge.
*** Model as a whole is not statistically significant at the $p<.05$ level.

In each of the comparisons the correlations between the two profiles were similar (in the .092 to 0.99 range), which indicates that the general shape of the profiles was fairly similar between the groups. Ideally the correlations would be lower. However, the effect sizes suggest that there were some differences at the individual scale level in each of the profile comparisons.

Logistical regression capitalizes on error variance to make the most accurate classification for the current sample. Unfortunately this can lead to results that are unique to a particular sample and are not replicable outside of that sample. This is a particular concern when there are a large number of predictors and a relatively small sample size. This issue is typically dealt with in

multiple regression by calculating an adjusted-R^2, which is an estimate of the population squared multiple correlation. The following equation is typically used to calculate adjusted-R^2:

$$\hat{R}^2 = 1 - (1 - R^2)\frac{(n-1)}{(n-k-1)}$$

Here n is the sample size, k is the number of predictors, and R^2 is the observed squared multiple correlation between outcome and predictors. The issue of shrinkage is compounded in the current study by the fact that the five strongest factors were selected from the logistical regression model and may have a disproportionate amount of error variance allocated to them. C. R. Reynolds (personal communication, May 2004) suggested that this issue can be dealt with by using the above adjusted-R^2 formula and using sixteen factors (k = 16) instead of five when calculating the adjusted-R^2 for the five best narrow factor comparisons. It should be noted that R^2 is not traditionally calculated for data with a dichotomous or categorical dependent variable because the maximum variance would be a 50-50 split. However, Reynolds suggest that R^2 can still be calculated for data sets with a dichotomous dependent variable to address the issue of shrinkage, but

that it is not as powerful of a predictor in logistical regression. Therefore, the R^2 and the adjusted- R^2 data for the first three research questions are listed in Table 17, but these values should only be used to examine the issue of shrinkage in this data set and should not be used to compare the results from this study to R^2 values derived from other studies.

Table 17

R^2 and Adjusted-R^2

Groups	R^2	Adjusted-R^2	Corrected for k
Job-Specific (APO)			
16 Factors	0.459	0.149	
*5 Narrow Factors	0.353	0.270	0.000
5 Broad Factors	0.219	0.119	
Company-Wide			
16 Factors	0.334	0.156	
*5 Narrow Factors	0.257	0.205	0.059**
5 Broad Factors	0.108	0.045	

* Five best factors from the 16 narrow factors.
**k = 16 instead of 5 in the adjusted-R^2 formula.

These results illustrate the common dilemma of having small sample sizes. In all comparisons, except for the five best narrow factors, the adjusted-R^2 is less than half the R^2. When adjusted-R^2 is corrected for the number of predictors in the best narrow factor group, there is a large decrease, which suggest that these results would not be replicable in other samples. It appears that the adjusted-R^2 basically falls back to the level of the five

broad factors in the company-wide comparison and falls even below the level of five broad factors in the job-specific comparisons. However, it should be noted that these results do provide further support that the 16 narrow factors were better predictors than the five broad factors. The adjusted-R^2 values for the 16 factor groups were comparatively the highest for both the job-specific and company-wide comparisons.

Research Question Four

The same analytical approach was also used when answering the fourth research question that asked if the company's current selection procedure is effective. This is done through comparing profiles through the backwards cross validation procedure described in Chapter Three. The following groups were compared in order to answer this question:

1. Hired vs. Successful
   16 Factors
   5 Factors
2. Hired vs. Unsuccessful
   16 Factors
   5 Factors
3. Not Hired vs. Successful
   16 Factors
   5 Factors
4. Not Hired vs. Unsuccessful
   16 Factors
   5 Factors

All of these comparisons were done at the company-wide level.

   Hired vs. Successful (16 Factors). The profiles between those employees who were hired were compared to profiles of employees who were successful. If the current selection process is discriminating between successful and unsuccessful employees, then the profiles of all hired employees and employees who were successful should be similar, which would result in a high correlation and small effect sizes. The graphical presentation of the means of the two groups is presented in Appendix H. An examination of the graphed results reveals that the overall shape of the two profiles is very similar and the means are highly correlated (r = 0.99). The descriptive statistics and effect sizes are presented in Table 18. Again, the average of the absolute d values was calculated as an overall measure of how well the sixteen factors as a whole differentiated between the two groups (mean of corrected |d|= 0.12).

Table 18
Descriptive Analysis: Hired vs. Successful (16)

| Variable | Mean | SD | Range | | d | 95% Confidence Interval for *d* | | Cor-rected | |
			Lower	*Upper*	*d*	*Lower*	*Upper*	*d*	*r*
A					-0.13	-0.46	0.20	-0.16	-0.06
Hired	5.26	1.77	1	9					
Successful	5.50	1.95	1	9					
B					-0.27	-0.60	0.06	-0.31	-0.12
Hired	4.62	2.03	1	10					
Successful	5.18	2.15	2	10					
C					-0.16	-0.49	0.16	-0.18	-0.07
Hired	7.40	1.36	4	9					
Successful	7.62	1.32	5	9					
E					0.10	-0.23	0.42	0.12	0.04
Hired	5.95	1.95	1	10					
Successful	5.76	2.07	2	10					
F					-0.02	-0.35	0.31	-0.02	-0.01
Hired	6.07	1.55	2	9					
Successful	6.10	1.37	4	9					
G					0.12	-0.21	0.44	0.14	0.05
Hired	7.28	1.52	4	9					
Successful	7.10	1.57	4	9					
H					0.05	-0.27	0.38	0.05	0.03
Hired	6.95	1.66	3	9					
Successful	6.86	1.82	3	9					
I					0.04	-0.29	0.37	0.05	0.02
Hired	3.79	1.75	1	10					
Successful	3.72	1.70	1	10					
L					0.17	-0.16	0.50	0.20	0.08
Hired	5.18	1.78	2	9					
Successful	4.88	1.71	2	9					
M					0.03	-0.29	0.36	0.03	0.01
Hired	4.21	1.57	2	8					
Successful	4.16	1.57	2	7					
N					0.19	-0.13	0.52	0.22	-0.09
Hired	4.88	1.62	1	9					
Successful	4.56	1.70	1	9					
O					-0.03	-0.35	0.30	-0.03	-0.01
Hired	4.14	1.66	1	9					
Successful	4.18	1.38	1	7					
Q1					0.01	-0.31	0.34	0.01	0.01
Hired	5.30	1.67	2	10					
Successful	5.28	1.65	2	9					
Q2					0.07	-0.25	0.40	0.08	0.03
Hired	3.88	1.60	1	9					
Successful	3.76	1.67	1	9					
Q3					-0.01	-0.34	0.31	-0.01	-0.01
Hired	7.10	1.37	2	9					
Successful	7.12	1.37	4	9					
Q4					0.24	-0.09	0.56	0.28	0.11
Hired	3.01	1.52	1	8					
Successful	2.66	1.35	1	6					

Next, a direct logistic regression analysis was performed on group membership as outcome and the sixteen personality factors as predictors: the sixteen narrow factors from the 16PF. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell (2001) were again met. A test of the full model with all sixteen predictors against a constant-only model was not statistically reliable, X^2 (16, N = 179) = 11.25, p = 0.7941, indicating that all the predictors, as a set, do not reliably distinguish between employees who were hired and employees who were successful.

Table 19 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the sixteen predictors. According to the Wald criterion, none of the sixteen factors reliably predicted between the two groups at the p < .05 level.

Table 19

Logistic Regression Analysis of Group Membership as a
Function of the Sixteen Narrow Factors from the 16PF

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
A	−1.12	0.82	0.88	0.69	1.15
B	−0.15	2.33	0.86	0.72	1.04
C	−0.12	0.42	0.89	0.62	1.27
E	0.06	0.41	1.07	0.88	1.30
F	−0.05	0.12	0.96	0.73	1.25
G	0.13	0.89	1.13	0.87	1.47
H	0.22	2.45	1.25	0.95	1.66
I	0.12	0.95	1.13	0.88	1.45
L	0.05	0.17	1.05	0.83	1.34
M	−0.06	0.15	0.94	0.70	1.27
N	0.12	1.13	1.13	0.90	1.42
O	−0.02	0.01	0.98	1.76	1.28
Q1	0.05	0.19	1.05	0.84	1.32
Q2	0.04	0.11	1.05	0.80	1.37
Q3	−0.04	0.05	0.96	0.71	1.31
Q4	0.17	1.56	1.20	0.90	1.58

Hired vs. Successful (5 Factors). The profiles between
those employees that were hired were compared to profiles
of employees who were successful using the five broad
factors. Again, if the current selection process is
discriminating between successful and unsuccessful
employees, then these profiles should be similar, which
would result in a high correlation and small effect sizes.
The graphical presentation of the means of the two groups
is presented in Appendix I. An examination of the graphed
results reveals that the overall shape of the two profiles
was again found to be similar and the means are highly
correlated (r = 1.00). The descriptive statistics and

effect sizes are presented in Table 20. The average of the
absolute *d* values was calculated as an overall measure of
how well the five factors as a whole differentiated between
the two groups (mean of corrected $|d|$ = 0.11).

Table 20

Descriptive Analysis: Hired vs. Successful (5)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for *d* Lower	Upper	Cor- rected d	r
EX					-0.14	-0.46	0.19	-0.15	-0.06
Hired	6.62	1.57	3	10					
Successful	6.84	1.65	3	10					
AX					0.23	-0.09	0.56	0.24	0.10
Hired	3.12	1.52	1	8					
Successful	2.78	1.23	1	5					
TM					0.01	-0.32	0.33	0.01	0.00
Hired	6.93	1.69	1	10					
Successful	6.92	1.70	2	10					
IN					0.10	-0.23	0.42	0.11	0.04
Hired	6.12	1.65	2	10					
Successful	5.96	1.68	3	10					
SC					0.02	-0.31	0.34	0.02	0.01
Hired	7.18	1.30	3	9					
Successful	7.16	1.32	4	9					

Next, a direct logistic regression analysis was
performed on group membership as outcome and the five
personality factors as predictors: the five broad factors
from the 16PF. Analysis was performed using the binary
logit model in SAS. All of the assumptions mentioned by
Tabachnick and Fidell (2001) were again met. A test of the
full model with all five predictors against a constant-only
model was not statistically reliable, X^2 (16, N = 179) =

3.55, *p* = 0.6160, indicating that all the predictors, as a set, do not reliably distinguish between employees who were hired and employees who were successful.

Table 21 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the five predictors. According to the Wald criterion, none of the five factors reliably predicted between the two groups at the *p* < .05 level.

Table 21

Logistic Regression Analysis of Group Membership as a Function of the Five Broad Factors from the 16PF

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio *Upper*	*Lower*
EX	-0.10	0.50	0.91	0.70	1.18
AX	0.18	1.54	1.19	0.90	1.58
TM	0.02	0.03	1.02	0.81	1.28
IN	0.12	1.03	1.13	0.89	1.42
SC	0.09	0.35	1.09	0.82	1.46

Hired vs. Unsuccessful (16 Factors). The profiles of all hired employees were compared to profiles of employees who were unsuccessful using the sixteen narrow factors from the 16PF. If the current selection process is discriminating between successful and unsuccessful employees, then these profiles should be different, and thus the 16PF should discriminate between the two groups. Therefore the correlations between the two groups should be

low and the effect sizes should be large. The graphical presentation of the means of the two groups is presented in Appendix J. An examination of the graphed results reveals that the overall shape of the two profiles was again found to be similar and the means are highly correlated (r = 0.97). The descriptive statistics and effect sizes are presented in Table 22. Again, the average of the absolute d values was calculated as an overall measure of how well the sixteen factors as a whole differentiated between the two groups (mean of corrected $|d|$ = 0.20).

Next, a direct logistic regression analysis was performed on group membership as outcome and the sixteen personality factors as predictors: the sixteen narrow factors from the 16PF. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell (2001) were again met. A test of the full model with all sixteen predictors against a constant-only model was not statistically reliable, X^2 (16, N = 156) = 15.17, p = 0.5121, indicating that all the predictors, as a set, do not reliably distinguish between employees who were hired and employees who were unsuccessful.

Table 22

Descriptive Analysis: Hired vs. Unsuccessful (16)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for *d* Lower	Upper	Cor- rected *d*	*r*
A					0.06	-0.35	-.48	0.07	0.02
Hired	5.26	1.77	1	9					
Unsuccessful	5.15	1.75	2	9					
B					0.13	-0.29	0.54	0.15	0.05
Hired	4.62	2.03	1	10					
Unsuccessful	4.37	1.84	1	8					
C					0.24	-0.18	0.65	0.27	0.09
Hired	7.40	1.36	4	9					
Unsuccessful	7.07	1.47	4	9					
E					-0.09	-0.50	0.33	-0.11	-0.03
Hired	5.95	1.95	1	10					
Unsuccessful	6.11	1.48	3	8					
F					-0.15	-0.56	0.27	-0.18	-0.06
Hired	6.07	1.55	2	9					
Unsuccessful	6.30	1.68	2	9					
G					0.04	-0.38	0.45	0.05	0.01
Hired	7.28	1.52	4	9					
Unsuccessful	7.22	1.58	4	9					
H					-0.05	-0.47	0.36	-0.05	-0.02
Hired	6.95	1.66	3	9					
Unsuccessful	7.04	1.72	4	9					
I					-0.01	-0.43	0.40	-0.01	-0.01
Hired	3.79	1.75	1	10					
Unsuccessful	3.81	1.78	1	8					
L					-0.47	-0.88	-0.05	-0.55	-0.18
Hired	5.18	1.78	2	9					
Unsuccessful	6.00	1.66	3	9					
M					-0.31	-0.73	0.11	-0.36	-0.12
Hired	4.21	1.57	2	8					
Unsuccessful	4.70	1.59	2	8					
N					-0.26	-0.68	0.15	-0.30	-0.10
Hired	4.88	1.62	1	9					
Unsuccessful	5.30	1.44	2	8					
O					0.09	-0.33	0.50	0.10	0.03
Hired	4.14	1.66	1	9					
Unsuccessful	4.00	1.59	1	7					
Q1					-0.02	-0.43	0.40	-0.03	-0.01
Hired	5.30	1.67	2	10					
Unsuccessful	5.33	1.36	3	8					
Q2					-0.21	-0.62	0.21	-0.24	-0.08
Hired	3.88	1.60	1	9					
Unsuccessful	4.22	1.72	2	8					
Q3					0.28	-0.14	0.69	0.33	0.11
Hired	7.10	1.37	2	9					
Unsuccessful	6.70	1.68	2	9					
Q4					-0.32	-0.74	0.10	-0.37	0.12
Hired	3.01	1.52	1	8					
Unsuccessful	3.52	1.89	1	8					

Table 23 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the sixteen predictors. According to the Wald criterion, none of the sixteen factors reliably predicted between the two groups at the $p < .05$ level.

Table 23

Logistic Regression Analysis of Group Membership as a Function of the Sixteen Narrow Factors from the 16PF

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
A	0.03	0.02	1.03	0.72	1.46
B	0.04	0.11	1.04	0.81	1.35
C	0.04	0.03	1.05	0.65	1.69
E	-0.02	0.01	0.98	0.72	1.33
F	-0.16	0.83	0.85	0.60	1.21
G	-0.20	1.24	0.82	0.57	1.17
H	-0.33	2.49	0.72	0.48	1.08
I	-0.06	0.10	0.95	0.67	1.33
L	-0.28	2.92	0.75	0.54	1.04
M	-0.15	0.61	0.86	0.58	1.26
N	-0.24	1.63	0.79	0.55	1.14
O	0.14	0.61	1.15	0.81	1.62
Q1	-0.01	0.01	0.99	0.70	1.38
Q2	-0.26	1.95	0.77	0.54	1.11
Q3	0.18	0.99	1.20	0.84	1.73
Q4	-0.16	0.95	0.85	0.61	1.18

Hired vs. Unsuccessful (5 Factors). The profiles of all hired employees were compared to profiles of employees who were unsuccessful using the five broad factors on the 16PF. Again, if the current selection process is discriminating between successful and unsuccessful employees, then these profiles should be different, and thus the 16PF should discriminate between the two groups.

Therefore the correlations between the two groups should be low and the effect sizes large. The graphical presentation of the means of the two groups is presented in Appendix K. An examination of the graphed results reveals that the overall shape of the two profiles was again found to be similar and the means are highly correlated (r = 0.99). The descriptive statistics and effect sizes are presented in Table 24. Again, the average of the absolute d values was calculated as an overall measure of how well the five factors as a whole differentiated between the two groups (mean of corrected $|d|$= 0.21).

Table 24

Descriptive Analysis: Hired vs. Unsuccessful (5)

Variable	Mean	SD	Range *Lower*	*Upper*	d	95% Confidence Interval for d *Lower*	*Upper*	Cor- rected d	r
EX					0.13	-0.28	0.55	0.14	0.05
Hired	6.62	1.57	3	10					
Unsuccessful	6.41	1.76	3	10					
AX					-0.37	-0.78	0.05	-0.39	-0.14
Hired	3.12	1.52	1	8					
Unsuccessful	3.70	1.84	1	7					
TM					0.02	-0.39	0.44	0.02	0.01
Hired	6.93	1.69	1	10					
Unsuccessful	6.89	1.53	3	10					
IN					-0.13	-0.55	0.28	-0.15	-0.05
Hired	6.12	1.65	2	10					
Unsuccessful	6.33	1.30	3	8					
SC					0.30	-0.11	0.72	0.33	0.12
Hired	7.18	1.30	3	9					
Unsuccessful	6.78	1.40	3	9					

Next, a direct logistic regression analysis was performed on group membership as outcome and the five

personality factors as predictors: the five broad factors

from the 16PF. Analysis was performed using the binary

logit model in SAS. All of the assumptions mentioned by

Tabachnick and Fidell were again met. A test of the full

model with all five predictors against a constant-only

model was not statistically reliable, X^2 (5, N = 156) =

4.57, p = 0.4708, indicating that all the predictors, as a

set, do not reliably distinguish between employees who were

hired and employees who were unsuccessful.

Table 25 shows regression coefficients, Wald

statistics, odds ratios, and 95% confidence intervals for

odds ratios for each of the five predictors. According to

the Wald criterion, none of the five factors reliably

predicted between the two groups at the p < .05 level.

Table 25

*Logistic Regression Analysis of Group Membership as a
Function of the Five Broad Factors from the 16PF*

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
EX	0.08	0.28	1.09	0.80	1.48
AX	−0.17	1.22	0.85	0.63	1.14
TM	−0.08	0.29	0.93	0.70	1.23
IN	−0.12	0.56	0.89	0.65	1.21
SC	0.16	0.93	1.18	0.84	1.65

Not Hired vs. Successful (16 Factors). The profiles of

all employees who were not hired were compared to profiles

of employees who were successful using the sixteen narrow factors from the 16PF. If the current selection process is discriminating between successful and unsuccessful employees, then these profiles should be different, and thus the 16PF should discriminate between the two groups. Therefore the correlation between the two groups should be low and the effect sizes large. The graphical presentation of the means of the two groups is presented in Appendix L. An examination of the graphed results reveals that the overall shape of the two profiles was again found to be similar and the means are high correlated ($r = 0.97$). The descriptive statistics and effect sizes are presented in Table 26. Again, the average of the absolute d values was calculated as an overall measure of how well the sixteen factors as a whole differentiated between the two groups (mean of corrected $|d| = 0.26$).

Next, a direct logistic regression analysis was performed on group membership as outcome and the sixteen personality factors as predictors: the sixteen narrow factors from the 16PF. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell were again met.

Table 26

Descriptive Analysis: Not Hired vs. Successful (16)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for *d* Lower	Upper	Cor-rected *d*	*r*
A					-0.19	-0.50	0.11	-0.23	-0.07
Not Hired	5.15	1.77	1	9					
Successful	5.50	1.96	1	9					
B					-0.36	-0.66	-0.05	-0.41	-0.14
Not Hired	4.47	1.96	1	10					
Successful	5.18	2.15	2	10					
C					-0.29	-0.59	-0.02	-0.33	-0.11
Not Hired	7.16	1.67	2	9					
Successful	7.62	1.32	5	9					
E					0.11	-0.20	0.41	0.14	0.04
Not Hired	5.96	1.81	1	10					
Successful	5.76	2.07	2	10					
F					-0.17	-0.47	0.14	-0.20	-0.06
Not Hired	5.84	1.57	1	9					
Successful	6.10	1.37	4	9					
G					-0.17	-0.48	0.14	-0.20	-0.06
Not Hired	6.82	1.65	2	9					
Successful	7.10	1757	4	9					
H					-0.17	-0.48	0.13	-0.18	-0.07
Not Hired	6.55	1.76	2	9					
Successful	6.86	1.82	3	9					
I					0.33	0.02	0.64	0.38	0.13
Not Hired	4.27	1.65	1	8					
Successful	3.72	1.70	1	10					
L					0.17	-0.13	0.48	0.20	0.07
Not Hired	5.20	1.87	1	10					
Successful	4.88	1.71	2	9					
M					0.14	-0.17	0.45	0.16	0.05
Not Hired	4.40	1.73	2	9					
Successful	4.16	1.57	2	7					
N					0.42	0.11	0.72	0.48	0.16
Not Hired	5.25	1.65	1	9					
Successful	4.56	1.70	1	9					
O					0.02	-0.29	0.32	0.02	0.01
Not Hired	4.21	1.62	1	9					
Successful	4.18	1.38	1	7					
Q1					-0.09	-0.39	0.22	-0.10	-0.03
Not Hired	5.13	1.76	1	10					
Successful	5.28	1.65	2	9					
Q2					0.25	-0.05	0.56	0.31	0.10
Not Hired	4.14	1.45	2	9					
Successful	3.76	1.67	1	9					
Q3					-0.25	-0.55	0.06	-0.30	-0.09
Not Hired	6.75	1.53	2	9					
Successful	7.12	1.37	4	9					
Q4					0.47	0.16	0.78	0.54	0.18
Not Hired	3.47	1.78	1	9					
Successful	2.66	1.35	1	6					

A test of the full model with all sixteen predictors

against a constant-only model was statistically reliable,

X^2 (16, N = 284) = 31.90, p = 0.0103, indicating that all

the predictors, as a set, reliably distinguish between

employees who were hired and employees who were

unsuccessful. Prediction success was moderate with a 75.0%

overall success rate.

Table 27 shows regression coefficients, Wald

statistics, odds ratios, and 95% confidence intervals for

odds ratios for each of the sixteen predictors. According

to the Wald criterion, Factor B, I, and Q4 reliably

predicted success at the p < .05 level.

Table 27

Logistic Regression Analysis of Group Membership as a
Function of the Sixteen Narrow Factors from the 16PF

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio *Upper*	*Lower*
A	−0.09	0.53	0.91	0.72	1.16
B	−0.25	6.94	0.78	0.64	0.94
C	0.05	0.10	1.05	0.77	1.42
E	0.12	1.31	1.13	0.92	1.39
F	−0.08	0.40	0.92	0.71	1.20
G	−0.08	0.41	0.92	0.71	1.19
H	0.11	0.74	1.12	0.86	1.45
I	0.29	6.15	1.33	1.06	1.67
L	−0.03	0.07	0.97	0.77	1.21
M	−0.11	0.56	0.90	0.68	1.19
N	0.20	3.18	1.22	0.98	1.52
O	−0.08	0.41	0.92	0.71	1.19
Q1	0.02	0.02	1.02	0.81	1.27
Q2	0.02	0.02	1.02	0.78	1.34
Q3	−0.14	0.93	0.87	0.65	1.16
Q4	0.35	6.10	1.42	1.08	1.87

Not Hired vs. Successful (5 Factors). The profiles of all employees who were not hired were compared to profiles of employees who were successful using the five broad factors from the 16PF. If the current selection process is discriminating between successful and unsuccessful employees, then these profiles should be different, and thus the 16PF should discriminate between the two groups. Therefore the correlation between the two groups should be low and the effect sizes should be large. The graphical presentation of the means of the two groups is presented in Appendix M. An examination of the graphed results reveals that the overall shape of the two profiles was again found to be similar and the means of the two groups are highly correlated (r = 0.99). The descriptive statistics and effect sizes are presented in Table 28. The average of the absolute d values was calculated as an overall measure of how well the five factors as a whole differentiated between the two groups (mean of corrected $|d|$= 0.24).

Table 28

Descriptive Analysis: Not Hired vs. Successful (5)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for d Lower	Upper	Cor- rected d	r
EX					-0.37	-0.68	-0.06	-0.39	-0.14
Not Hired	6.24	1.61	1	10					
Successful	6.84	1.65	3	10					
AX					0.40	0.09	0.70	0.43	0.15
Not Hired	3.46	1.80	1	10					
Successful	2.78	1.23	1	5					
TM					-0.09	-0.40	0.22	-0.10	-0.04
Not Hired	6.77	1.66	2	10					
Successful	6.92	1.70	2	10					
IN					0.01	-0.30	0.31	0.01	0.00
Not Hired	5.97	1.61	2	10					
Successful	5.96	1.68	3	10					
SC					-0.27	-0.57	0.04	-0.29	-0.10
Not Hired	6.75	1.59	2	10					
Successful	7.16	1.32	4	9					

Next, a direct logistic regression analysis was performed on group membership as outcome and the five personality factors as predictors: the five broad factors from the 16PF. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell (2001) were again met. A test of the full model with all five predictors against a constant-only model was statistically reliable, X^2 (5, N = 284) = 11.66, p = 0.0397, indicating that all the predictors, as a set, reliably distinguish between employees who were not hired and employees who were successful. Prediction success was not impressive with a 64.0% overall success rate.

Table 29 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the five predictors. According to the Wald criterion, Factor EX reliably predicted success at the $p < .05$ level.

Table 29

Logistic Regression Analysis of Group Membership as a Function of the Five Broad Factors from the 16PF

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
EX	−0.27	4.32	0.77	0.60	0.99
AX	0.14	1.13	1.15	0.89	1.48
TM	−0.05	0.20	0.95	0.76	1.19
IN	0.14	1.36	1.14	0.91	1.44
SC	−0.09	0.48	0.92	0.71	1.18

Not Hired vs. Unsuccessful (16 Factors). The profiles of all applicants who were not hired were compared to profiles of employees who were unsuccessful using the sixteen narrow factors from the 16PF. If the current selection process is discriminating between successful and unsuccessful employees, then these profiles should be similar, and thus the 16PF should not discriminate between the two groups. Therefore the two profiles should be highly correlated and have small effect sizes. The graphical presentation of the means of the two groups is presented in Appendix N. An examination of the graphed results reveals

that the overall shape of the two profiles was again found to be similar and the means are highly correlated (r = 0.97). The descriptive statistics and effect sizes are presented in Table 30. The average of the absolute d values was calculated as an overall measure of how well the sixteen factors as a whole differentiated between the two groups (mean of corrected $|d|$= 0.17).

Next, a direct logistic regression analysis was performed on group membership as outcome and the sixteen personality factors as predictors: the sixteen narrow factors from the 16PF. Analysis was performed using the binary logit model in SAS. All of the assumptions mentioned by Tabachnick and Fidell were again met. A test of the full model with all sixteen predictors against a constant-only model was not statistically reliable, X^2 (16, N = 261) = 20.51, p = 0.1982, indicating that all the predictors, as a set, did not reliably distinguish between employees who were not hired and employees who were unsuccessful.

Table 30

Descriptive Analysis: Not Hired vs. Unsuccessful (16)

Variable	Mean	SD	Range Lower	Upper	d	95% Confidence Interval for d Lower	Upper	Cor-rected d	r
A					0.00	-0.40	0.40	0.00	0.00
Not Hired	5.15	1.77	1	9					
Unsuccessful	5.15	1.75	2	9					
B					0.05	-0.35	0.45	0.07	0.02
Not Hired	4.47	1.96	1	10					
Unsuccessful	4.37	1.84	1	8					
C					0.06	-0.34	0.45	0.07	0.02
Not Hired	7.16	1.65	2	9					
Unsuccessful	7.07	1.47	4	9					
E					-0.08	-0.48	0.31	-0.10	-0.03
Not Hired	5.96	1.81	1	10					
Unsuccessful	6.11	1.48	3	8					
F					-0.29	-0.69	0.11	-0.34	-0.09
Not Hired	5.84	1.57	1	9					
Unsuccessful	6.30	1.68	2	9					
G					-0.24	-0.64	0.16	-0.28	-0.07
Not Hired	6.82	1.65	2	9					
Unsuccessful	7.22	1.58	4	9					
H					-0.28	-0.68	0.12	-0.30	-0.08
Not Hired	6.55	1.76	2	9					
Unsuccessful	7.04	1.72	4	9					
I					0.28	-0.12	0.67	0.32	0.08
Not Hired	4.27	1.65	1	8					
Unsuccessful	3.81	1.78	1	8					
L					-0.43	-0.83	-0.03	-0.50	-0.13
Not Hired	5.20	1.87	1	10					
Unsuccessful	6.00	1.66	3	9					
M					-0.17	-0.57	0.22	-0.20	-0.05
Not Hired	4.40	1.73	2	9					
Unsuccessful	4.70	1.59	2	8					
N					-0.03	-0.43	0.37	-0.03	-0.01
Not Hired	5.25	1.65	1	9					
Unsuccessful	5.30	1.44	2	8					
O					0.13	-0.27	0.53	0.15	0.04
Not Hired	4.21	1.62	1	9					
Unsuccessful	4.00	1.59	1	7					
Q1					-0.12	-0.51	0.28	-0.15	-0.04
Not Hired	5.13	1.76	1	10					
Unsuccessful	5.33	1.36	3	8					
Q2					-0.05	-0.45	0.34	-0.06	-0.02
Not Hired	4.14	1.45	2	9					
Unsuccessful	4.22	1.72	2	8					
Q3					0.03	-0.37	0.43	0.04	0.01
Not Hired	6.75	1.53	2	9					
Unsuccessful	6.70	1.68	2	9					
Q4					-0.03	-0.43	0.37	-0.03	-0.01
Not Hired	3.47	1.78	1	9					
Unsuccessful	3.52	1.89	1	8					

Table 31 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the sixteen predictors. According to the Wald criterion, Factor G and L reliably predicted success at the $p < .05$ level.

Table 31

Logistic Regression Analysis of Group Membership as a Function of the Sixteen Narrow Factors from the 16PF

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio *Upper*	*Lower*
A	0.02	0.02	1.03	0.74	1.42
B	0.01	0.01	1.01	0.80	1.28
C	0.12	0.38	1.13	0.77	1.66
E	0.17	1.35	1.18	0.89	1.57
F	-0.24	2.06	0.78	0.56	1.09
G	-0.51	7.21	0.60	0.41	0.87
H	-0.24	1.86	0.79	0.56	1.11
I	0.22	1.98	1.25	0.92	1.69
L	-0.30	4.80	0.74	0.57	0.97
M	-0.19	1.09	0.83	0.57	1.18
N	-0.04	0.07	0.96	0.68	1.33
O	0.12	0.48	1.13	0.81	1.58
Q1	-0.19	1.54	0.83	0.62	1.11
Q2	-0.11	0.40	0.90	0.64	1.26
Q3	0.07	0.15	1.07	0.76	1.50
Q4	-0.09	0.56	0.92	0.68	1.24

Not Hired vs. Unsuccessful (5 Factors). The profiles of all applicants who were not hired were compared to profiles of employees who were unsuccessful using the five broad factors from the 16PF. If the current selection process is discriminating between successful and unsuccessful employees, then these profiles should be similar, and thus the 16PF should not discriminate between

the two groups. Therefore the two profiles should be highly correlated and the effect sizes should be small. The graphical presentation of the means of the two groups is presented in Appendix O. An examination of the graphed results reveals that the overall shape of the two profiles was again found to be similar and the means are highly correlated (r = 1.00). The descriptive statistics and effect sizes are presented in Table 32. The average of the absolute d values was calculated as an overall measure of how well the five factors as a whole differentiated between the two groups (mean of corrected $|d|$ = 0.12).

Table 32

Descriptive Analysis: Not Hired vs. Unsuccessful (5)

Variable	Mean	SD	Range *Lower*	*Upper*	d	95% Confidence Interval for d *Lower*	*Upper*	Cor- rected d	r
EX					-0.10	-0.50	0.29	-0.11	-0.03
Not Hired	6.24	1.61	1	10					
Unsuccessful	6.41	1.76	3	10					
AX					-0.13	-0.53	0.27	-0.14	-0.04
Not Hired	3.46	1.79	1	10					
Unsuccessful	3.70	1.84	1	7					
TM					-0.07	-0.47	0.33	-0.08	-0.02
Not Hired	6.77	1.66	2	10					
Unsuccessful	6.89	1.53	3	10					
IN					-0.23	-0.63	0.17	-0.26	-0.07
Not Hired	5.97	1.61	2	10					
Unsuccessful	6.33	1.30	3	8					
SC					-0.02	-0.42	0.38	-0.02	-0.01
Not Hired	6.75	1.59	2	10					
Unsuccessful	6.78	1.40	3	9					

Next, a direct logistic regression analysis was performed on group membership as outcome and the five

personality factors as predictors: the five broad factors

from the 16PF. Analysis was performed using the binary

logit model in SAS. All of the assumptions mentioned by

Tabachnick and Fidell were again met. A test of the full

model with all five predictors against a constant-only

model was not statistically reliable, X^2 (5, N = 261) =

3.03, p = 0.6940, indicating that all the predictors, as a

set, did not reliably distinguish between employees who

were not hired and employees who were unsuccessful.

   Table 33 shows regression coefficients, Wald

statistics, odds ratios, and 95% confidence intervals for

odds ratios for each of the five predictors. According to

the Wald criterion, none of the factors reliably predicted

success at the p < .05 level.

Table 33

Logistic Regression Analysis of Group Membership as a Function of the Five Broad Factors from the 16PF

Variable	*B*	Wald Test (z-ratio)	Odds Ratio	95% Confidence Interval for Odds Ratio	
				Upper	*Lower*
EX	-0.09	0.31	0.92	0.68	1.24
AX	-0.16	1.32	0.85	0.65	1.12
TM	-0.10	0.52	0.90	0.69	1.19
IN	-0.15	1.11	0.86	0.64	1.14
SC	-0.08	0.24	0.93	0.68	1.26

Summary of Findings for the Fourth Research Question

The results for the fourth research question are presented in Table 34. The 16PF revealed statistically significant differences at the *p* < .05 level between applicants who were not hired and successful employees on both the five and sixteen factors.

Table 34

Summary of Results for the Fourth Research Question

Groups	Chi Squared (X^2)	Percent Concordant	Factors Sig. at *p*<.05 level	Mean of Corrected $|d|$	*r*
Hired vs. Successful					
16 Factors	11.25 (*p*=0.7941)	***	None	0.12	0.99
5 Factors	3.55 (*p*=0.6160)	***	None	0.11	1.00
Hired vs. Unsuccessful					
16 Factors	15.17 (*p*=0.5121)	***	None	0.20	0.97
5 Factors	4.57 (*p*=0.4708)	***	None	0.21	0.99
Not Hired vs. Successful					
16 Factors	31.90 (*p*=0.0103)	75.0%	B, I, Q4	0.26	0.97
5 Factors	11.66 (*p*=0.0397)	64.0%	EX	0.24	0.99
Not Hired vs. Unsuccessful					
16 Factors	20.51 (*p*=0.1982)	***	G, L	0.17	0.97
5 Factors	3.03 (*p*=0.6940)	***	None	0.12	1.00

*** Model as a whole not statistically significant at the *p* < .05 level

The fact that the 16PF differentiated between applicants that were not hired and successful employees indicates that those profiles are different. The 16PF could not differentiate between all hired employees and successful employees or between applicants who were not hired and involuntarily terminated (unsuccessful)

employees. This suggests that the profiles of members of those groups are similar. Unfortunately, the 16PF was unable to differentiate between hired applicants and unsuccessful employees.

CHAPTER V

SUMMARY AND DISCUSSION

This chapter provides evaluation and interpretation of the results obtained for each of the research questions. This will include discussing the generalizability of the research findings, practical implications, limitations, and suggestions for future research.

Research Question One

The first research question was: How useful is the 16PF in predicting job performance in a small, team-based manufacturing organization? This part of the study is basically a replication study to provide additional support for the use of the 16PF in personnel selection. Results in the current study indicate that the 16PF was able to correctly classify successful and unsuccessful employees over 86% of the time using the sixteen narrow factors at the company-wide level. This was despite the fact that the general shape of the profiles from the two groups appears to be relatively similar (r = .93; $|d|$ = .31) and no conclusions could be drawn from simple visual comparisons of the profiles. Unfortunately the effect sizes typically ranged from the small to medium range, which suggests that

these results may not be generalizable to other settings.
The distinction between the two groups only became apparent
during the logistical regression. These results support
other findings in the literature such as Batram (1995)
supporting the use of the 16PF in assessing job
performance. More importantly, these results add to the
literature by not only providing additional support for the
use of the 16PF in personnel selection, but also by
providing a specific practical example of using the 16PF as
a screening tool in a small, team-based manufacturing
environment.

Research Question Two

The second research question was: In team-based
organizations, should job specific or organizational-wide
profiles be used for personnel selection? It was
hypothesized that despite the company's stated emphasis on
small groups and the importance of being a good team member
across jobs within the organization, job-specific
comparisons will yield better classification rates than
company-wide comparisons. If the performance criterion (in
this case, employment status) was purely contextual in

nature, then one would expect to find no differences between job-specific and company-wide profile comparisons.

Results from the current study suggest that the 16 narrow factors were successful at correctly classifying employees as successful or unsuccessful at both the company-wide (80.7% correct classification rate; r = .98; $|d|$ = .47) and job-specific (85.1% correct classification rate; r = .96; $|d|$ = .57) levels. These comparisons were made using the five best predictors from the 16PF (the narrow traits). The rationale for doing so will be discussed later in the limitations section, but it should be noted that when using all narrow factors, the sixteen predictors had a correct company-wide classification rate of 86.1% (r = .93; $|d|$ = .31). Although the job-specific comparison had a slightly higher classification rate, was less correlated, and had a larger effect size, due to the magnitude of these differences it is not prudent to say that this provides clear evidence that either job-specific or company-wide profiles would be acceptable to use for personnel selection.

A closer examination of the results reveals that H (Social Boldness), L (Vigilance), and Q4 (Tension) were the most powerful predictors at the job-specific level and H

(Social Boldness), L (Vigilance), Q2 (Self-Reliance), and Q4 (Tension) were the most powerful predictors for the company-wide level. Although Social Boldness and Vigilance appear to be the strongest predictors in both groups, it can be argued that all of these factors can be linked in one way or another to social interactions and team membership. In general, successful employees are more shy, trusting, and relaxed, while unsuccessful employees are more socially bold, suspicious, and tense. However, it is notable that factor Q2 (self-reliance) appears to be a better predictor for the company-wide profile than the job-specific profile. It appears that successful employees are more group-oriented and unsuccessful employees are more self-reliant on the company-wide level, but there is almost no difference between the two groups at the job-specific level. This may be because specific job-related characteristics that are associated with the job of an assistant press operator are not present in the company as a whole. For example, although the company reports that it is highly team-oriented across all job descriptions, the noise level on the plant floor precludes much talking in the actual printing areas where the assistant press operators work. Therefore, assistant press operators may

need to be more independent than employees in other areas of the organization due to job specific demands. Thus, the company-wide profiles may not be the best predictor for job-specific performance even in team-based organizations.

Although the hypothesis that the results from the 16PF would predict job-specific performance better than company-wide performance was not supported, the fact that different factors were more powerful predictors in the two groups gives support to the practice of using job-specific data in personnel selection. It is also suspected that although the company reports that being a good team member is the most important criteria for performance within their organization, the chosen performance criteria for this study (involuntary termination) may not be as contextual in nature as team membership and, therefore, is job specific and not applicable company-wide.

Research Question Three

The third research question was: Which type of personality traits (narrow or broad) are the best predictors of job performance? It was hypothesized that the narrow traits would better predict success in this organization. Results indicated that the five strongest

narrow traits correctly classified employees as successful 85.1% (r = .96; $|d|$ = .58) of the time at the job specific level and 80.7% (r = .98; $|d|$ = .47) of the time at the company-wide level. The broad traits were unable to distinguish between the two groups at a statistically significant level for either the job-specific or company-wide level.

The fact that not one of the five individual broad factors or the five factors as a whole were statistically significant at the p < .05 level as predictors of success at either the job-specific or company-wide level, while three individual narrow factors and the model as a whole (5 narrow factors) were statistically significant at the p < .05 level for both the job-specific and company-wide levels, provides more supporting evidence for the use of narrow factors in practical applications (Ashton, 1998; Ones & Viswesvaran, 1996). The fact that none of the five global factors were statistically significant suggests that using an assessment instrument that only focused on the Big Five likely would not have found any significant results, while the narrow (more specific) traits were able to detect the subtle differences in the profile and, therefore, were stronger predictors.

These results support Ashton's (1998) findings that narrow factors can be better predictors than broad factors in practical applications. The results also appear to support Ones and Viswesvaran's (1996) statements regarding how global constructs should be able to predict broad criteria with moderate validity and narrow constructs should be able to predict specific criteria with maximal validity. Most researchers would probably argue that when performance is defined by employment status, it would be considered a broad criteria, but in the current study, there were very specific behavioral criteria that resulted in involuntary termination. Therefore, in this case, termination can be considered a more specific criterion, which suggests that these results are congruent with Ones and Visesvaran's statement. The results give support to the hypotheses that the narrow traits would be better predictors in practical settings.

Research Question Four

The fourth research question was: Is the organization's current selection procedure, in which the 16PF is only used to generate interview questions, effective? It was hypothesized that the company's current

method of developing non-empirically based interview

questions based on the 16PF scales was not a valid means of

selection. This was addressed through conducting the

backwards-cross validity procedure discussed in Chapter

Three. The results of that comparison are graphically

presented in Figure 2.
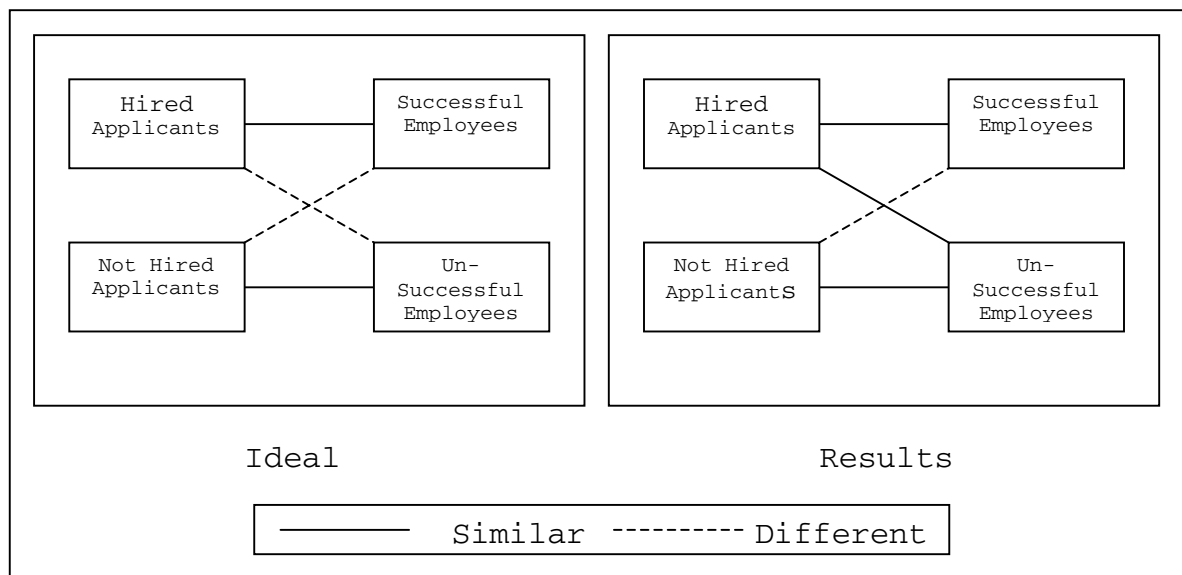
Figure 2. Cross Validation Results

The ideal relationship between the four groups is

represented on the left and the actual results are

represented on the right. If the relationship of the

results would have been exactly matched with the

relationship on the right, then we could have reasonably

concluded that the current selection procedure was effective. In this case, three out of the four relationships suggest that the organization's current selection procedure is at least partially effective. The profiles of hired applicants appear similar to successful employees and the profiles of non-hired applicants appear similar to unsuccessful employees. The scales on the 16PF also discriminated between successful employees and non-hired employees, which indicates that these two groups are different. The only one of the four relationships that did not support the current selection procedure was that the factors could not discriminate between hired applicants and unsuccessful employees. The fact that three of the four tenets of this approach were met, lends at least partial support to the fact that the current selection procedure is being effective in selecting successful employees. The results indicate that the hypothesis that the company's current selection method is not effective does not appear to be supported.

Limitations

The first and most obvious limitation of the current study is the small sample size. This is an excellent

example of one of the biggest hurdles that practitioners encounter when attempting to use personality measures for selection purpose in small organizations. It is very difficult to gather enough data to validate instruments in particular settings when there are not a lot of employees in that setting. For example, the current data were collected over a three-year period and there were still only 17 employees who were assistant press operators and who had been involuntarily terminated. This is likely the reason why the logistic regression between the successful and unsuccessful assistant press operators (using all 16 factors) did not converge in the current study. However, the data could be analyzed using just the five strongest factors, but the results need to be interpreted with caution due to the small sample size. This issue is frequently encountered and makes running validity studies of hiring practices in small organizations difficult.

Another limitation to the current study is the criterion variable. Although this company has a highly structured process for an employee to be involuntarily terminated, this is still not a precisely defined variable. There could be a wide range of counter-productive behaviors that could technically lead to being involuntarily

terminated and that information was not available for the current study. It seems that if there were a more behaviorally-based measure of performance then it is likely that the personality variables from the 16PF could have more accurately predicted performance. This highlights another practical implication of this study. The organization that this study was conducted in had performance data, but they were constantly developing and changing their rating scales and this data was very inconsistent. To add to these inconsistencies, a cursory examination of the current performance-rating scales indicated that there was a large amount of variability between different manager's ratings of employees. Some of the rating sheets were completely filled out with detailed explanations, while others simply had a single score written on the bottom. Again, small companies have difficulty gathering data over a long enough time period to accumulate the numbers that they need to validate particular instruments. Therefore, performance often has to be operationally defined by vague variables such as employment status.

A final limitation of the current study was that the 16PF was not a true measure of the five-factor model. As

mentioned earlier, the five global factors from the 16PF

are correlated with the Big Five, but were actually

developed long before the inception of the Big Five Model.

Therefore, the generalizability of these results to other

studies that used instruments that were developed based on

the Big Five typology should be done with caution. Also,

the fact that most of the *d's* were in the very low to

moderate range according to Cohen's (1983) criteria, limits

the practical implications of these findings. This suggests

that there was very little variability between the groups

of successful and unsuccessful employees on the majority of

both the broad and narrow factors.

Implications for Future Research

The results of the current study support the use of

the 16PF as an effective tool in personnel selection. It

provides further evidence of the importance of making the

job-performance connection at the job-specific level and

that the narrow factors appear to be more powerful

predictors of success. The results from the current study

suggest that additional research be conducted in using

personality measures to predict performance in team-based

organizations. Current findings also suggest that

additional research needs to be conducted in controlling for work-environment fit purported by Holland (1973). It is possible that if the employee's work-environment fit could have been controlled for in the current study, then perhaps the factors from the 16PF could have been even more powerful predictors as Fritzsche, McIntire, and Yost (2002) found.

There has been a recent effort in personality research to conduct factor analysis on several of the traditional personality instruments (including the 16PF) so that the narrow scales factor into the actual Big Five model (Goldberg, 1999). It would be beneficial to conduct this research with this type of data set so that a more direct comparison to the Big Five body of research can be made. This would allow the current results to be compared to a much broader body of work and would be a logical next step for this study.

Finally, non-empirically based selection procedures need to be further researched. The results of this study suggest that the company's current selection model, where interview questions are generated from results of personality measures, were at least partially successful. Highhouse (2002) suggests that these types of evaluations

are common when evaluating candidates for executive positions and for highly specialized jobs, but there is limited empirical evidence for personality tests to be used in this manner.

In summary, the research findings suggest that the 16PF can be effectively used as part of a selection model and that it appears to be a valid instrument for predicting performance in a small, team-based manufacturing environment. The research adds support for using narrow personality factors in predicting success and assessing performance at a job-specific level. Results also call for further investigation into the use of non-empirically based selection procedures such as the approach used by the company in this study.

REFERENCES

Arthur, W., Jr., Woehr, D.J., & Graziano, W.G. (1997). Personality testing in employment settings: Problems and issues in the application of typical selection practices. *Paper presented at the 11th Annual Conference of the Society for Industrial and Organizational Psychology in St. Louis, MO, April 1997.*

Ashton, M.C. (1998). Personality and job performance: The importance of narrow traits. *Journal of Organizational Behavior, 19*, 289-303.

Barrick, M.R., & Mount, M.K. (1991). The Big-Five personality dimensions in job performance: A meta-analysis. *Personnel Psychology, 44,* 1-26.

Barrick, M.R., Mount, M.K., & Judge, T.A. (2001). Personality and performance at the beginning of a new millennium: What do we know and were do we go next. *Personality and Peformance, 9,* 9-30.

Bartram, D. (1992). The personality of UK Managers: 16PF norms for short-listed applicants. *Journal of Occupational and Organizational Psychology, 65,* 159-172.

Batram, D. (1995). The predictive validity of the EPI and the 16PF for military flying training. *Journal of Occupational and Organizational Psychology, 68*, 219-236.

Borman, W.C., & Motowidlo, S.J. (1993). Expanding the criterion domain to include elements of contextual performance. In N. Schmitt & W.C. Borman (Eds.), *Personnel selection in organizations*. San Francisco, CA: Jossey-Bass.

Borman, W.C., & Motowidlo, S.J. (1997). Task performance and contextual performance: The meaning for personnel research. *Human Performance, 10*, 99-109.

Borman, W.C., Penner, L.A., Allen, T.D., & Motowidlo, S.J. (2001). Personality predictors of citizenship performance. *International Journal of Selection and Assessment, 9*, 52-69.

Buchner, A., Faul, F., & Erdfelder, E. (1997). *G-Power: A priori, post-hoc, and compromise poser analyses for the Macintosh* (Version 2.1.2) [Computer program]. Trier, Germany: University of Trier.

Cascio, W. (1994). The Americans with Disabilities Act of 1990 and the 1991 Civil Rights Act: Requirements for psychological practice in the workplace. In B.D. Sales & G.R. Vandenbos (Eds.), *Psychology in litigation and legislation*. Washington, DC: American Psychological Association.

Cascio, W. (1998). *Applied psychology in human resource management*. Upper Saddle River, NJ: Prentice-Hall.

Cattell, H.E. (1993). Comments on Goldberg. *American Psychologist, 48*, 1302-1303.

Cattell, R.B., Eber, H.W., & Tatsuoka, M.M. (1970). *Handboook for the Sixteen Personality Factor Questionnaire (16PF)*. Champaign, IL: Institute for Personality and Ability Testing.

Christiansen, N.D., Goffin, R.D., Johnston, N.G., & Rothstein, M.G. (1994). Correcting the 16PF for faking: Effects on criterion-related validity and individual hiring decisions. *Personnel Psychology, 47*, 847-860.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlational analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.

Conn, S., & Rieke, M.L. (1993). Constuct validation of the 16PF fifth edition. In S. Conn & M.L. Rieke (Eds.), *The Sixteen Personality Factor Questionnaire fifth edition technical manual*. Champaign, IL: Institute for Personality and Ability Testing.

Conway, J.M. (1996). Additional construct validity evidence to the task/contextual performance distinction. *Human Performance, 9*, 309-329.

Costa, P.T., and McCrae, R.R. (1992). *Manual for the Revised NEO Personality Inventory (NEO-PI-R).* Odessa, Fl: Psychological Assessment Resources.

Cronbach, L.J., & Gleser, G.C. (1965). *Psychological tests and personnel decisions.* Urbana: University of Illinois Press.

Davis, R.D., & Million, T. (1999). Models of personality and its disorders*.* In T. Million, P.H. Blaney, & R.D. Davis (Eds.), *Oxford textbook of psychopathology* (pp. 485-522). New York: Oxford University Press.

Digman, J.M. (1990). Personality structure: Emergence of the Five-Factor Model. *Annual Review of Psychology, 41,* 417-440.

Edwards, J.R. (1993). Problems with the use of profile similarity indices in the study of congruence in organizational research. *Personnel Psychology, 46,* 641-665.

Edwards, J.R. (1994). The study of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Making, 58*, 51-100.

Fritzsche, B.A., McIntire, S.A., and Yost, A.P. (2002). Holland type as a moderator of personality-performance predictions. *Journal of Vocational Behavior, 60*, 422-436.

Fritzsche, B.A., Powell, A.B., and Hoffman, R. (1999). Person-environment congruence as a predictor of customer service performance. *Journal of Vocational Behavior, 54*, 59-70.

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe*, Vol. 7 (pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

Herman, K., & Usita, P. (1994). Predictive validity of the 16PF in screening volunteers for big brothers/big sisters. *Psychological Reports, 74,* 249-250.

Hermelin, E., & Robertson, I.T. (2001). A critique and standardization of meta-analytic validity coefficients in personnel selection. *Journal of Occupational and Organizational Psychology,* 74, 253-277.

Highhouse, S. (2002). Assessing the candidate as a whole: A historical and crucial analysis of individual psychological assessment for personnel decision making. *Personnel Psychology, 55*, 363-396.

Hofer, S.M., & Eber, H.W. (2002). Second-order factor structure of the Cattell Sixteen Personality Factor Questionnaire. In de Radd, B. (Ed.), *Big five assessment* (pp. 397-404). Ashland, OH: Hogrefe & Hubler Publishers.

Hogan, J. & Roberts, B.W. (1996). Issues and non-issues in the fidelity-bandwidth trade-off. *Journal of Organizational Behavior, 17,* 627-637.

Hogan, J., Rybicki, S.L., Motowidlo, S.J., & Borman, W.C. (1998). Relations between contextual performance, personality, and occupational advancement. *Human Performance, 11*, 189-207.

Hogan, R. and Hogan J. (1992). *Hogan Personality Inventory Manual*. Tulsa, OK: Hogan Assessment Systems.

Hogan, R., Hogan, J., & Roberts, B.W. (1996). Personality measurement and employment decisions. *American Psychologist, 51*, 469-477.

Hogan, R., & Shelton, D. (1998). A socioanalytic perspective on job performance. *Human Performance, 11*, 129-144.

Holland, J.L. (1973). *Making vocational choices: A theory of careers.* Englewood, NJ: Prentice-Hall.

Hough, L.M., Eaton, N.K., Dunnette, M.D., Kamp, J.D., and McCloy, R.A. (1990). Criterion-related validities of personality constructs and the effect of response distortion on those validities. *Journal of Applied Psychology, 75*, 581-585.

Hull, C.L. (1928). *Aptitude testing.* Yonkers on Hudson, NY: World Book Company.

Hunter, J.E., and Schmidt, F.L. (1990). *Methods of meta-analysis: Correcting error and bias in research findings.* Newbury Park, CA: Sage.

Hurtz, G.M. and Donovan, J.J. (2000). Personality and job performance: The big five revisited. *Journal of Applied Psychology, 85, 869-879.*

Inwald, R.E., & Brockwell, A.L. (1991). Predicting the performance of government security personnel with the IPI and MMPI. *Journal of Personality Assessment, 56*, 522-535.

Inwald, R.E., & Resko, J.A. (1995). Preemployment screening for public safety personnel. In L. Vandercreek, S. Knapp, and T.L. Jackson (Eds.), *Innovations in clinical practice: Vol. 14. a source book*. Sarasota, FL: Professional Resource Press.

Judge, T.A., Martocchio, J.J., & Thoresen, C.J. (1997). Five-factor model of personality and employee absences. *Journal of Applied Psychology, 82,* 745-755.

Kane, J. S. (1997). Assessment of the situational and individual components of job performance. *Human Performance, 10*, 193-226.

McDaniel, M. A., & Frei, R. L. (1998). Validity of customer service measures in personnel selection: A review of criterion and construct evidence. *Human performance, 11*, 1-27.

McLellan, M.J. (1995). Review of the Sixteen Personality Factor Questionnaire, Fifth Edition. *The twelfth mental measurements yearbook.* Lincoln, NE: The University of Nebraska Press.

Mitchell, J.V., Jr. (Ed.) (1985). *The ninth mental measurements yearbook.* Lincoln, NE: The Buros Institute of Mental Measurements.

Mosier, C.I. (1943). On the reliability of a weighted composite. *Psychometrika*, 8, 161-168.

Motowidlo, S.J., & Van Scotter, J.R. (1994). Evidence that task performance should be distinguished from contextual performance. *Journal of Applied Psychology, 79*, 475-480.

Mount, J.K., Barrick, M.R., and Stewart, G.L. (1998). Five-factor model of personality and performance in jobs involving interpersonal interactions. *Human Performance,* 11, 145-165.

Murphy, K.R. (1993). *Honesty in the workplace.* Pacific Grove, CA: Brooks & Cole.

Norman, W.T. (1963). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nominated personality ratings. *Journal of Abnormal Social Psychology, 66,* 574-583.

O'Connor, E.J., Peters, L.H., Pooyan, A., Weekley, J., Frank, B., & Erenkrantz, B. (1984). Situational constraint effects on performance, affective reactions, and turnover: A field replication and extension. *Journal of Applied Psychology, 69*, 663-672.

Ones, D.S., & Viswesvaran, C. (1996). Bandwidth-fidelity dilemma in personality measurement for personnel selection. *Journal of Organizational Behavior, 17,* 609-626.

Paunonen, S.V., Rothstein, M.G., & Jackson, D.N. (1999). Narrow reasoning about the use of broad personality measures for personnel selection. *Journal of Organizational Behavior, 20,* 389-405.

Postuma, R.A. (2002). Employee selection procedures and the business necessity defense. *Applied H.R.M. Research, 7, 53-64.*

Robertson, I.T., Baron, H., Gibbons, P., MacIver, R, & Nyfield, G. (2000). *Journal of Occupational and Organizational Psychology*, 73, 171-180.

Robertson, I.T., & Smith, M. (2001). Personnel selection. *Journal of Occupational and Organizational Psychology,* 74, 441-472.

Rotto, P.C. (1995). Review of the Sixteen Personality Factor Questionnaire, Fifth Edition. *The twelfth mental measurements yearbook.* Lincoln, NE: The University of Nebraska Press.

Russell, M.T., & Karol, K.L (1994). *The 16PF Fifth Edition administrator's manual*. Champaign, IL: Institute for Personality and Ability Testing.

Salgado, J.F. (1997). The five factor model of personality and job performance in the European community. *Journal of Applied Psychology, 82*, 30-43.

Salgado, J.F. (2002). The big five personality dimensions and counterproductive behaviors. *International Journal of Selection and Assessment, 10*, 117-125.

Salgado, J.F. (2003). Predicting job performance using FFM and non-FFM personality measures. *Journal of Occupational and Organizational Psychology, 76*, 323-346.

Schmidt, F.L., & Hunter, J.E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin*, 124, 262-274.

Schmidt, F.L., Ones, D.S., & Hunter, H.E. (1992). Personnel selection. *Annual Review of Psychology, 43*, 627-670.

Schmitt, N., Gooding R.Z., Noe R.A., & Kirsh M. (1984). Meta-analyses of validity studies published between 1964 and 1982 and the investigation of study characteristics. *Personnel Psychology, 37,* 407-421.

Smith, C.A., Organ, D.W., & Near, J.P. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied psychology, 68*, 653-663.

Stevens, J. (1986). *Applied multivarite statistics for the social sciences.* Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Tabachnick, B.G., & Fidell, F.S. (2001). *Using multivariate statistics.* Boston: Allyn and Bacon.

Tett, R.P., Jackson, D.N., & Rothstein, M. (1991). Personality measures as predictors of job performance: A meta-analytical review. *Personnel Psychology, 21,* 703-742.

Villanova, P. (1996). Predictive validity of situational constraints in general versus specific performance domains. *Journal of Applied Psychology, 81*, 532-547.

Vinchur, A.J., Schippmann, J.S., Switzer, F.S. & Roth, P.L. (1998). A meta-analytic review of predictors of job performance in salespeople. *Journal of Applied Psychology,* 83, 586-597.

von Eye, A. (1990). *Introduction to configural frequency analysis.* New York: Cambridge Press.

Wakcher, S., Cross, K., & Blackman, M.C. (2003). Personality comparison of airline pilot incumbents, applicants, and general population norms on the 16PF. *Psychological Reports*, 92, 773-780.

Waller, N.G., & Meehl, P.E. (1998). *Multivariate taxometric procedures: Distinguishing types from continua.* Thousand Oaks, CA: Sage Publications.

Walsh, W.B. & Betz, N.E. (1995). *Tests and assessment* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall, Inc.

APPENDIX A

List of jobs for which applicants were applying

Job Title	Number of Applicants	Percent (%)
Assistant Press Operator	211	58.1
Shipping/Receiving Clerk	48	13.2
Perforator/Bag Operator	12	3.2
Team Leader	21	5.8
Customer Service Rep / Sales	15	4.1
Other	15	4.1
Maintenance Technician	10	2.8
Admin/Clerical	7	1.9
Press Operator	6	1.7
Receptionist	5	1.4
Computer/Info Systems	4	1.1
Human Resources	4	1.1
Accounting	2	0.6
Ink Tech	2	0.6
Graphics	1	0.3

APPENDIX B

All Current APO vs. Invol. Term. APO (16)

- - - - All Curent APO ——— All Invol. APO
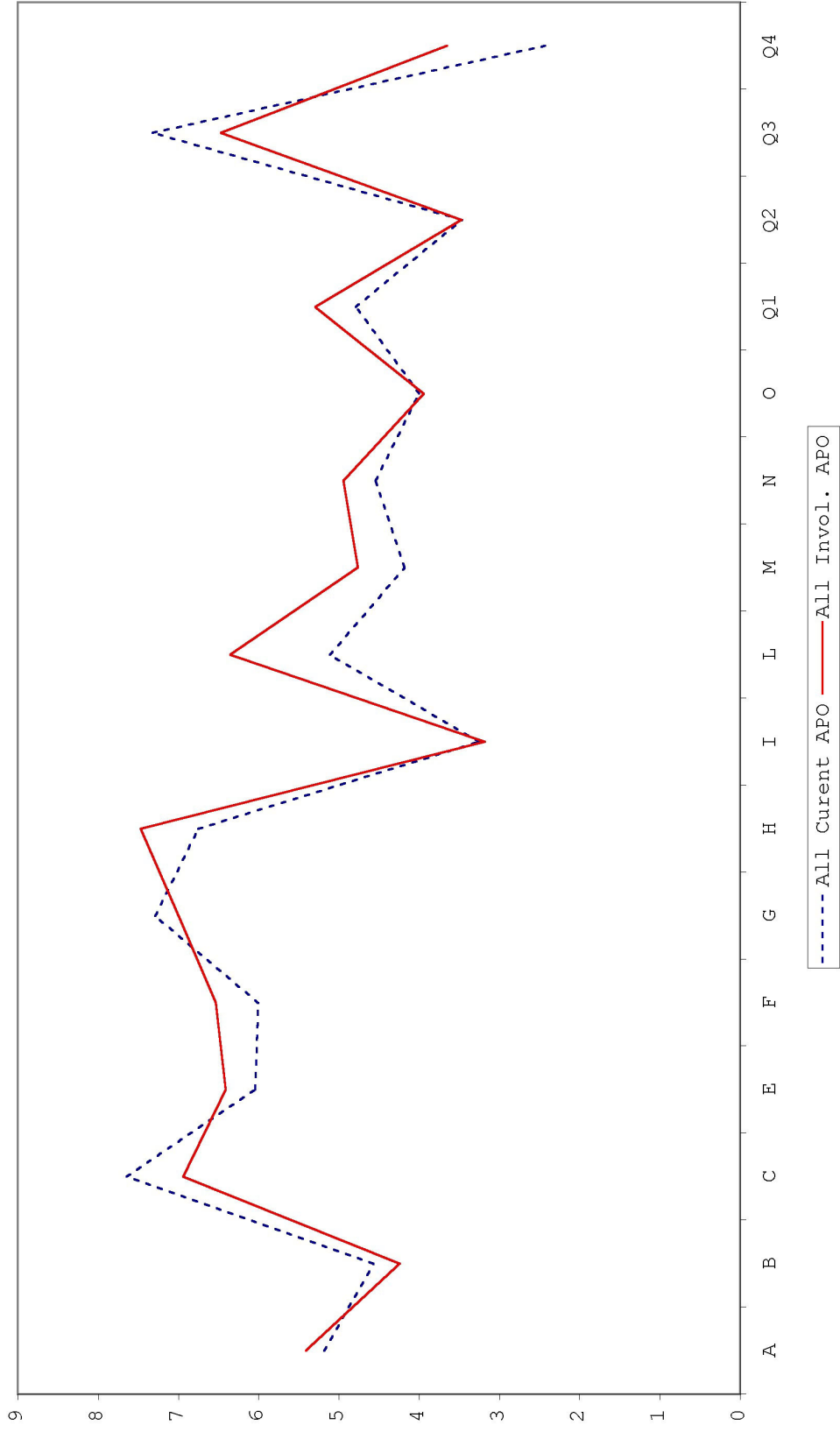
APPENDIX C

All Current APO vs. Invol. Term. APO (5)

- - - - All Current APO ——— All Invol. APO
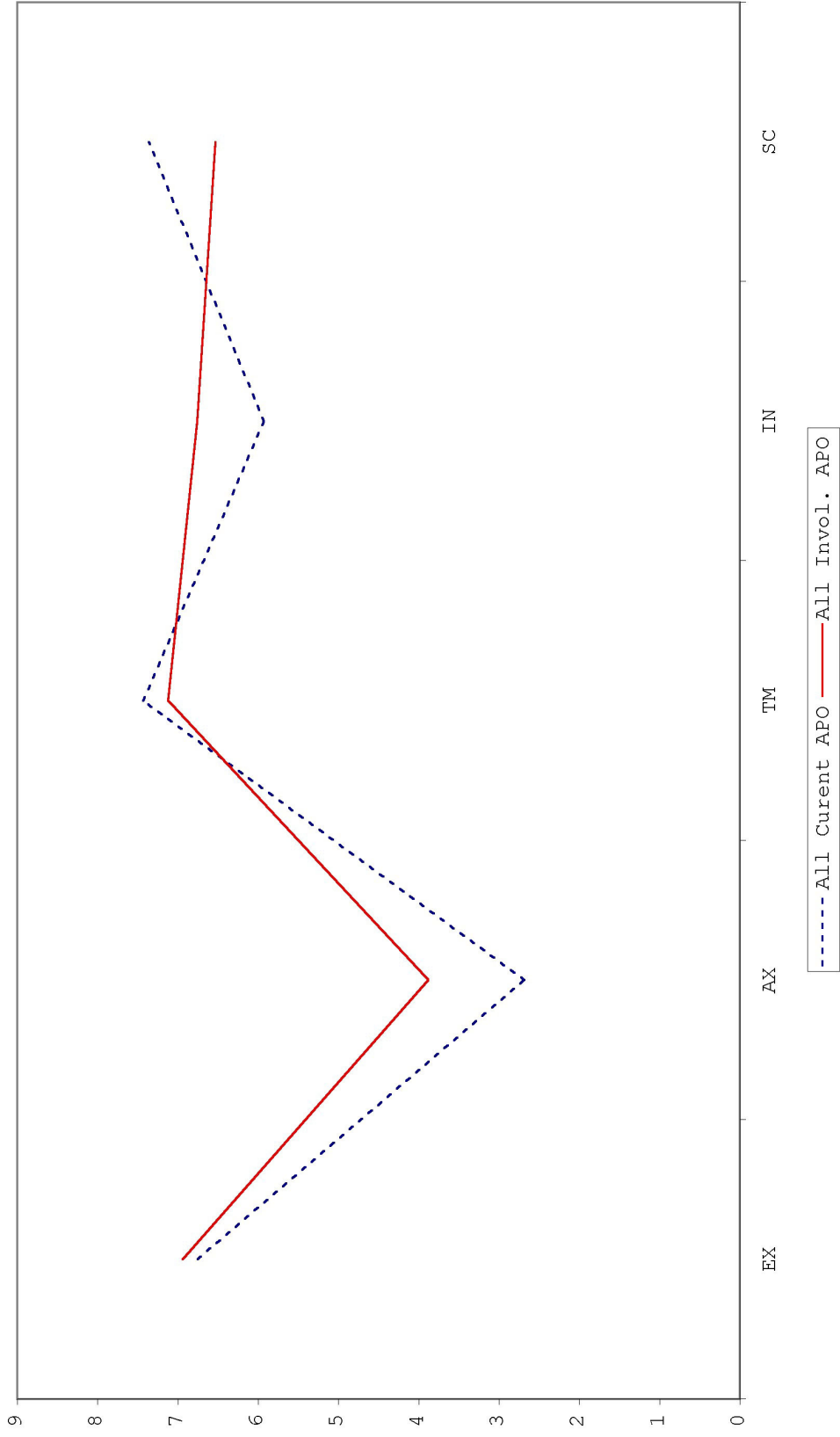
APPENDIX D

All Current Empoyees vs. All Invol. Term Emp. (16)

- - - - All Curent Employees   ——— All Invol. Term
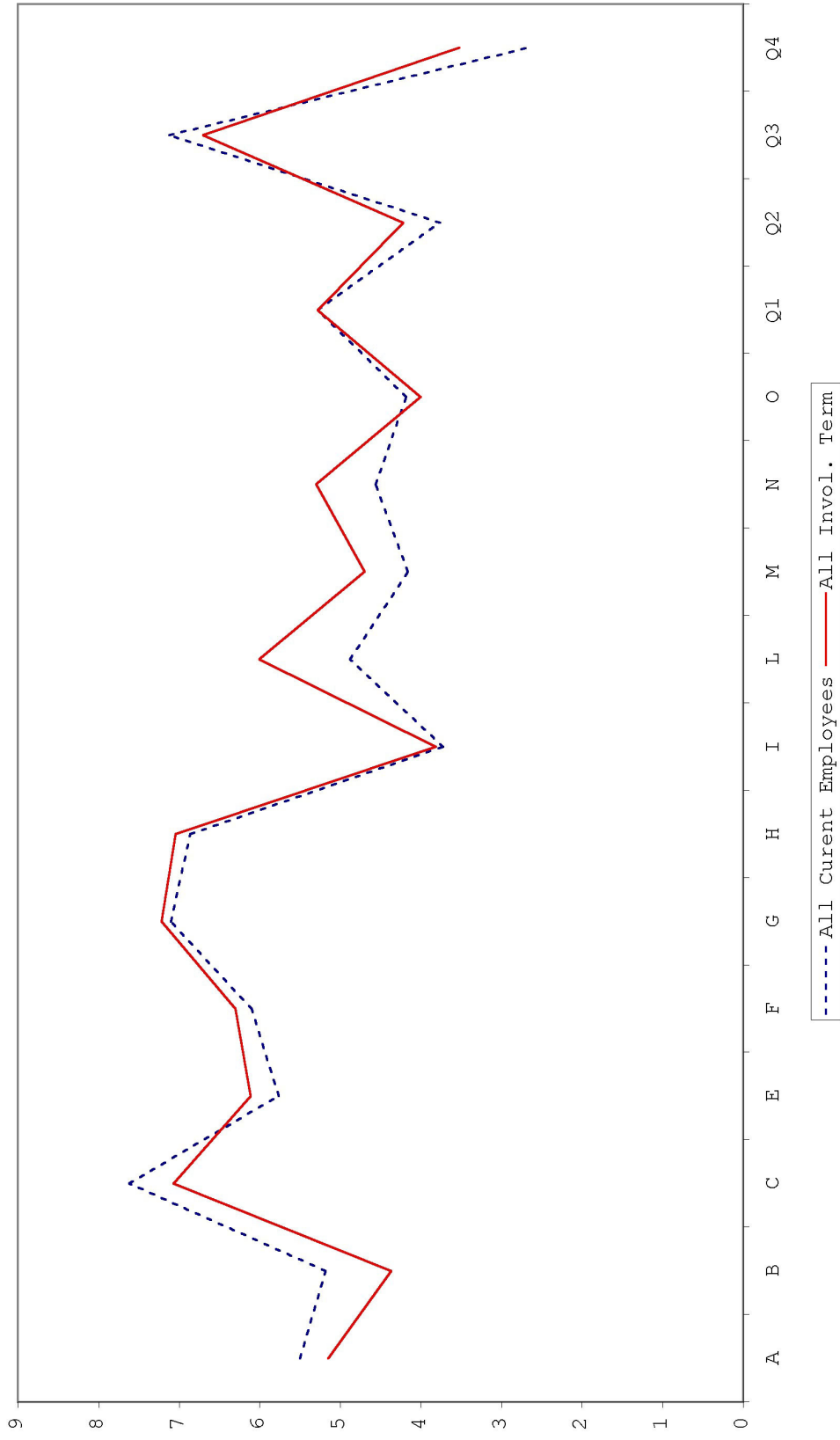
APPENDIX E

All Current Employees vs. All Invol. Term. Emp. (5)

Legend: - - - - All Current Employees   ——— All Invol. Term
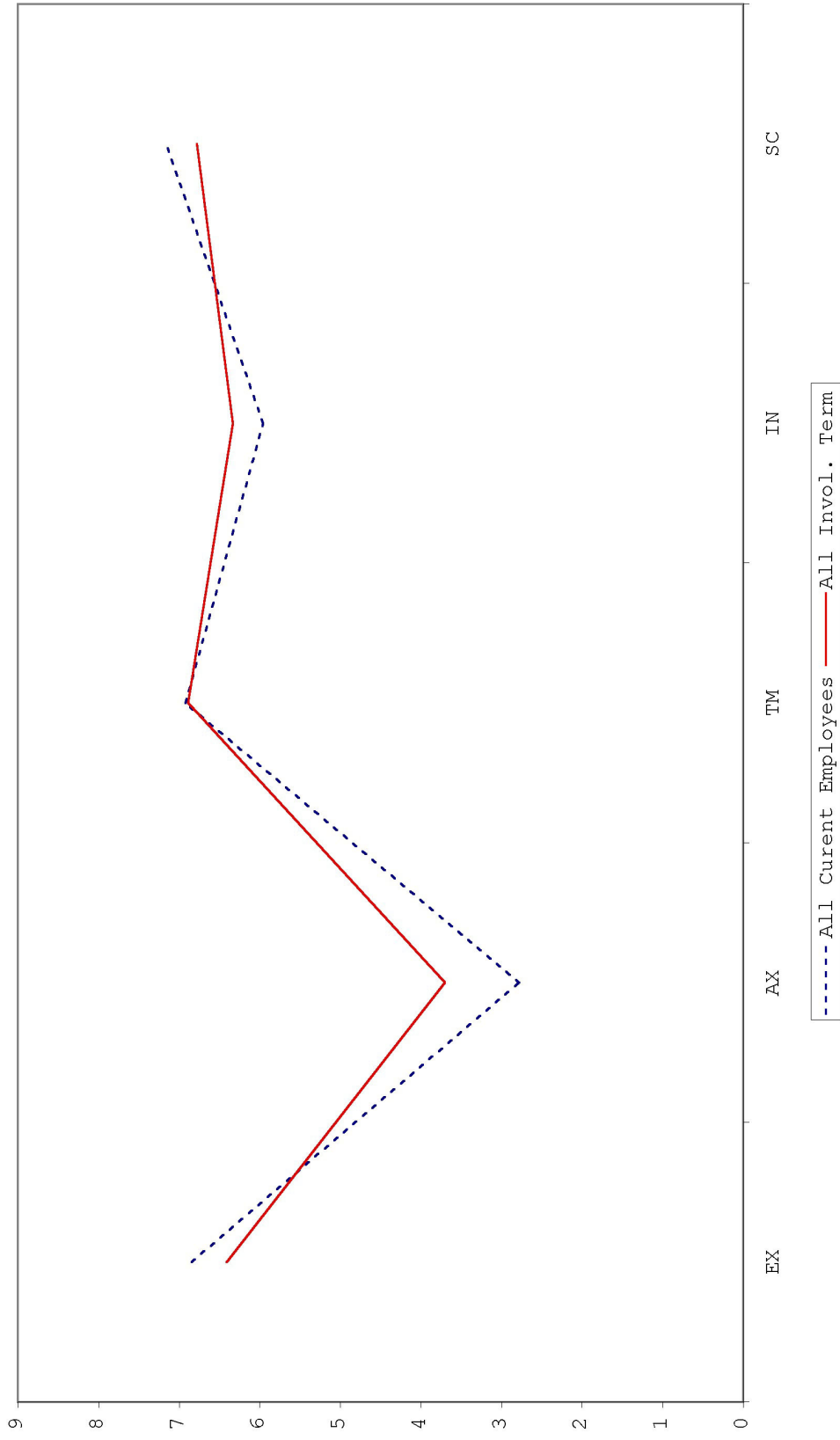
APPENDIX F

All Current APO vs. Invol. Term APO (Best 5 Narrow Traits)
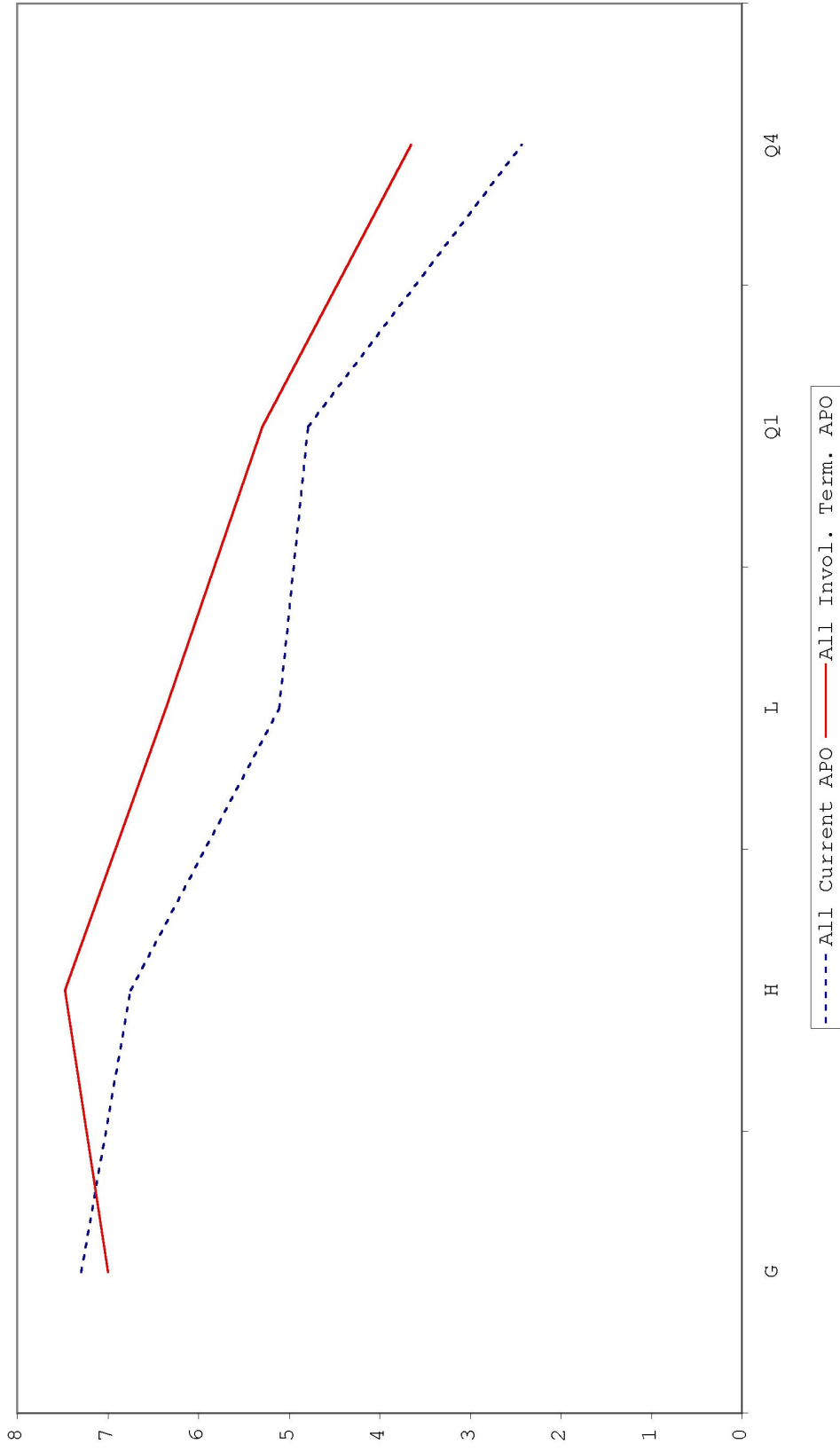
APPENDIX G

All Current vs. All Invol Term (Best 5 Narrow Factors)

- - - - All Current ———— All Invol. Term.
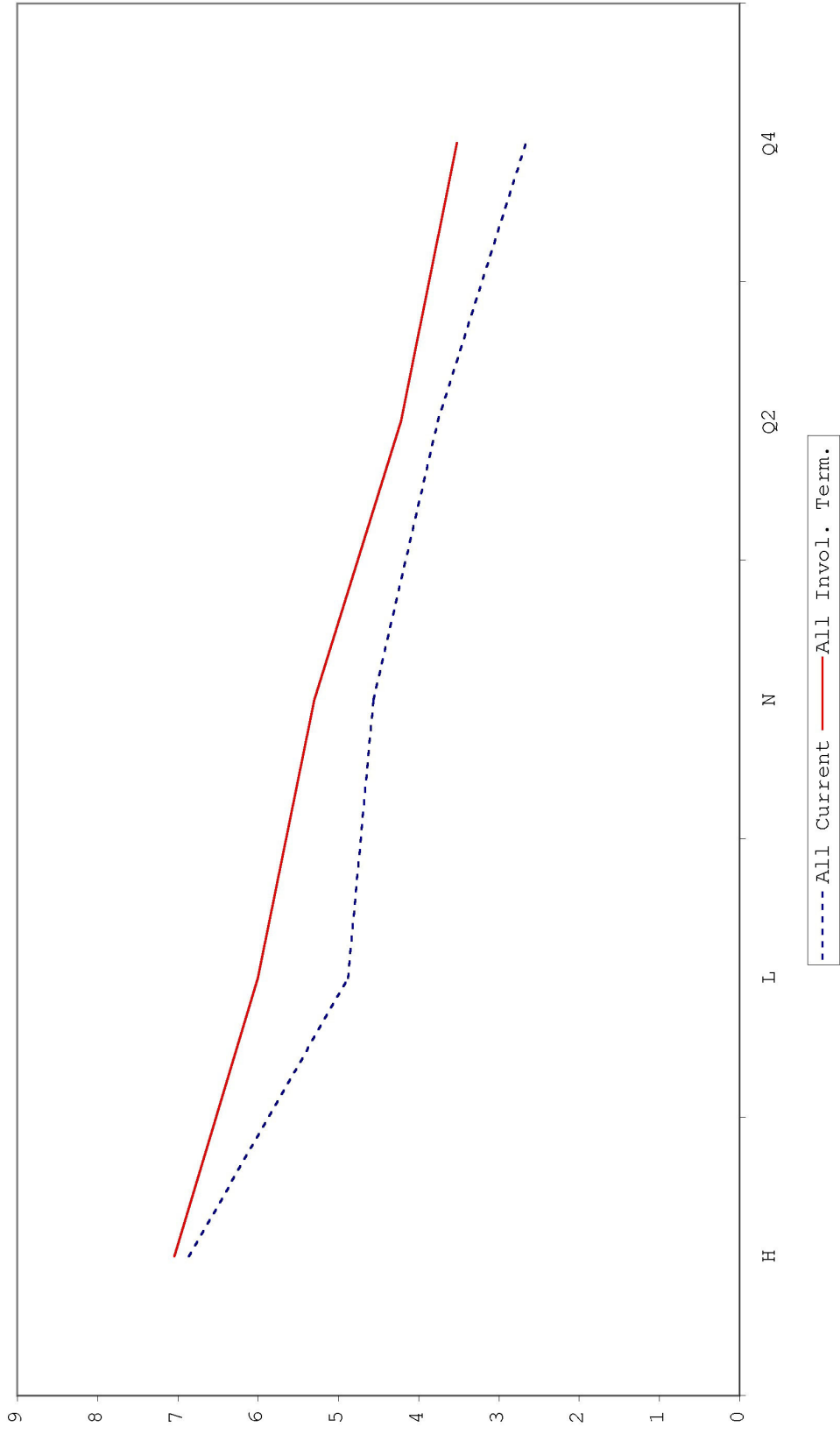
APPENDIX H

Hired vs Successful - Companywide (16)
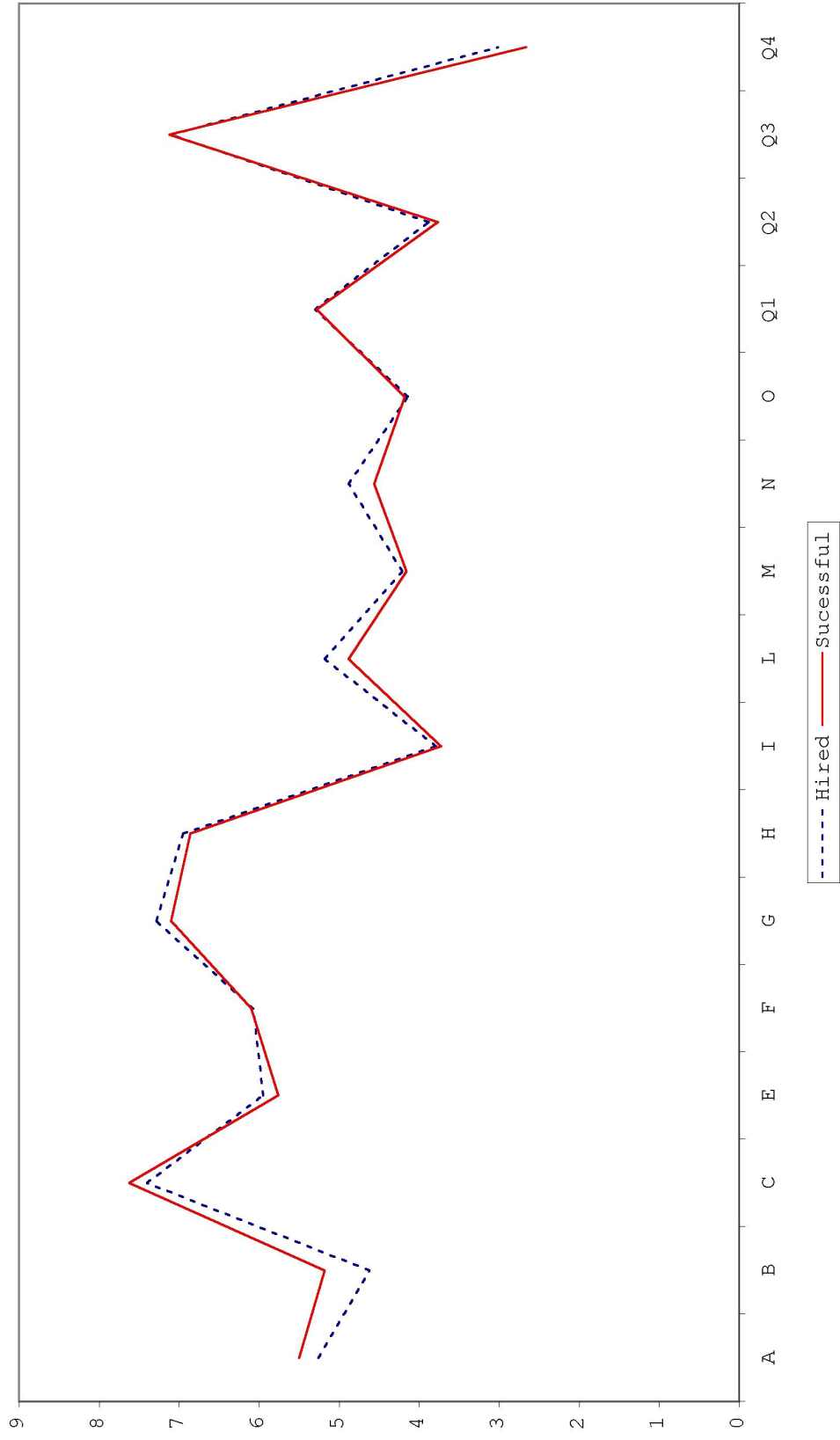
APPENDIX I

Hired vs Successful - Companywide (5)
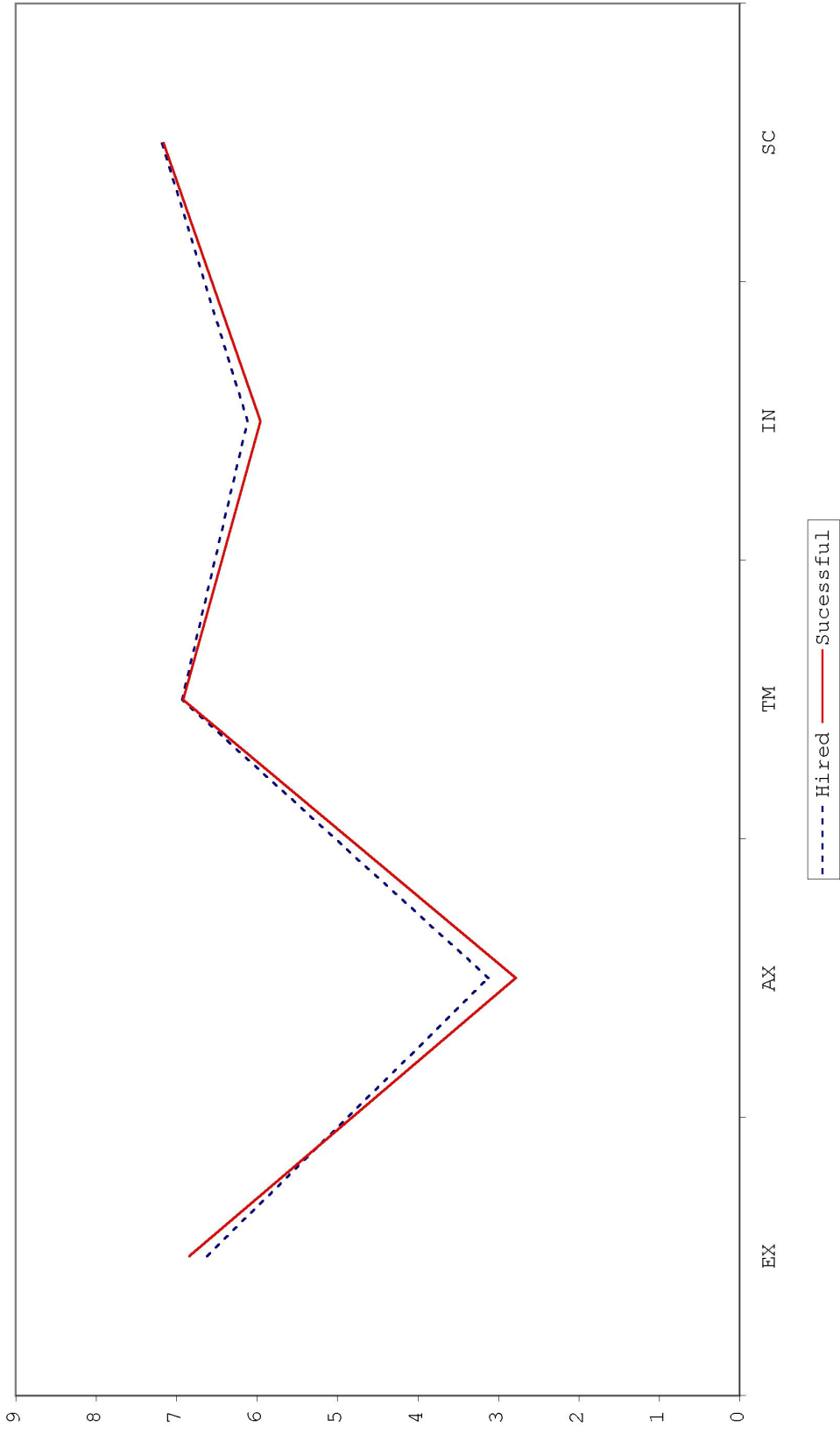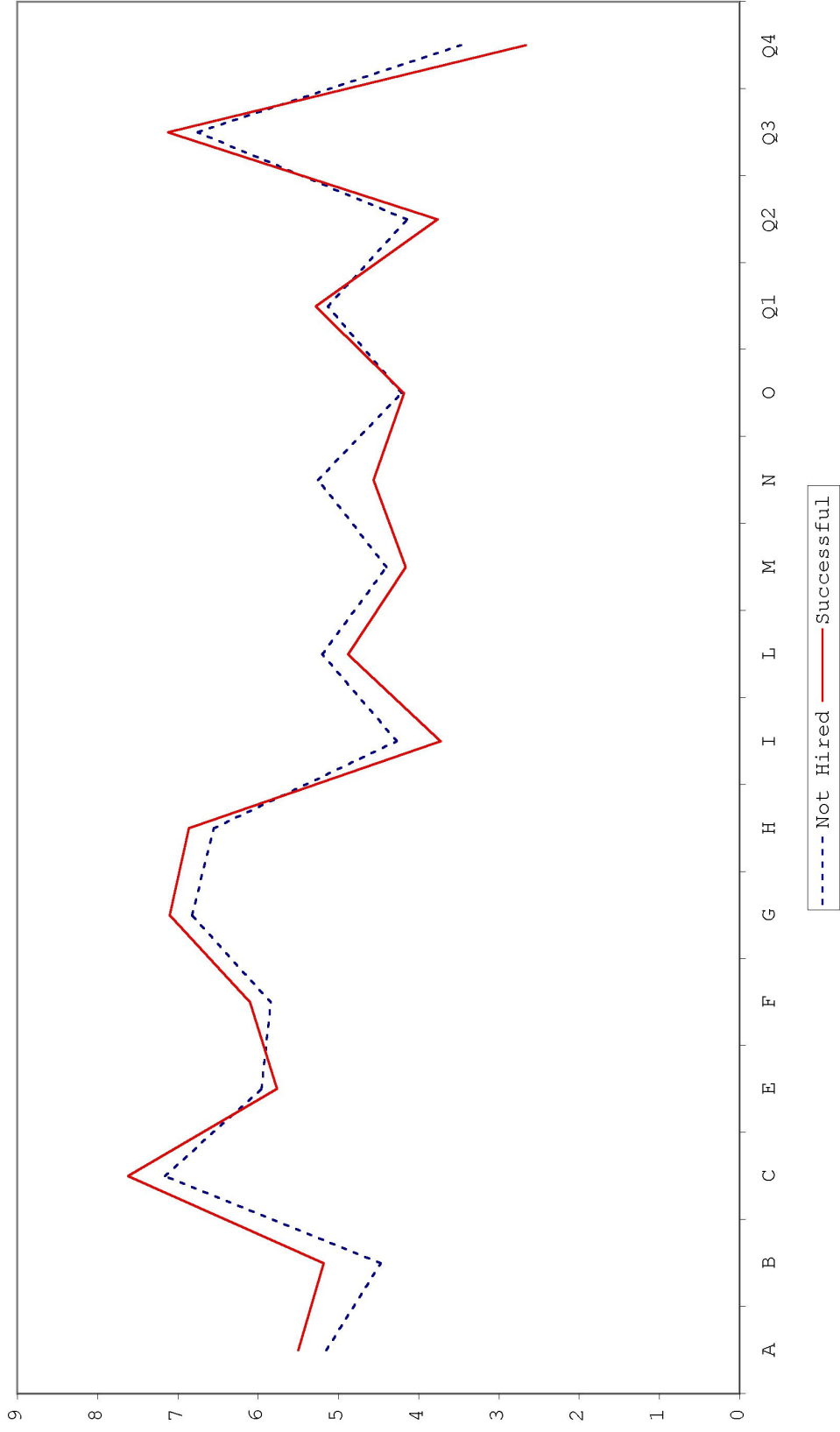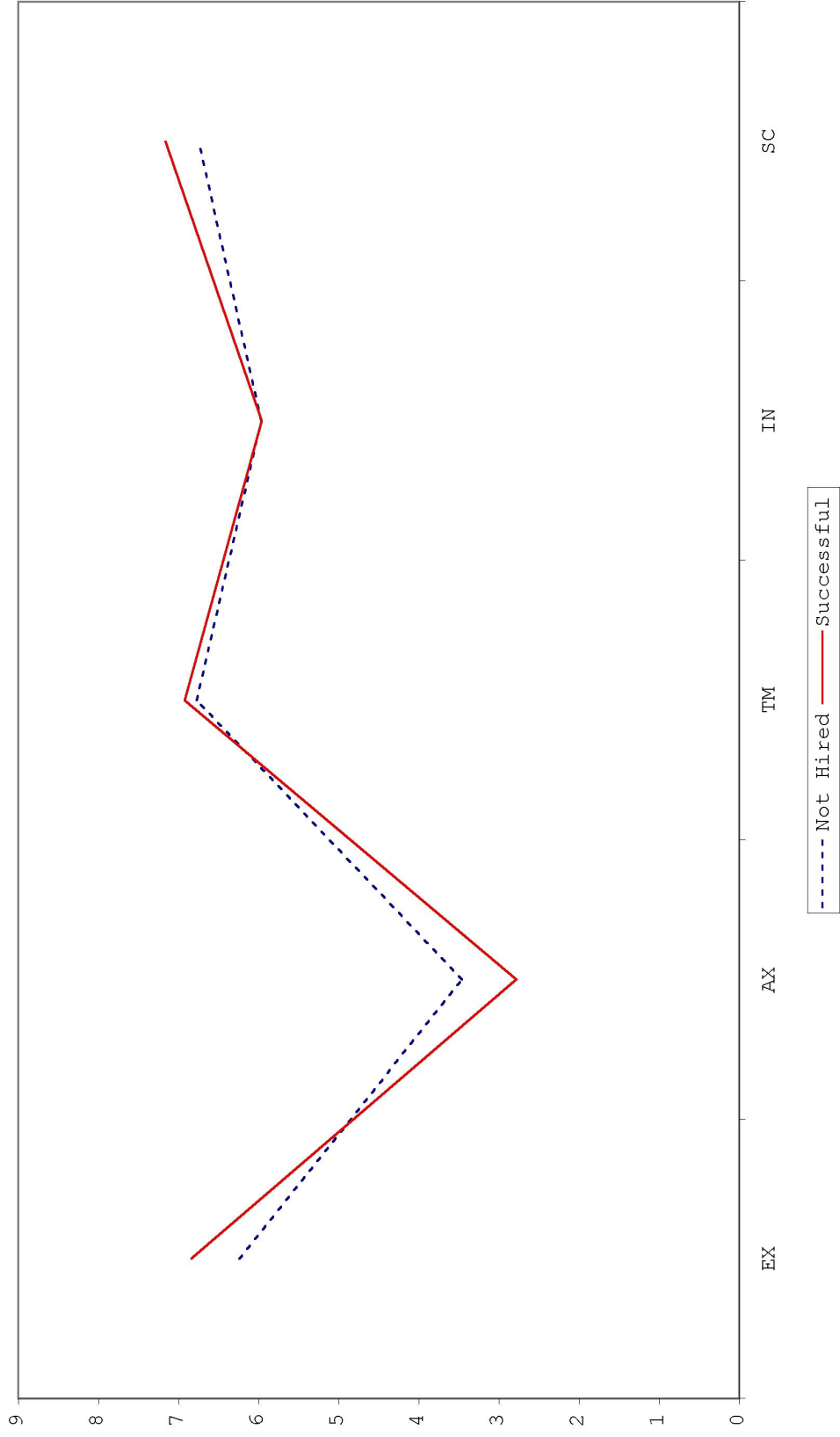
APPENDIX J

Hired vs Not Successful - Companywide (16)

Hired ---- Not Successful ——
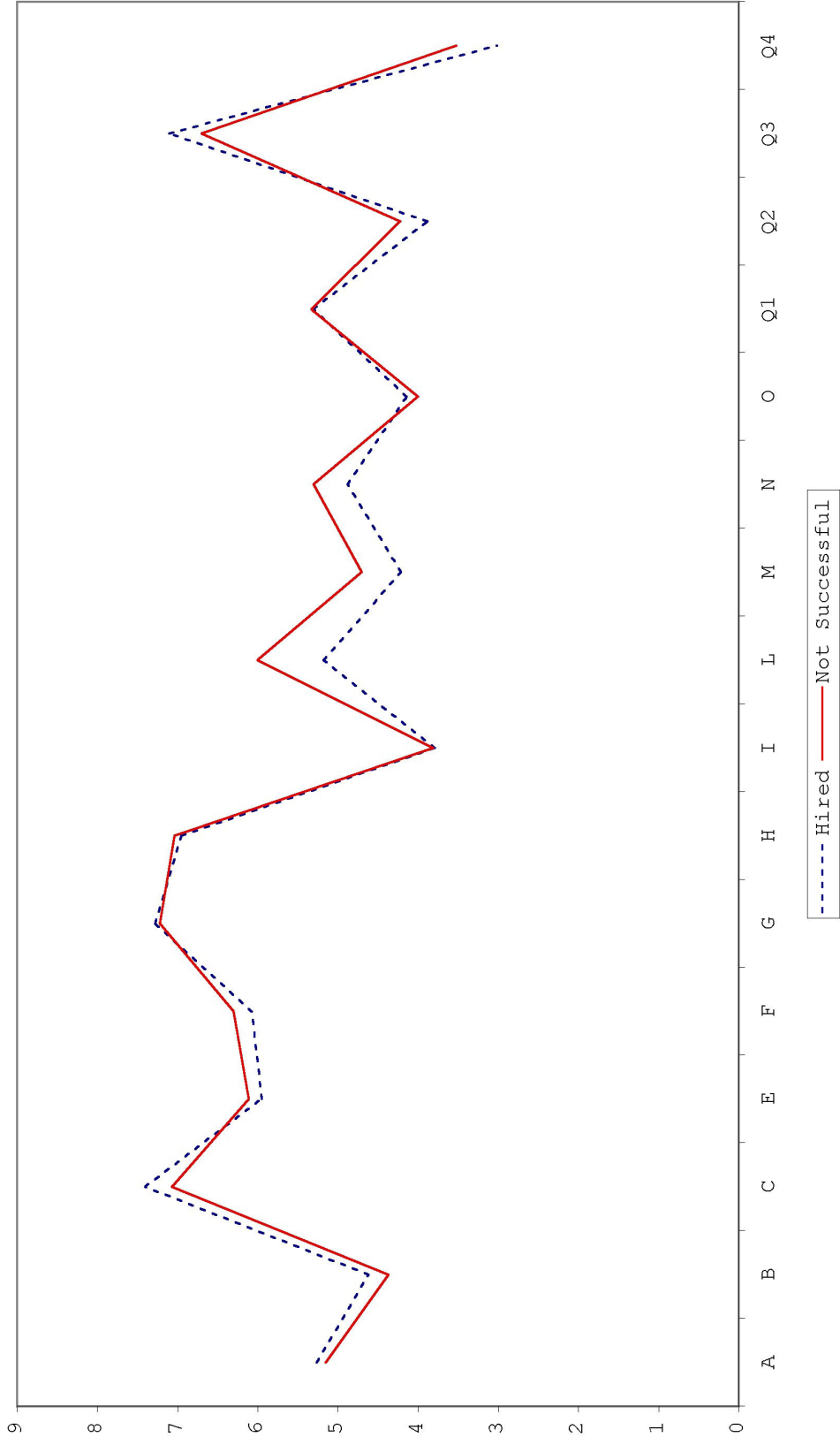
APPENDIX K

Hired vs Not Successful - Companywide (5)

Legend: Hired, Not Successful
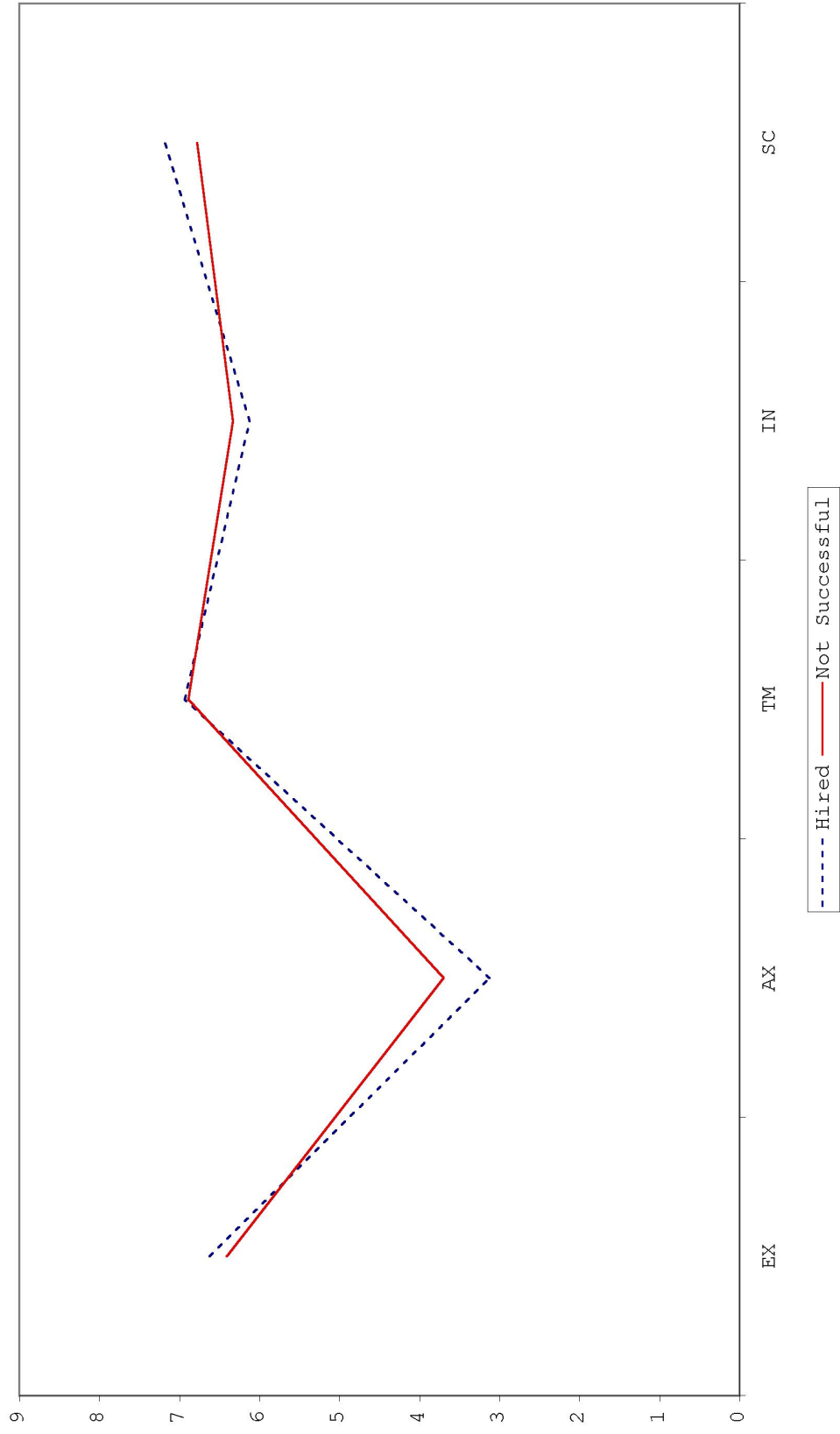
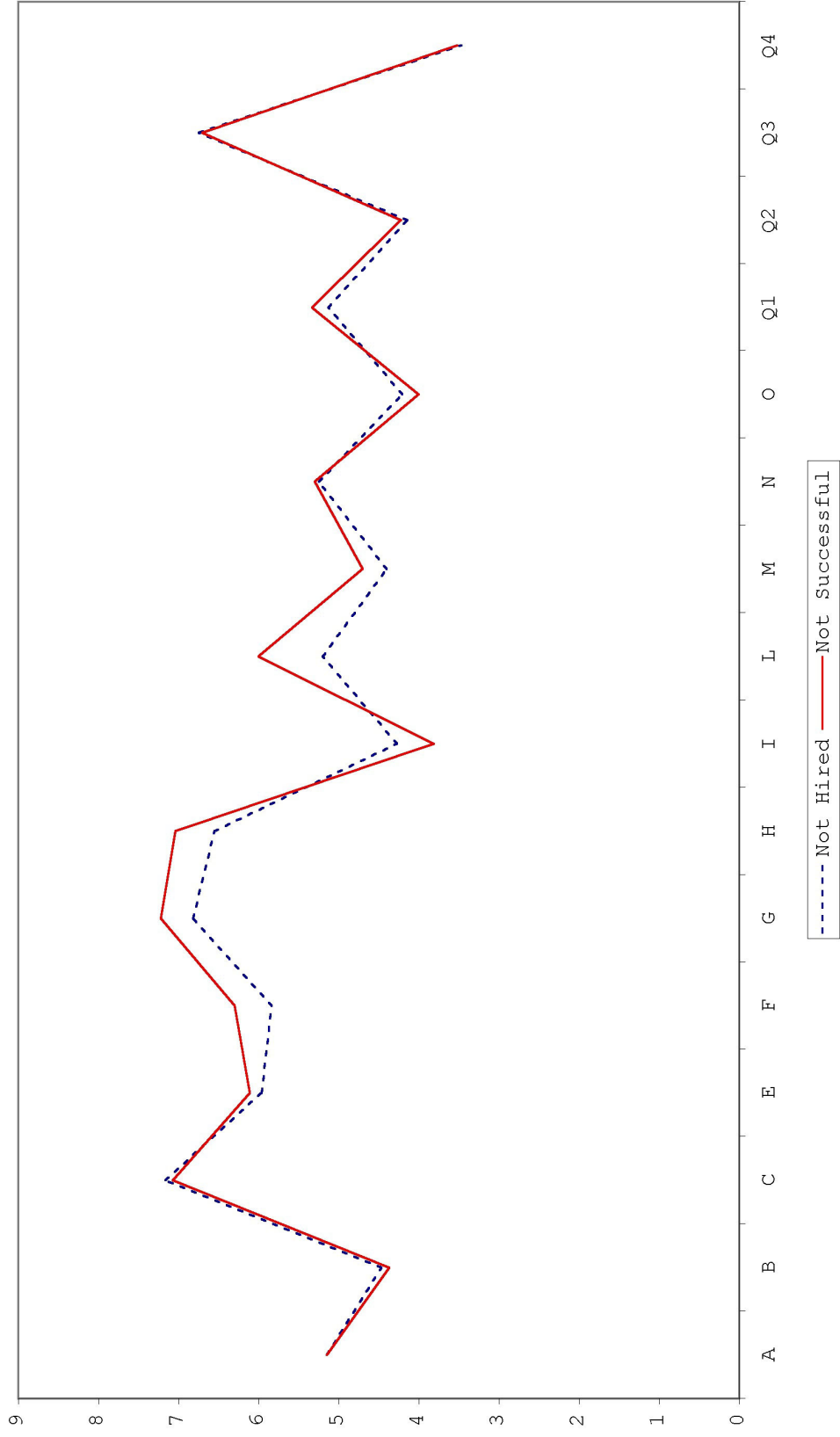APPENDIX L

Not Hired vs Successful - Companywide (16)

APPENDIX M

Not Hired vs Successful - Companywide (5)

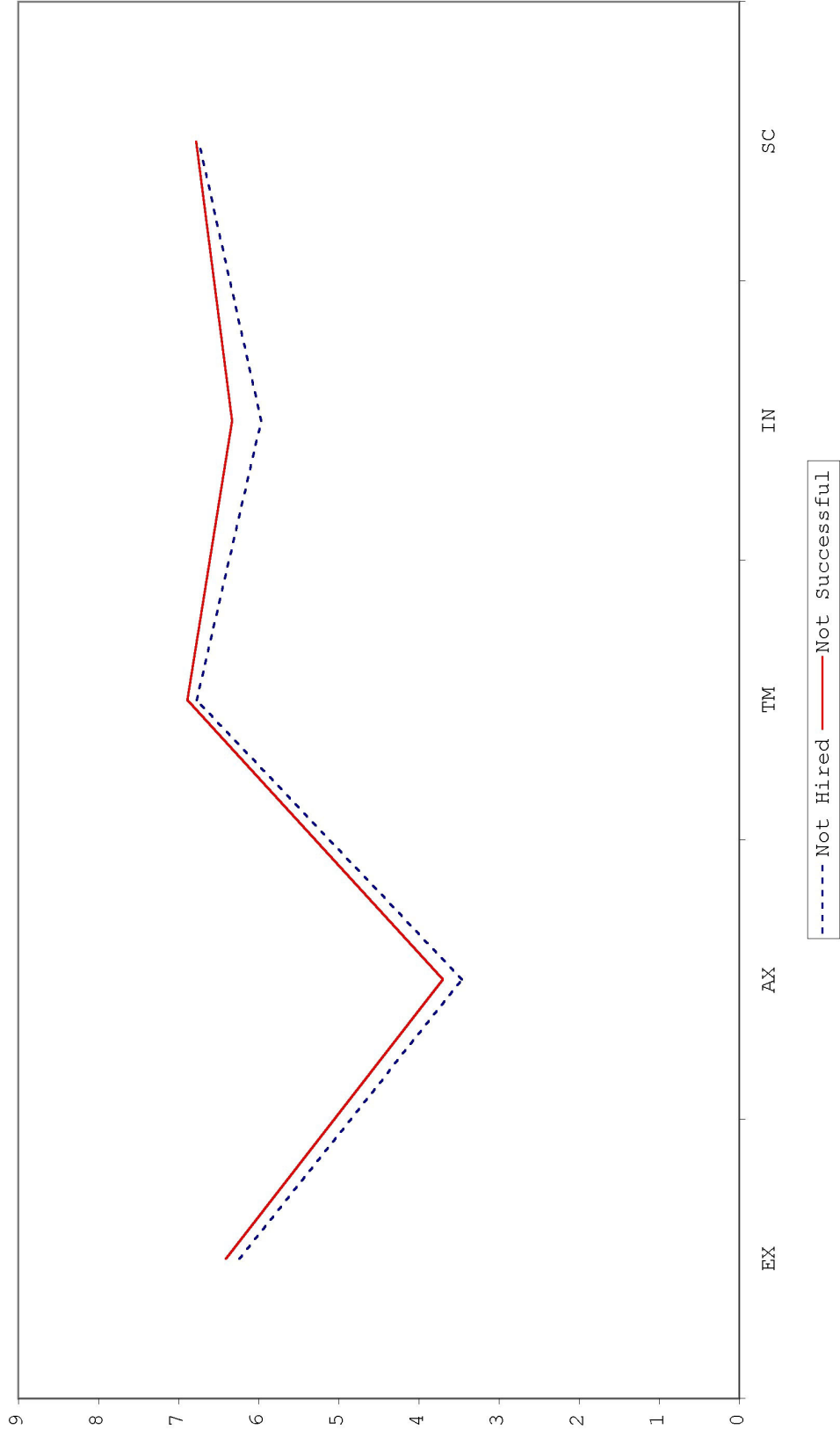APPENDIX N

Not Hired vs Not Successful - Companywide (16)

APPENDIX O

Not Hired vs Not Successful - Companywide (5)

VITA

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