VIABILITY OF THE JOB CHARACTERISTICS MODEL IN A TEAM ENVIRONMENT:  
PREDICTION OF JOB SATISFACTION AND POTENTIAL MODERATORS  

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Much of the history of management and motivation theory is rooted in the desire to understand the factors that contribute to having a satisfied workforce. Job satisfaction is the most widely studied construct in the history of industrial/organizational psychology. The job characteristics model (JCM) holds that if jobs are enriched with high levels of specific job characteristics (i.e., task significance, task variety, task identity, autonomy and feedback), employees will report higher levels of job satisfaction. While this claim enjoys wide support in studies conducted in traditional, hierarchically based organizational environments, few studies have tested the JCM in team based organizational designs.

This study also evaluated possible moderating influences of growth need strength (GNS; the need for personal growth and development within the job environment) and emotional reactivity (a measure of frustration with perceived obstacles in the work environment). It was hypothesized that employees with higher levels of GNS would respond more positively (via higher job satisfaction ratings) to enriched jobs than would employees with lower levels of GNS. Alternatively, it was hypothesized that employees with lower levels of emotional reactivity would respond more positively (via higher job satisfaction ratings) to enriched jobs than would employees with higher levels of emotional reactivity.

Results indicated that four job characteristics (task significance, task variety, task
identity and feedback) served as significant positive predictors of job satisfaction, while GNS moderated the relationships between task significance and task variety with job satisfaction in a way that supported the research hypothesis. Emotional reactivity was not found to moderate any of the relationships between individual job characteristics and job satisfaction. Overall, results support the relevance of the JCM to team based organizations, providing support for the assertion that the relationship between enriched jobs and higher levels of job satisfaction persists across professional work contexts, as well as the partial moderating influence of GNS.
TABLE OF CONTENTS

LIST OF TABLES ........................................................................................................................... iv

LIST OF FIGURES .......................................................................................................................... v

Chapter

I. INTRODUCTION ...................................................................................................................... 1
   Purpose of the Study ................................................................................................................... 6
   Review of the Literature ........................................................................................................... 8
      Job Satisfaction ..................................................................................................................... 8
      Job Redesign and the Job Characteristics Model ................................................................. 15
   Hypotheses ................................................................................................................................. 26
      Hypothesis 1 ......................................................................................................................... 26
      Hypothesis 2 ......................................................................................................................... 27
      Hypothesis 3 ......................................................................................................................... 31
   Issues with Data Collected from Self-Reports ........................................................................ 32

II. METHOD .................................................................................................................................. 34
   Phase I – Qualitative Data Gathering ....................................................................................... 35
      Participants ......................................................................................................................... 35
      Apparatus ........................................................................................................................... 36
      Procedure ............................................................................................................................ 36
   Phase II – Questionnaire Construction and Administration .................................................... 36
      Participants ......................................................................................................................... 37
      Sample ............................................................................................................................... 38
      Variables Included in the Survey ....................................................................................... 38
      Instruments .......................................................................................................................... 40
      Apparatus ........................................................................................................................... 41
      Procedure ............................................................................................................................ 41
      Method of Analysis ............................................................................................................. 42

III. RESULTS ............................................................................................................................... 47
   Data Cleansing ......................................................................................................................... 47
Descriptive Statistics ................................................................. 47
Factor Analysis of Job Characteristics .................................... 48
   Exploratory Factor Analysis ............................................... 49
   Confirmatory Factor Analysis .......................................... 50
Regression Analysis ................................................................ 52

IV. DISCUSSION ............................................................................ 57
   Interpretation of Research Findings .................................... 57
      Four-Factor Solution ..................................................... 57
      Autonomy ....................................................................... 58
   Predictive Ability of Job Characteristics ............................ 60
   Predictive Ability of GNS and Emotional Reactivity .......... 61
      Moderating Influence of GNS and Emotional Reactivity... 62
   Implications for Theory ...................................................... 67
   Implications for Practice ................................................... 68
   Limitations of the Study .................................................. 68
   Ideas for Future Research ................................................ 70
   Conclusion ......................................................................... 70

APPENDIX .................................................................................... 89

REFERENCES .............................................................................. 92
<table>
<thead>
<tr>
<th></th>
<th>LIST OF TABLES</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Demographics of 25 Interviewees</td>
<td>71</td>
</tr>
<tr>
<td>2.</td>
<td>Demographics of 541 Survey Participants</td>
<td>72</td>
</tr>
<tr>
<td>3.</td>
<td>Industries Represented in 117 Work Groups</td>
<td>72</td>
</tr>
<tr>
<td>4.</td>
<td>Descriptives of all Variables</td>
<td>73</td>
</tr>
<tr>
<td>5.</td>
<td>Complete Bivariate Correlation Matrix</td>
<td>74</td>
</tr>
<tr>
<td>6.</td>
<td>Common Variance</td>
<td>76</td>
</tr>
<tr>
<td>7.</td>
<td>EFA Factor Loadings and Variance Accounted For</td>
<td>76</td>
</tr>
<tr>
<td>8.</td>
<td>Complete Scale Correlation Matrix</td>
<td>77</td>
</tr>
<tr>
<td>9.</td>
<td>Standardized Factor Loadings for Job Characteristics</td>
<td>78</td>
</tr>
<tr>
<td>10.</td>
<td>Goodness of Fit Indices for Job Characteristics</td>
<td>78</td>
</tr>
<tr>
<td>11.</td>
<td>Standardized Factor Loadings for GNS and Emotional Reactivity</td>
<td>79</td>
</tr>
<tr>
<td>12.</td>
<td>Goodness of Fit Indices for GNS and Emotional Reactivity</td>
<td>79</td>
</tr>
<tr>
<td>13.</td>
<td>Model Summaries for Regression Analyses</td>
<td>79</td>
</tr>
<tr>
<td>14.</td>
<td>Regression Coefficients</td>
<td>80</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Job characteristics model</td>
<td>81</td>
</tr>
<tr>
<td>2.</td>
<td>Scree plot of Eigenvalues</td>
<td>82</td>
</tr>
<tr>
<td>3.</td>
<td>Predictor model of job characteristics with job satisfaction</td>
<td>83</td>
</tr>
<tr>
<td>4.</td>
<td>Predictor model of GNS and emotional reactivity with job satisfaction</td>
<td>84</td>
</tr>
<tr>
<td>5.</td>
<td>GNS moderating job satisfaction and task significance</td>
<td>85</td>
</tr>
<tr>
<td>6.</td>
<td>GNS moderating job satisfaction and feedback</td>
<td>86</td>
</tr>
<tr>
<td>7.</td>
<td>GNS moderating job satisfaction and task variety</td>
<td>87</td>
</tr>
<tr>
<td>8.</td>
<td>Emotional reactivity moderating job satisfaction and task identity</td>
<td>88</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Much of the history of management and motivation theory is rooted in the desire to understand the factors that contribute to increased levels of job performance and workplace productivity. Not surprisingly, ratings of job satisfaction have consistently served as one of the highest correlates of job performance and productivity (Gardner & Pierce, 1998; Judge, Thoresen, Bono & Patton, 2001; Organ & Near, 1995; Wanous, 1974). Accordingly, job satisfaction has been the most widely studied construct in the history of industrial/organizational psychology (Judge, Parker, Colbert, Heller & Ilies, 2001), and is the most commonly investigated dependent variable in the field (Staw, 1984).

Definitions of job satisfaction vary. Most definitions on job satisfaction focus on either an affective or emotional reactivity to one’s job, or as an attitude one holds about one’s job (Weiss, Nicholas & Daus, 1999). Cranny, Smith and Stone (1992) define job satisfaction as an “affective reaction” (p. 27) to a job, where the employee compares desired versus actual outcomes. While stressing the affective component, this definition allows for a key cognitive component of evaluation, which then informs the affective stance.

Brief (1998) uses the term “attitude” (p. 17) to reference job satisfaction, believing that attitudes have both cognitive and affective components. Attitude is conceptualized as including affect, belief and behaviors (Hulin, 1991). Finally, Locke (1976) defines job satisfaction as “…a pleasurable or positive emotional state resulting from the appraisal
of one’s job or job experiences” (p. 1304), which is perhaps the most widely used
definition today (Brief, 1998).

The importance and role of job satisfaction has been well documented. In
addition to its relationship with job performance, research has supported job satisfaction
having at least moderate correlations with various outcomes, including life satisfaction
(Judge, Locke, Durham & Kluger, 1998; Near, Smith, Rice & Hunt, 1984; Tait, Padgett &
Baldwin, 1989), intent to leave (Mobley, 1982), turnover (Hulin, Roznowski & Hachiya,
1985), anxiety (Jex & Gudanowski, 1992), and depression (Schaubroeck, Ganster &
Kemmerer, 1996). The relationship between job satisfaction and job performance is of
particular importance to employers, who are constantly searching for ways to increase
productivity, lower costs and remain competitive in the marketplace. Of prime concern,
therefore, is the determination of the main antecedents of job satisfaction, and how
employers can best facilitate greater levels of job satisfaction among employees, and in
so doing, facilitate greater levels of individual job performance and workplace
productivity.

Theories concerning the antecedents of job satisfaction can generally be
classified as situational, dispositional or interactive in nature. Situational theories
hypothesize that various aspects of the environment (e.g., the nature of the job itself)
are the principal determinant of job satisfaction levels (Hackman & Oldham, 1976;
Herzberg, 1967; Salanick & Pfeffer, 1978), while dispositional theories argue that quite
independently of the environment, an individual's assessment of job satisfaction is
rooted in the nature of their personality (Brief, Butcher & Roberson, 1995; Necowitz &
Roznowski, 1994; Staw & Ross 1985). Specifically, dispositional factors including
neuroticism (Judge, Bono & Locke, 2001) and emotional stability (Judge, Locke, Durham & Kluger, 1998) have been shown to correlate with levels of job satisfaction.

Interactive theories of job satisfaction include both situational and dispositional variables to explain job satisfaction, believing that the interplay of both has greater power to predict levels of job satisfaction than either one in isolation (Hulin, Roznowski & Hachiya, 1985; Locke, 1976).

One of the most popular models outlining the central antecedents of job satisfaction is known as the job characteristics model (JCM; Hackman & Oldham, 1975; 1976; 1980; see Figure 1). While largely situation based, the JCM does possess some dispositional elements.

In a comprehensive review of job satisfaction literature, the JCM has enjoyed more research support and successful practical application than have most alternative models (Judge, Parker, Colbert, Heller & Ilies, 2001). The JCM is based on a job design principle known as job enrichment. The evolution of the workplace towards job enrichment is explained in detail later in this chapter; suffice to say that with rising levels of education, coupled with a higher skill level required in the workplace, cultures emphasizing that workers “do, but don’t think”, have yielded to current models where employees are expected to make decisions on workplace design and make significant contributions to strategy, rather than simply carrying out assigned tasks (Campion, Mumford, Morgeson & Nahrgang, 2005).

In accordance with these principles, the JCM essentially argues that enriched or complex jobs are best composed of five core job characteristics of task significance, task variety, task identity, autonomy and feedback. These five job characteristics are
believed to positively correlate with job satisfaction and job performance. This part of the model has its roots in the situational theory of job satisfaction.

In addition, a factor termed growth need strength (GNS) is believed to moderate the relationships between the job characteristics and job satisfaction (Hackman & Oldham, 1976). Referred to by the JCM as a “higher-order” (p. 87) need of the individual, GNS represents each employee’s unique need for personal growth and development within the job environment. Employees possessing higher levels of GNS will respond with enthusiasm to jobs enriched with high levels of the five job characteristics, while those with lower levels of GNS, being less inclined to desire professional growth and development, are more likely to respond with apathy to enriched job environments (Hackman & Oldham, 1980). Growth need strength, then, is a distinctly dispositional element of the JCM.

The evolution of work teams to accomplish organizational objectives is an attempt to engage individual employee’s knowledge and skills to a greater extent than do traditional hierarchical structures. Work teams of various sorts have been in development for decades (Cohen & Bailey, 1997). Lawler, Mohrman, and Ledford (as cited in Sundstrom, McIntyre, Halfhill & Richards, 2000), in an analysis of Fortune 1000 companies, report that by 1987, 27% of those companies had some sort of self-managing teams in some part of the organization. By 1996, this number had risen to 78%.

A work team is not synonymous with a group of people working together. Work groups are characterized by narrowly defined jobs having low levels of authority, with rewards based primarily on the type of job, the individual’s performance and seniority
A work team, by contrast, is composed of an interdependent collection of people who share responsibility and accountability for specific outcomes and goals from their joint collaboration. They have a common purpose, and have been specifically empowered with the tools and decision making authority to accomplish their objectives (Katzenbach & Smith, 2001; Sundstrom, De Meuse & Futrell, 1990).

The values of the JCM are inherent in the job characteristics purported to influence levels of job satisfaction, and are remarkably aligned with the values underpinning work teams (Polley & Van Dyne, 1994). The job characteristic of task significance is a reflection of the belief that humans are motivated and fulfilled by work they deem important and meaningful. This concept is closely related to the characteristic of task identity, in which fulfillment is derived from seeing how one’s efforts contribute to larger organizational objectives. The nature of work team processes is such that before the work begins, members spend a significant amount of time understanding the importance of the work they are about to engage in; being part of a team allows each member to view the contributions of others and more easily understand their own contribution in light of the whole than if they were working as isolated individuals (Katzenbach & Smith, 2001).

The job characteristic of task variety is an implicit recognition of the ability and need for the human mind to be stimulated by change, and the challenge of continuous learning. In like manner, work teams are characterized by a flexibility in roles; members are expected to shine in their areas of specialization, but are also required to “do whatever is needed” to ensure that objectives are met. This often means accepting
unanticipated challenges and learning new skills to meet emerging needs (Polley & Van Dyne, 1994).

The job characteristic of autonomy is a reflection of every person’s desire to develop a sense of mastery at work, and to be trusted to make important decisions. One of the hallmarks of effective work team designs is the granting of decision making authority to work teams, providing them with the empowerment they need to make decisions as a body (Polley & Van Dyne, 1994).

Finally, the job characteristic of feedback is a reflection of the human need to gauge one’s own progress and success at work, and to continuously improve. Once again, fundamental to any team’s success is the measurement and communication of progress and obstacles, both internally to the team and across the organization. Regular and continuous feedback is essential for the alignment of teams with their objectives and the sense that they are progressing towards their goals (Cohen, 1994).

**Purpose of the Study**

Despite the alignment between the values of work team organizational designs and the JCM, empirical research on the JCM has largely focused on workers in traditional, hierarchically based organizational designs. This is despite the fact that the nature of work environments around the world are increasingly characterized by employees working in various forms of teams where values are remarkably aligned with the job characteristics of the JCM (Polley & Van Dyne, 1994).

To begin to fill this gap in the literature, research needs to be conducted to explore the relationships between job characteristics and job satisfaction in team
settings. With the increasing prevalence of teams, the applicability of the JCM to this new work environment needs to be established if the model is to continue serving as a guide for work redesign efforts.

Secondly, the role that dispositional characteristics may have in the various relationships of JCM constructs remains relatively unexplored. This is due to the fact that studies involving the JCM (and job redesign research in general), assume that situational factors are mostly if not solely responsible for the attitudes and behaviors of employees (Arvey, Carter & Buerkley, 1991).

Such research often ignores the dispositional element of GNS that Hackman & Oldham (1980) include in their model. The claimed role of GNS as a variable moderating the relationships between the job characteristics and job satisfaction, however, has proven to be a controversial area of research, with studies both confirming and disconfirming this role. This study will serve to broaden this debate by testing whether GNS moderates the relationship between job characteristics and job satisfaction in a highly educated, technical professional environment characterized by work teams.

The purpose of the present study, therefore, is four-fold: (a) to test the relationships of job characteristics with the outcome of job satisfaction; (b) to broaden the ongoing dialogue concerning the role of GNS as a moderator between job characteristics and job satisfaction; (c) to investigate whether the JCM can include a second dispositional element by assessing whether emotional reactivity moderates the relationships between job characteristics and job satisfaction; and (d) to test all of the above relationships in technical professional work team environments.
Review of the Literature

What follows is a review of job satisfaction including related issues and theories, leading to a discussion of job redesign efforts and the JCM. Hypotheses for the current study are included.

Job Satisfaction

The following details the history and development of job satisfaction, as well as various issues in the field. Central theories are also discussed, as well as the impact on job performance.

History and development. Acknowledging that job satisfaction is the most widely studied construct in the history of industrial/organizational psychology, Spector (1996) reports that over 12,400 studies were published on job satisfaction by 1991. Using EBSCO Host, it was found that an additional 9,177 studies were published on job satisfaction from 1991 to 2006.

During his studies on workplace efficiency, Taylor (1911) used such words as “attitude” (p. 8) and “belief”, in describing supervisors and workers (p. 8). Hoppock (1935), was the first known researcher to use the term “satisfaction” (p. 12) to reference how employees assessed their jobs, while Child (1941) used the term “morale” (p. 393) to describe job satisfaction.

Cognition versus affect. Reflecting on Locke’s (1976) definition, Judge et al. (2001) note the interplay of cognitive appraisal and affect. Organ and Near (1985) have also explored the tension between cognition and affect, noting that most measures of job satisfaction reflect primarily cognitive rather than affective evaluations.
Nevertheless, research on the affective contribution to job satisfaction has been conducted. Kunin (1955) developed a job satisfaction measure that asked respondents to choose from a series of pictured facial expressions that best represented their feelings at work. One of the most popular measures of job satisfaction, the Job Descriptive Index (JDI), is purported to measure an employee’s affective reaction to their job (Smith, Kendall & Hulin, 1969). Today, most researchers believe that both cognition and affect are involved in one’s determination of the level of satisfaction they have with their job (Weiss, Nicholas and Daus, 1999).

Global versus facet-based measures. A second issue is whether job satisfaction is best understood and measured as a single, global construct, or if it has various components or facets. Some measures of job satisfaction are faceted (having several items), while others are global (having one item) in nature. Spector (1997) believes that facet satisfaction is of greater practical interest than global job satisfaction, particularly when organizations desire to isolate specific interventions that will result in greater levels of satisfaction in the workplace. Differentiating between various facets allows greater discriminatory power to identify and target specific areas for improvement in order to enhance both job satisfaction and job performance.

Popular measures of job satisfaction. Hoppock (1935) was one of the first researchers to attempt to measure job satisfaction, having respondents answer questions probing the degree to which they liked their current jobs, whether they wanted to quit their jobs, and how well they thought their job satisfaction levels compared with that of others. Brayfield and Rothe (1951) developed an 18-item measure of overall job satisfaction, claiming it was sensitive to variations in attitude among respondents. The
original JDI measured job satisfaction using the five facets of pay, promotions, coworkers, supervision and the work itself (Smith, Kendall & Hulin, 1969). The Minnesota Satisfaction Questionnaire (MSQ; Weiss, Dawis, England, & Lofquist, 1967), and the six-faceted Job Satisfaction Survey (JSS; Spector, 1985) also assess satisfaction from a work facet perspective. With this brief sampling of measures, it seems that a unified, universally agreed upon approach for measuring job satisfaction has not yet been established.

**Theories of job satisfaction.** Popular theories of job satisfaction can be classified as being situational (i.e., based on the environment or job situation), dispositional (i.e., based on the personality or other unique characteristics of the individual), or an interaction of situational and dispositional influences. The situational approach to job satisfaction views it as state based in that ratings of job satisfaction can be influenced and even determined by select changes in the environment. The dispositional approach to job satisfaction has proponents arguing for both situational and dispositional frameworks to understand job satisfaction. Classical dispositional approaches argue for a trait based approach, with various studies claiming stable satisfaction scores over long periods of time, even through changes in jobs and superiors (Newton & Keenan, 1991, Steele & Rentsch, 1997). Other research (e.g., Fisher, 2002) has recorded moment by moment real time changes in job satisfaction ratings accompanied by changes in affect, while other studies show patterns of change in job satisfaction ratings with age (Clark, Oswald & Warr, 1996; Warr, 1992).

One of the earliest situational theories of job satisfaction was Herzberg’s (1967) dual-factor theory. Based on a multitude of employee interviews, Herzberg concluded
that job satisfaction was associated with intrinsic factors including responsibilities, achievements, and the nature of the work itself, factors that he labeled “motivators” (p. 43). Conversely, workers mentioned extrinsic factors, such as company policies, relationships with superiors and pay as chief causes of job dissatisfaction, which Herzberg termed “hygiene” (p. 43) factors.

Herzberg concluded that addressing issues related to motivators, while desirable, would not necessarily result in increased levels of job satisfaction if the factors related to job dissatisfaction were not also addressed. Although subsequent research has usually failed to replicate Herzberg’s findings (finding instead that both intrinsic and extrinsic factors contribute to both satisfaction and dissatisfaction), many of the principles underlying his theories are still discussed today and used in organizational settings, the JCM in particular (Hackman & Oldham, 1980).

A second situational theory called the social information processing view argues that job satisfaction is essentially a socially constructed reality (Salanick and Pfeffer, 1978). Individuals rely on social sources of information, such as cues by their coworkers, interpretations of their own behaviors, and general societal norms to guide their perceptions of job satisfaction. Support for this theory is seen in earlier work by Seashore (1954), who reported a significant negative correlation between group cohesiveness and variety of opinions expressed by group members, and Herman and Hulin (1972), who found that group affiliations explained individual attitudes better than individual characteristics.

Overall, the preponderance of research suggests that situational factors do influence evaluations of job satisfaction. Efforts to positively impact job satisfaction
levels should incorporate these findings.

The dispositional approach to studying job satisfaction was not a major focus of research until the mid-1980s. Exceptions include Hoppock (1935), who found that workers who were highly satisfied with their jobs exhibited a higher level of emotional adjustment than did dissatisfied workers, as well as Bem and Allen (1974), who noted general consistency of behavior across situations. Staw and Ross (1985) investigated the consistency of attitudes over time, reanalyzing the National Longitudinal Survey of Mature Men data set of over 5,000 men. Results indicated significant stability in attitudes across situations such as change of employer or change of profession. They concluded that pre-existing attitudes may have been as persistent a predictor of subsequent attitudes as situational changes were. Staw, Bell and Clausen (1986) found that dispositional measures significantly predicted job attitudes over a time span of nearly 50 years, providing more evidence that disposition may override changes in the environment or job redesign efforts aimed at raising levels of job satisfaction.

Further evidence for the dispositional nature of job satisfaction is seen in research by Arvey, Bouchard, Segal and Abraham (1989), who had 34 monozygotic twins who were reared apart complete the MSQ. Approximately 30% of the observed variance in job satisfaction was due to genetic factors, even when complexity, motor skill requirements and physical demands were held constant.

A significant body of research has focused on positive affectivity and negative affectivity. Positive affectivity is characterized by enthusiasm, pleasurable engagement and high energy, while negative affectivity is characterized by nervousness and distress (Watson, Clark & Tellegen, 1988). Watson and Clark (1984) proposed that the tendency
to experience positive or negative affect was a stable, ongoing dispositional trait. Other researchers have found evidence linking positive affectivity with high levels of job satisfaction and negative affectivity with low levels of job satisfaction (Johnson & Johnson, 2000; Necowitz & Roznowski, 1994). Most studies have found that the relationship between positive affectivity and job satisfaction is stronger than the relationship between negative affectivity and job satisfaction (Connolly & Viswesvaran, 2000).

While some researchers believe that positive affectivity and negative affectivity should not be treated as separate concepts, holding that they are in fact opposite ends of a single, bipolar construct (e.g., Carroll, Yik, Russell & Bartlett, 1999), others insist that limiting personality to two traits is a mistake. The Big Five model of personality (i.e., neuroticism, extraversion, openness to experience, agreeableness and conscientiousness; Goldberg, 1990) were used by Judge, Heller and Mount (2002) in a meta-analytic review of 1,277 studies linking them to job satisfaction, finding that traits of neuroticism \( r = -.29 \), extraversion \( r = .25 \), and conscientiousness \( r = .26 \) displayed moderate correlations with job satisfaction, while agreeableness \( r = .19 \) and openness to experience \( r = .02 \) were weaker. For these latter two factors, the authors noted a high variability of correlations across studies. No reason was provided for the overall weakness of these correlations.

Another dispositional theory gaining credibility is known as core self-evaluations (CSE; Judge, Locke & Durham, 1997). Core self-evaluations refer to the fundamental, subconscious beliefs that individuals hold about themselves and their functioning in the world. Situation-specific appraisals are affected by these deeper and more fundamental
self-appraisals, even though people may not be aware of the influence that CSEs have on their perceptions and behavior.

Two primary studies have linked CSEs to job satisfaction, finding moderate correlations between job satisfaction and CSEs for both self-report and independent ratings by significant others (Judge, Bono & Locke, 2000; Judge et al., 1998). It would appear, therefore, that dispositional effects should not be discounted when trying to measure and/or raise levels of job satisfaction.

Some researchers argue that rather than adhering strictly to a situational or dispositional explanation of job satisfaction, both influences may work either together or at least alongside each other. Gerhart (1987) showed that job characteristics explained variance in satisfaction scores even after accounting for any effects due to attitudinal stability. His results indicate that attitudinal stability accounted for 20% of the variance in job satisfaction, while job characteristics accounted for 23% of the variance in job satisfaction. Interestingly, this study differentiated between high and low attitudinal stability. Results indicated that job redesign efforts might prove more successful when the employee exhibits low attitudinal stability. Gerhart concluded that an “interactive perspective” (p. 878) of job satisfaction being comprised of both situational and dispositional elements, was the best interpretation of his findings.

*Impact on job performance.* Awareness of the impact of job satisfaction on performance is rooted in such research as the Hawthorne studies, the major finding of which was that valuing people by involving and recognizing them was strongly correlated to increased levels of performance. Recent research by Judge, Thoresen, Bono, and Patton (2001) involved a meta-analysis of 312 studies investigating the
relationship between job satisfaction and job performance. This study looked at several models of the relationship between job satisfaction and job performance, reporting a moderate but significant positive correlation between job satisfaction and job performance ($r = 0.30$). The authors note substantial variation in the individual correlations across the 312 studies, indicated by the wide credibility interval (.03 to .57). Possible reasons for the moderate positive correlation is that the relationship between job satisfaction and job performance for high complexity jobs ($r = .52$) was much higher than for low complexity jobs ($r = .29$), suggesting that job complexity moderates the job satisfaction – job performance relationship.

**Job Redesign and the Job Characteristics Model**

Efforts to redesign jobs to increase levels of job satisfaction and workplace productivity have a relatively short history. Initial attempts at job redesign were pioneered by Taylor (1947). Based on his work from 1895-1911, he advocated job specialization as the most effective way to promote workplace productivity. Popularized by Henry Ford’s assembly line process, job specialization consisted of: (a) breaking a job down into its smallest components; (b) determining the most efficient way of performing each component; (c) designing the layout of the workplace to best facilitate work completion; (d) training workers to perform very specific tasks without deviation; and (e) using money as the primary incentive.

While the assembly line process resulted in greater efficiency and cost savings, the individual’s potential value to the organization was limited to a strict adherence to performing the prescribed tasks. Work was repetitive and boring, resulting in negative
side effects such as apathy and carelessness. The body was engaged, but not the mind, and jobs therefore lacked meaning and interest. In such an environment, workers were not provided with opportunities to develop skills and grow with the organization (Staw, 1984). For example, Walker and Guest (1952) found low levels of job satisfaction among workers in a car assembly plant. When asked why they were dissatisfied, employees pointed to a lack of control over work tools and processes, involvement with only a small part of the production cycle, and repetitive, low skill level work.

In response to such findings, organizations adopted strategies such as job rotation, where workers were cross-trained on different jobs, and job enlargement (also known as horizontal job loading), where jobs were expanded to include tasks previously performed by others. The idea behind both approaches was to increase the variety of tasks and thereby raise employees’ levels of interest, hoping for a corresponding reduction in the monotony and boredom associated with performing a single task. Neither of these approaches resulted in significant nor sustained improvements in job satisfaction levels or job performance (Hackman & Oldham, 1980).

Job enrichment or “vertical job loading” (p. 77), was originally proposed by Herzberg (1967), as part of his dual-factor theory of motivation. Herzberg advocated that jobs be rich in motivators such as a sense of achievement, recognition, responsibility, opportunity for growth and advancement, and the work itself. Jobs should therefore be designed with a goal of maximizing these factors. Workers should be given significant control over resources, and provided with regular feedback on their performance. Facilitating the shift from job rotation to job enrichment was a rise in education levels, as well as greater levels of technical sophistication in the workplace.
that allowed for less supervision and the chance for workers to make a greater number of decisions themselves (Herzberg, 1967).

People have accomplished more by working together in groups or teams than by working alone for thousands of years. In the modern industrial workforce, however, the evolution of work teams to their present level of success and popularity has been slow in coming.

Some of the earliest known research on teams in the workplace was conducted by Sherif (1936), who found that the influence of norms formed in the context of work groups left an imprint on each member of those groups long after they had been dissolved. Although the individual was again working in relative isolation, their dominant frame of reference on major issues remained the same to the conceptualizations agreed upon by their former work group.

Other early research focused on the use of power and decision making in organizations. Lewin, Lippitt and White (1939) found that leaders who involved subordinates in the debate and decision making process were more effective in achieving business objectives than both autocratic and laissez-faire style leaders. Another study found that the same style of leadership facilitated workplace cultures where employees were less resistant to difficult changes and were, in fact, more satisfied with those changes than workers in other organizations (Coch & French, 1948).

A major study by Trist & Bamfort (1951) focused on British coal miners, and advocated that management provide the work groups with “responsible autonomy” (p. 38), and that each group should be provided with a “satisfying sub-whole” as its central
objective (p. 38), principles virtually identical with the job characteristics of task identity and autonomy.

In what came to be known as Social Comparison Theory, Festinger (1954) found evidence that self-evaluation was often based on a benchmark of how well people believed they matched up with others. This finding had significant implications for the understanding of group dynamics and how peer pressure could be used within work teams.

By the 1970s, the use of work teams was growing in the U.S., and success stories were beginning to circulate. One major study at General Motors with over 6,500 employees documented savings of several million dollars in productivity gains via process improvements attributed to the use of work teams. The domestic auto industry’s embrace of work teams was in part modeled on Japanese values in their auto plants, where managers shunned individual titles and prestige, preferring to be identified as part of their work team. In many of these environments, performance evaluations were conducted by one’s fellow team members, not just managers, and compensation was team-based (Katzenbach & Smith, 2001).

By the late 1980s and early 1990s, principles of effective work teams were crystallizing in the literature. Most researchers agreed on a fairly consistent set of effective team principles, including clear and measurable goals, clear roles for team members, support from other functions in the organization, and empowering leadership (Larson & Lefasto, 1991, Orsburn, Moran, Mussellwhite & Zenger, 1990, Tjosvold & Tjosvold, 1991).

The JCM is based on the principles of job enrichment established by Herzberg
(1967), as well as Hackman and Lawler (1971), who believed that if jobs could be enriched in certain ways, that certain psychological states composed of special attitudes and beliefs would result, leading to positive outcomes including higher levels of internal motivation, job satisfaction and job performance (Hackman & Lawler, 1976).

The JCM of Hackman and Oldham (1976) identified internal work motivation, growth satisfaction and job satisfaction as personal outcomes, while quality job performance, turnover and absenteeism were postulated as work outcomes. To provide validation measures for the various independent and dependent variables of the JCM, Hackman and Oldham (1975) created the Job Diagnostic Survey (JDS).

Outline of the job characteristics model. The JCM is described in detail later in this chapter. This section provides an overview. The JCM identifies five core job characteristics (i.e., task significance, task variety, task identity, autonomy and feedback) as essential to prompting three critical psychological states (i.e., experienced meaningfulness of work, experienced responsibility for work outcomes and knowledge of work results). These three critical psychological states, in turn, lead to several positive personal and work outcomes (i.e., higher levels of growth satisfaction, internal work motivation, job satisfaction and job performance).

Factors termed as growth satisfaction, internal work motivation and job satisfaction are classified as personal outcomes, with job performance being the sole work outcome. The critical psychological states are identified as such because according to the JCM, they must be experienced by the individual if the five core job characteristics are to influence personal and work outcomes. The critical psychological states serve as mediators of the relationship between the job characteristics and the
personal and work outcomes (Hackman & Oldham, 1976). In addition, other factors are believed to serve as important moderators of the relationships between the core job characteristics and outcomes, including work environment characteristics (i.e., satisfaction with pay, satisfaction with security, satisfaction with co-workers, satisfaction with supervision), knowledge and skill, and GNS (Hackman & Oldham, 1976; 1980). A review of these claims, along with other relationships claimed by the JCM, will be undertaken later in this chapter.

**Definition of variables and the job diagnostic survey.** Hackman and Oldham (1980) provide the following descriptions for the five job characteristics:

1. **Task significance** refers to the degree to which the job has a substantial and obvious impact on the lives or well being of others, either within or outside the organization.

2. **Task variety** refers to the degree to which a job challenges the skills and abilities of the employee. The greater the number of skills required, the greater chance that the skills and abilities of the whole person are called upon. Regardless of the degree of skill involved, the sheer number of different skills required mitigates against monotony.

3. **Task identity** is the degree to which the job requires completion of a whole or identifiable piece of work from its inception to its completion, with a visible outcome for the worker.

Taken together, these first three job characteristics contribute to the mediating psychological state of experienced meaningfulness, where the individual perceives their work as worthwhile or important. If a job has high levels of these three job characteristics, the employee is likely to feel that their job is very meaningful. Even if two of the three job characteristics are present, the employee is still likely to experience a high level of experienced meaningfulness (Hackman & Oldham, 1980).

4. **Autonomy** refers to the degree to which the job provides the employee with freedom, independence, discretion in scheduling work and determining how it will be performed, giving the employee an overall
sense of control over their work. If a job is high in this characteristic, employees are likely to feel a greater sense of personal responsibility and accountability in their jobs, since they have a greater level of control over whether the job will be performed well or poorly, rather than relying strictly on orders from superiors or a job instruction manual. The level of autonomy is the greatest contributor to the psychological state of experiencing responsibility for work outcomes. The sense of ownership gained from having control over performing the work transfers directly to feeling responsible for the success of the outcomes of the work (Hackman & Oldham, 1980).

5. Feedback refers to the degree to which the worker is able to determine the success of their efforts. Such feedback may come from superiors, others, or through direct observation of the effects of those efforts. This job characteristic, more than any other, influences the degree to which the employee possesses knowledge of the results of their work, the final critical psychological state in the JCM (Hackman & Oldham, 1980).

Identified as one of the personal outcomes of the JCM, internal work motivation is the extent to which the employee is self-motivated to perform effectively in their job. When performing at a high level, employees high in internal work motivation will experience positive internal feelings; accordingly, employees will feel negative internal feelings when performing poorly (Hackman & Oldham, 1980). Other outcomes of the JCM include growth satisfaction, which is the extent to which one feels that one is learning and growing personally and professionally at work, job satisfaction, and job performance (Hackman & Oldham, 1980).

Several moderators are presented in the model that warrant definition. As described previously, GNS refers to each employee’s unique need for personal growth, development and accomplishment in the job environment. Hackman and Oldham (1976) believed that one of the most important values of the individual worker was their need for personal growth and development through their job. Workers with high levels of GNS should respond more positively to jobs that have high levels of the five job characteristics than will workers possessing low levels of GNS. Levels of GNS,
therefore, moderate the relationships between the job characteristics and job satisfaction such that people with higher levels of GNS will have stronger correlations between job characteristics and job satisfaction, while people with lower levels of GNS will show weaker correlations between these two variables (Hackman & Oldham, 1980).

Other moderators include satisfaction with pay, which refers to the degree of satisfaction with compensation, including benefits and bonuses, as well as the degree to which compensation is commensurate with the individual’s contribution to the organization. Security satisfaction is defined as the degree of perceived general security, as well as the sense of one’s prospects for security in the future. Co-worker satisfaction refers not only to the degree of satisfaction with other employees, but also with opportunities to get to know and assist others in the workplace. Supervision satisfaction refers to the degree of satisfaction with the treatment, support and quality of leadership received from one’s supervisor. Knowledge and skill are not defined, as they are unique to each specific work setting (Hackman & Oldham, 1980).

To summarize the JCM, when jobs are designed to prompt employees to experience the psychological states of meaningfulness in their work, responsibility for the outcomes of their work, and possessing knowledge of the results of their work, they will have strong positive feelings that will result in high levels of internal work motivation, job satisfaction, growth satisfaction, and job performance. Key to the prompting of the psychological states are the presence of the five job characteristics (i.e., task significance, task variety, task identity, autonomy and feedback), which serve as a roadmap for job redesign (Hackman & Oldham, 1980). Finally, the employee’s level of GNS, satisfaction with security, supervision, pay and co-workers, as well as the
employee’s level of knowledge and skill, moderate the relationships between the job characteristics and the psychological states, the relationships between the psychological states and the personal and work outcomes, and the relationships between the job characteristics and the personal and work outcomes. The JDS provides a set of measurements with which to test the constructs and relationships claimed by the JCM (Hackman & Oldham, 1980).

Assessment of the job characteristics model. Algera (1990) reports that the JCM has generated more research than any other theory of job redesign, and the model is regarded by many as one of the most comprehensive job redesign structures in existence (Anthony, Perrewe & Kacmar, 1996). Griffin (1991) reports that the corresponding JDS is widely used in job redesign research and application, and has acceptable psychometric properties, but also notes that many specific relationships between variables in the model have been questioned. This section will review research pertaining to the central relationships assumed in the model, namely, the relationships between the job characteristics and the personal and work outcomes, the role of the critical psychological states as mediators, and the role of GNS and other moderators in the model.

The a priori dimensionality proposed by Hackman and Oldham (1975) proposed five distinct job characteristics having moderate correlations with each other. Many studies have investigated the factor structure of the five job characteristics in the JCM, with several of them confirming the dimensionality of the characteristics as outlined in the model. Confirmation of Hackman and Oldham’s (1975) five-factor structure was found with employees from insurance (Pokorney, Gilmore & Beehr, 1980); the public
sector (Lee & Klein, 1982); the Ohio national guard (Harvey, Billings & Nilan, 1985), and managers in a utility company (Johns, Xie & Fang (1992).

There are several other studies, however, that have failed to find a five-factor solution. For example, Dunham (1976) reported that 83% of the explained variance in his sample of over 3,000 employees in a merchandising corporation was accounted for by a single factor, concluding that for this sample, the two most reasonable conclusions consisted of either a single-factor solution defined as “job complexity” (p. 405), or a four-factor solution, with task variety and autonomy combined into a single factor.

Dunham, Aldag and Brief (1977), in a larger study, divided 5,945 employees across five different organizations into 20 sub-samples based on job type. The JCM’s five-factor solution was confirmed for only two of the 20 samples investigated. Two, three or four-factor solutions were much more common. Finally, Fried and Ferris (1986), in a study of 6,930 employees in 876 jobs across 56 organizations, found that a three-factor solution, with task significance, task variety and autonomy collapsing into a single factor, was the best fit for the model.

Possible causes for these different findings include the moderating effects of age and education (e.g., Fried & Ferris, 1986), as well as the underlying dimensionality of perceived task design. Dunham et al. (1977), called for more research on individual and organizational characteristics, hypothesizing that individual differences may provide filters such that different people perceive job characteristics differently. Additionally, organizational design characteristics could be undermining the dimensionality of the job characteristics in certain organizations. For example, the only way that task variety is attainable could be the exercise of autonomy, or vice versa.
Idaszak and Drasgow (1987) believe that the reverse scored items on the JDS may play a role, finding that after rewriting the reverse scored items (i.e., reversing the reversal), to a format analogous to the other items, the original five-factor solution originally proposed by Hackman and Oldham (1976) emerged. Idaszak and Drasgow (1987) refer to the Fried and Ferris (1986) study results, which suggest that the measurement artifact associated with the reverse scored items is due to education level or reading comprehension ability. Fried and Ferris found reasonable approximations to the *a priori* structure only in sub-samples characterized by higher education and work position levels. Idaszak and Drasgow speculate that workers with less education and lower reading ability may be experiencing greater difficulty reversing the items mentally, and thus are responding differently to those items than they may be intending.

Other studies contrasting the original JDS with the revised proposal of Idaszak and Drasgow (1987) have found the latter to be superior in finding the five-factor solution (Cordery & Sevastos, 1993; Kulik, Oldham & Langner, 1988). However, Burke (1999), views that the need to screen for invalid responses (e.g., carelessness, inattentiveness, or low comprehension) is of greater importance than the rewording of negative items. Overall, the factor structure of the job characteristics remains in question, and requires further analysis.

In addition, the factor structure of the JCM has not been tested on a sample of technical professionals working in a team based organizational structure. In such a setting, rewards are often given to the team rather than the individual, and the job characteristics may be taking on a new meaning in a team design versus a traditional, individually focused hierarchy. Autonomy, for example, may be more based at the team
level than at the individual level, while task significance may be more easily observable at the team level as well (Polley & Van Dyne, 1994). Perceived levels of job characteristics, however, are still believed to predict levels of job satisfaction by most researchers.

Hypotheses

Hypothesis 1: Job characteristics factors will significantly and positively predict levels of job satisfaction in organizations using work teams.

Research on the JCM has largely focused on personal outcomes (i.e., internal work motivation, growth satisfaction and job satisfaction), rather than the work outcome of job performance (Algera, 1990). Kelly (1992) believes that this is rooted in the difficulty in establishing objective measures for productivity and performance across workplaces. Research findings related to the relationships between job characteristics and performance measures have been generally inconclusive or weak; for example, Kemp and Cook (1983) reported weak relationships between job characteristics and turnover and absenteeism. The same study, however, exhibited strong correlations between job characteristics and job satisfaction. Spector and Jex (1991), using information from incumbents, job description ratings and the Dictionary of Occupational Titles (DOT) reported significant correlations between the job characteristics of autonomy \( r = -.18 \), task significance \( r = -.15 \) and feedback \( r = -.23 \) with turnover intent, which has been shown to be highly correlated with actual turnover \( r = .41 \) (Griffeth, Hom & Gaertner, 2000).

Several studies have linked job characteristics with personal outcomes of internal work motivation, growth satisfaction and job satisfaction. Loher, Noe, Moeller and
Fitzgerald (1985) conducted a meta-analysis to determine the relationship between job characteristics and job satisfaction, finding significant positive correlations for each job characteristic and job satisfaction ($r = .46$ for autonomy; $r = .41$ for task variety; $r = .41$ for feedback; $r = .38$ for task significance; and $r = .32$ for task identity), which they interpreted as supportive of efforts to increase levels of job satisfaction through job enrichment strategies as outlined by the JCM.

A second meta-analysis looking at possible relationships between job characteristics and outcomes was conducted by Fried and Ferris (1987). Feedback had the strongest positive correlation with job satisfaction ($r = .43$), followed by autonomy ($r = .35$), task significance ($r = .35$), task variety ($r = .30$) and task identity ($r = .26$). Autonomy showed the strongest relationship with growth satisfaction ($r = .71$), while task variety had the strongest relationship with internal work motivation ($r = .52$). Job characteristics were also related to absenteeism (e.g., autonomy, ($r = .29$); task variety, ($r = -.24$); feedback, ($r = -.19$)). Fried and Ferris (1987) concluded that overall, there was general support for the JCM’s contention that job characteristics influence outcomes. Gerhart (1987) and Renn and Vandenberg (1995) also found moderate to strong relationships between job characteristics and outcomes, particularly job satisfaction.

Hypothesis 2: Growth need strength (GNS) will moderate the relationships between each job characteristic and job satisfaction in organizations using work teams, such that levels of job satisfaction for employees with higher levels of GNS will be significantly higher than levels of job satisfaction for employees with lower levels of GNS.

An additional exploratory hypothesis states that GNS will significantly and positively predict levels of job satisfaction in organizations using work teams.
The role of the three critical psychological states as mediators, and GNS, knowledge and skill and work environment characteristics (i.e., satisfaction with pay, security, supervision and co-workers) as moderators is very controversial. The JCM regards the psychological states (i.e., experienced meaningfulness, experienced responsibility and knowledge of results) as mediators between job characteristics and job satisfaction, claiming that all three psychological states are necessary in order for significant positive outcomes to exist (Hackman & Oldham, 1976; 1980). In addition, correlations between the job characteristics of task significance, task variety and task identity are believed to be greater with experienced meaningfulness of work than they are with experienced responsibility for work outcomes and knowledge of results, which themselves are more correlated with autonomy and feedback respectfully (Hackman & Oldham, 1976).

Research has found only partial support for the claim that the three psychological states serve as mediators. Renn and Vandenberg (1995) failed to confirm that the psychological states serve as mediators. Fried and Ferris (1987) recommended integrating the two critical psychological states of experienced meaningfulness and experienced responsibility into a single dimension, thus reducing the number of psychological states to two, while Johns, Xie and Fang (1992), while finding some support for mediation, favored collapsing the three psychological states into a single factor.

Several researchers question the value of including the critical psychological states in the model at all (Champoux, 1991; O’Brien, 1982; Roberts & Glick, 1981; Wall & Martin, 1987). Wall, Clegg and Jackson (1978) reported strong relationships between
the job characteristics with personal and work outcomes occurring without including the critical psychological states, concluding that the states were irrelevant to job redesign efforts. The lack of support for the role of the critical psychological states in the model, as well as their questionable utility in the field, given the practical use of the job characteristics and the outcome variables, excludes them from further attention in this study.

A variable can be said to have a moderating influence if it affects the direction and/or strength of the correlation between an independent and dependent variable (Baron & Kenny, 1986). Many studies are skeptical that GNS moderates the relationships between the job characteristics and personal and work outcomes (Graen, Noval & Sommerkamp, 1982; Orpen, 1979; Umstot, Bell & Mitchell, 1976). Maillet (1984) found that GNS was only a weak moderator between job characteristics and job performance in a study of penitentiary guards, while Wall and Clegg (1981) failed to find evidence of GNS serving as a moderator between job characteristics and intrinsic motivation, concluding with other researchers who found either weak or a complete lack of evidence for the role of GNS as a moderator for these variables (Johns, Xie & Fang, 1992; O'Brien, 1982, Roberts & Glick, 1981).

Support for the claimed moderating influence of GNS, however, comes from other studies (Aldag, Barr & Brief, 1981; Pierce & Dunham, 1976), as well as some major meta-analytic studies. For example, Spector (1985) found that GNS played a moderating role between job characteristics and the outcomes of job satisfaction, internal work motivation and job performance, with the evidence for job satisfaction being the strongest. Employees with higher levels of GNS showed stronger correlations
between job characteristics and job satisfaction than did employees with lower levels of GNS. Loher et al. (1985) also found that the relationships between job characteristics and job satisfaction were moderated by GNS, again for employees with higher levels of GNS \((r = .68)\) versus employees with lower levels of GNS \((r = .38)\). Loher et al. concluded that for individuals having lower levels of GNS, certain external situational characteristics (e.g., management support for various work enrichment activities) would be necessary if job enrichment efforts were to result in increased levels of job satisfaction. The meta-analysis by Fried and Ferris (1987) also found that for employees higher in GNS, the relationship between the job characteristics with job satisfaction was much stronger \((r = .45)\) than the same relationship for employees lower in GNS \((r = .10)\).

Overall, the divergence in findings for the role of GNS as a moderator calls for further research, with significant practical application. If the effects of job characteristics on personal and work outcomes vary as a function of individual differences such as one’s level of GNS, it could guide the nature and application of workplace interventions.

The JCM holds that work environment characteristics (i.e., satisfaction with pay, security, co-workers, supervisors and possession of knowledge and skills to perform the job) also moderate the relationships between job characteristics and outcome measures. If employees are unhappy or frustrated by such factors, the effectiveness of the job characteristics to influence outcomes is compromised (Hackman & Oldham, 1976). Support for the role of work environment characteristics is limited, with several studies failing to confirm their role as moderators (Abdel-Halim, 1979; Champoux, 1981; Ferris & Gilmore, 1984; Hunt, Head & Sorensen, 1982).
Hypothesis 3: Emotional reactivity will moderate the relationships between each job characteristic and job satisfaction in organizations using work teams, such that levels of job satisfaction for employees with higher levels of emotional reactivity will be significantly lower than levels of job satisfaction for employees with lower levels of emotional reactivity.

An additional exploratory hypothesis states that emotional reactivity will significantly and negatively predict levels of job satisfaction in organizations using work teams.

Besides the role of GNS, the JCM, being based on Herzberg’s (1967) dual-factor theory of motivation, neglected the possibility that individual dispositional differences (e.g., personality) could serve as moderators. Research studying the role of disposition as a moderator between job characteristics and outcomes is relatively rare (Staw & Ross, 1985). Some research has been conducted that has linked affect to job satisfaction (Agho, Mueller & Price, 1993; Chen & Spector, 1991; Cropanzano, James & Konovsky, 1993), as well as research finding positive correlations between job satisfaction and life satisfaction (Rain, Lane & Steiner, 1991; Tait, Padgett & Baldwin, 1989). In a study of the relationships between the Big Five model of personality and job satisfaction, Morrison (1996) found that the traits of extraversion and subjective well-being had a significant influence on job satisfaction for over 300 restaurant franchisees. In addition, Staw and Ross (1985) found stability in test-retest correlations with job satisfaction, even with employees who changed jobs.

Very little work has been done to relate the construct of emotional reactivity to job satisfaction. Emotional reactivity is defined as the individual’s level of frustration or annoyance resulting from perceived work obstacles (Keenan & Newton 1984). High levels of emotional reactivity bore a relatively small \( r = -0.17 \) but significant negative
correlation with job satisfaction (Keenan & Newton, 1984). No research has directly tested emotional reactivity’s possible role as a moderator of the relationships between job characteristics and job satisfaction. The potential, however, for dispositional factors such as emotional reactivity to change the relationships between situational factor such as job characteristics and job satisfaction could be significant. Certainly, more research is needed to investigate the potential of such dispositional variables as emotional reactivity to moderate the relationship between job characteristics and outcomes such as job satisfaction.

Issues with Data Collected from Self-Reports

Podsakoff and Organ (1986) state that self-report is virtually ubiquitous as a form of data collection, but is regarded as a weakness in organizational research literature. Self-report data is often vulnerable to common method variance (Campbell & Fiske, 1959), where measures of two or more variables (variables usually collected via self-report that require recall, weighting, inference, prediction, interpretation and evaluation) show exaggerated correlations with each other. In this study, a self-report measure of a job characteristic such as task significance and a self-report measure of job satisfaction, for example, may each overlap with the variance in their respective domains. However, there is no guarantee that the overlap in variance of the measures themselves, particularly when taken from the same sources, is a true overlap, thus possibly leading to an illusory relationship between the two variables. The most important problem in the use of self-report data, therefore, lies in isolating the potential causes of artifactual covariance between what are presumed to be two distinctly and independent variables.
Among other possible remedies, Podsakoff and Organ suggest using Harman’s single-factor test. To perform this test, all of the variables of interest are included in a factor analysis. The results of the unrotated factor solution are examined to determine the number of factors required to account for the variance in the variables. If a large amount of common method variance exists, either a single factor will emerge from the factor analysis, or one general factor will account for the majority of the variance in the variables.

Regarding the JCM, some researchers have criticized the exclusive use of self-report data to measure the variables. For example, Roberts and Glick (1981) note the fact that the JCM relies on subjective perceptions of job characteristics exclusively, charging that perceptions may not represent the true attributes of tasks. However, the majority of studies addressing this issue have found self-report data to be accurate assessments of the objective characteristics of their jobs (Boonzaier & Boonzaier, 2001; Taber, Beehr & Walsh, 1985).
CHAPTER II

METHOD

This chapter provides a historical background for the current research, outlining how the current survey was created, participant demographics, apparatus and procedures. It concludes with a detailed description of the statistical tools employed to test the research hypotheses.

This study is based on prior research which focused on the development and testing of a theoretical model of work teams in organizational settings composed of technical professionals whose common link was membership in one or more work teams.

The earlier study consisted of two phases, outlined briefly below, and described in greater detail later in this chapter. The purpose of the first phase was to build a qualitative database that would be used to develop a survey for technical professionals in work teams. A grounded theory approach (Glaser & Strauss, 1967) was used due to a belief that the literature on technical professionals in work teams was of insufficient maturity to support the development of substantive hypotheses.

The central objective of the second phase was to construct a survey in which linkages could be established between the issues emerging from the interviews in the first phase with established bodies of research literature. The establishment of such linkages would serve to facilitate the creation of a valid and reliable survey with research hypotheses based on prior research.
Phase I – Qualitative Data Gathering

The central objective of Phase I was to determine the main issues facing technical professionals in team settings in order to lay the foundation for creation of the survey instrument. Interviews were conducted at various sites to select technical professionals with varying functions within their organizations.

Participants

During the spring of 1992, interviews were conducted with 25 engineers and managers in various functional areas at three defense industry manufacturing sites in the southwestern United States. Twenty-four of the 25 participants provided biodata information, having an average age of 38.4 years. Ninety-six percent of the 24 participants were male. Attained education was varied; 63% percent held bachelors degrees, 29% held masters degrees, and 4% held doctoral degrees.

Participants were employed in a wide variety of functions including manufacturing, operations, inventory control, purchasing, quality, finance, information system management, assembly, maintenance, training and various engineering specialties (e.g., process, design, quality, product and equipment). Participants supervised an average number of 16 direct reports, had been in their industry an average of 12 years, and had been with their current organization an average of 9.6 years. Participants reported being in their current specialization an average of 6.6 years; average tenure in their current team was 1.5 years. Table 1 provides a summary of this data.
**Apparatus**

Materials for Phase I of this study included an informed consent form describing the nature of the study, as well as a biodata sheet asking for demographic information from the participants.

**Procedure**

Participants were informed that the form completion and interview would require approximately one hour of their time. Informed consent forms describing the nature of the study and participant rights were distributed and signed, at which point participants were asked to complete the biodata form. Interviews were then conducted, which were transcribed and analyzed to highlight significant themes. Eighty themes were revealed through content analysis. An extensive search of published research instruments led to discovery of scales for 66 of the themes. One additional scale was used from a prior study conducted by the researchers. This information was then used to guide the selection of scales for the survey that was administered in Phase II of the study.

**Phase II – Questionnaire Construction and Administration**

An introductory letter describing the project included information about the voluntary nature of the questionnaire, and confidentiality of responses was assured. Survey questions were selected from recognized, published instruments demonstrating validity and reliability and used in other research studies. Items chosen reflected issues highlighted during the participant interviews of Phase I.
Participants

Participants in this study consisted of 541 technical professional employees representing 117 different work groups and 14 companies within the United States and Canada. If one item was missing from the scales included in the study, the case was dropped from the data analysis. Using this conservative standard, a total of 49 cases were dropped from the original sample of 541, leaving 492 cases to be analyzed for this study. Most companies represented were characterized by traditional organizational designs (i.e., hierarchical) engaged in redesign efforts. Twelve of the companies surveyed were publicly traded American corporations; one included participants from a foreign subsidiary, one was a privately held American company, and one was under foreign ownership. The companies represent the following industries (number of firms in parentheses): computers: office equipment (three); aerospace (three); electronics, electrical equipment (three); petroleum refining (one); plastics (one); industrial gases (one); aluminum processing (one). Ten of the participating or parent companies were listed on the 1993 Fortune 500 list at the time of data collection. Several professions represented by the participants included administration, customer service, development, engineering, facilities, finance, human resources, information systems, marketing, material operations, planning, purchasing, quality, real estate sales, and technical writing and illustration.

Seventy percent of participants in this study were male, having an average age of 35.9 years. This was a well educated sample; 22% of respondents held masters or doctoral degrees, the remainder holding either bachelors or associate degrees. Participants had been with their current company an average of 7.5 years, serving in
their current for an average of 2.8 years. Eighty-eight percent worked the day shift and 25% indicated that they supervised at least one individual. The average reported work week was 45 hours.

Participants indicated that they had been a member of their current team for an average of 1.3 years, and that their team’s duration averaged 1.7 years. While 33% reported that they were a full-time member of one team, 9% indicated that they had been loaned out to a variety of teams. Almost 27% of respondents reported that they had what they considered to be a home team, in addition to being involved at times with other teams. Interestingly, 26% of respondents chose not to answer this question (see Table 2 for complete information).

Sample

The sample used in this study was targeted; approximately one year was taken to contact companies in order to find and interest key players in each organization. Introductory information included a copy of the survey, the informed consent letter requesting participation, an explanation of the benefits inherent in participating, and some background information of the theoretical models behind the study. This information was sent to 50 companies. From this targeting, 14 companies eventually agreed to participate in exchange for detailed feedback concerning the information that participants from their company provided.

Variables Included in the Survey

Variables included in the questionnaire were based on the results of Phase I, as
well as the relevant literature, are outlined below. The complete survey consisted of a total of 302 questions and 66 published scales, as well as one from a prior study of the researchers. Eight of these scales are investigated in this study. Definitions are drawn from generally established meanings in the literature.

*Task significance* is “the degree to which the job has a substantial impact on the lives of other people, whether those people are in the immediate organization or in the world at large” (Hackman & Oldham, 1975, p. 161).

*Task variety* is “the degree to which a job requires a variety of different activities in carrying out the work, involving the use of a number of different skills and talents of the employee” (Hackman & Oldham, 1975, p. 161).

*Task identity* is “the degree to which a job requires completion of a “whole” and identifiable piece of work, that is, doing a job from beginning to end with a visible outcome” (Hackman & Oldham, 1975, p. 161).

*Autonomy* is “the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out” (Hackman & Oldham, 1975, p. 162).

*Feedback* is “the degree to which carrying out the work activities required by the job provides the individual with direct and clear information about the effectiveness of his or her performance” (Hackman & Oldham, 1975, p. 162).

*Growth need strength* is a measure of one’s need for growth or personal accomplishment in the workplace. “Some people have strong needs for personal accomplishment, for learning, and for developing themselves beyond where they are
now...These people are said to have strong growth needs. Others have less strong needs for growth…” (Hackman & Oldham, 1980, p. 85).

*Job satisfaction* is “an overall measure of the degree to which the employee is satisfied and happy with the job” (Hackman & Oldham, 1975, p. 162).

*Emotional reactivity* is posited as a result of frustration with various aspects of the work environment. Frustration is further defined as “…interference with the individual’s ability to carry out his day-to-day duties effectively” (Keenan & Newton, 1984, p. 783).

**Instruments**

Scale items used in Phase II without alteration included the job characteristics model (JCM) job characteristic of task significance, as well as GNS as a claimed moderator in the model, and job satisfaction as an outcome (Hackman & Oldham, 1980). Using Cronbach’s (1951) coefficient alpha, *a priori* internal reliabilities for task significance in a sample of $N = 658$ workplace professionals across a wide variety of jobs was $\alpha = .66$, while growth need strength (GNS) was $\alpha = .88$. Cronbach’s alpha is preferable to other measures (e.g., Spearman-Brown), as it includes the effect of each item when estimating overall reliability.

For the job characteristics of task variety, task identity, feedback and autonomy, items from Hackman and Oldham’s (1975) scales were replaced with items from the Job Characteristics Inventory (JCI; Sims, Szilagyi, & Keller, 1976) scales due to their stronger internal reliability. Three items were used to assess each of these four scales. Sims, et al. (1976) did not develop a scale corresponding to the Hackman and Oldham (1975) task significance scale. Reliability coefficients for the unedited scales of task
variety, task identity, feedback and autonomy tested on a sample of \( N = 215 \) workplace professionals were all high (.88, .88, .86 and .84, respectively). Reliability coefficients for the unedited scales of task variety, task identity, autonomy and feedback tested on a sample of \( N = 110 \) workplace professionals were also high (.89, .94, .85 and .98, respectively) (Sims et al., 1976). For each job characteristic, a 5-point Likert-type scale was used. Depending on the wording of the item, the Likert scale wording ranged from 1 = very little to 5 = very much, or 1 = a minimum amount to 5 = a maximum amount.

Task significance was assessed using the original three item scale from Hackman and Oldham’s (1976) JDS, using a 7-point Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree. Emotional reactivity was assessed using three items developed by Keenan and Newton (1984). Internal reliability of this scale was high (.83) for \( N = 413 \) graduate engineers in the United Kingdom (Keenan & Newton, 1984).

**Apparatus**

Materials included the survey accompanied by an informed consent letter explaining that participation was voluntary and confidential. Coordinating personnel at most of the participating company sites distributed the survey along with the informed consent letter.

**Procedure**

Surveys were distributed to technical professional employees by coordinating personnel at each company work site. Surveys were not numbered until completed and returned by participating organizations. For this reason, a precise measure of the
response rate to the survey is not available. In the majority of cases, surveys were
returned by mail; individuals at two company sites delivered the survey results by hand.
When received, each survey was assigned a nine-digit code that classified the survey
according to the company, participant number, team, and survey administration year.
Surveys were then provided to the data entry office of the University of North Texas for
data entry. Written comments were also assigned identification numbers and were
typed.

Method of Analysis

Descriptive statistics will be computed for each demographic variable and whole
scale total. Prior to testing hypotheses, the dimensionality of the five-factor structure
proposed by Hackman and Oldham (1976) will be assessed.

Factor analytic procedures will be employed to determine the factor structure of
the JCM. The goals of factor analysis are threefold; firstly, to determine the number of
fundamental, underlying influences on another variable(s), secondly, to quantify the
extent to which each variable is associated with those factors, and thirdly, to learn more
about those influences by observing which factors contribute the most or least to the
variables (Cudeck, 2000).

For this study, both exploratory factor analysis (EFA) and confirmatory factor
analysis (CFA) will be used to determine the factor structure of the JCM. The relatively
large data set (N = 492) allows it to be split in half, with one half being devoted to the
EFA, and the remaining half used for the CFA. An explanation and rationale for the use
of both techniques is described below.
Exploratory factor analysis does not actively test hypotheses, but rather aims to explore the data and discover the central constructs or factors. In this case, an exploratory factor analysis with varimax rotation will be used to maximize the variance of each factor, thus aiding interpretability of the model (Kaiser, 1958).

An EFA for this data set is proposed for three reasons. Firstly, as cited above, many studies using the Job Diagnostic Survey (JDS), JCI or combinations of both, have failed to replicate the five-factor structure proposed by Hackman and Oldham (1976).

Secondly, for the purposes of this study, the JCI scales were modified, with some items being dropped from three of the four job characteristics assessed by the JCI. For task variety and autonomy, the JCI employs five items to measure each construct; the technical professionals in teams data set selected only three items from the JCI for each of the scales. The JCI assesses autonomy with four items, while the technical professionals in teams data set used three of those items.

Thirdly, one item from the job characteristic of task significance (assessed with items from the JDS, not the JCI, as Sims, et al. did not create a scale measuring task significance), has been significantly reworded from the original Hackman and Oldham (1976) version. The original wording of this item was “In general, how significant or important is your job? That is, are the results of your work likely to significantly affect the lives or well-being of other people?”, with a 7-point Likert-type rating scale where 1 = not very significant, the outcomes of my work are not likely to have important effects on other people; 4 = moderately significant; and 7 = highly significant, the effects of my work can affect people in very important ways (Hackman & Oldham, 1980, pp. 83). The rating points of 2, 3, 5 and 6 were not accompanied by any descriptors. This item was
reworded for this study to read, “My work is important for the lives and well-being of other people,” with a 7-point Likert-type scale where 1 = strongly disagree; 2 = moderately disagree; 3 = slightly disagree; 4 = neither agree nor disagree; 5 = slightly agree; 6 = moderately agree; and 7 = strongly agree.

With these substantive differences, an EFA needs to be conducted to test the possible changes that this re-worded item may have on the factor of task significance, and on the overall factor structure. Exploratory factor analysis typically makes use of Eigenvalues as an indicator of the linear function of the factors. Generally, the common rule of thumb is to include factors with Eigenvalues greater than 1.0, which should result in a reasonable portion of variance accounted for by the set of items. The EFA that will be conducted for this study will follow this guideline using Eigenvalues. A scree plot of the Eigenvalues will also be used to visually aid the determination of the appropriate number of factors resulting from the EFA.

Rather than being exploratory in nature, a CFA can test hypotheses that one would get from the results of an EFA; unlike an EFA, a CFA provides statistical probability. To test the factor structure determination of the EFA, and to provide greater confidence in it, a CFA will be performed on the remaining half of the data set.

Strong correlations between independent variables are often a sign of multi-collinearity. In such instances, the variance is inflated, possibly resulting in wrong signs and magnitudes of regression coefficient estimates, and, consequently, incorrect conclusions about the relationships between independent and dependent variables. Multi-collinearity is best detected by examining the tolerance and variable inflation factors (VIF) for each independent variable. The VIF measures the total standard
variance to unique variance, while tolerance, an alternative measure, establishes the proportion of total standard variance that is unique. As a rule of thumb, if the tolerance is below .10 or VIF is greater than 10.0, multi-collinearity likely exists (Kline, 1998). As mentioned previously, self-report data is often vulnerable to common method variance. To assess the possibility of common method variance, Harman’s single-factor test will be conducted on all variables of interest (Harman, 1967).

The first hypothesis states that job characteristics factors will significantly and positively predict levels of job satisfaction in organizations using work teams. This hypothesis will be tested using multiple regression analysis and the scaled responses to determine the extent to which each factor (the number of which will be determined by the EFA and CFA) predicts job satisfaction.

The second hypothesis states that GNS will moderate the relationships between each job characteristic and job satisfaction in organizations using work teams, such that levels of job satisfaction for employees with higher levels of GNS will be significantly higher than levels of job satisfaction for employees with lower levels of GNS.

The third hypothesis states that emotional reactivity will moderate the relationships between each job characteristic and job satisfaction in organizations using work teams, such that levels of job satisfaction for employees with higher levels of emotional reactivity will be significantly lower than levels of job satisfaction for employees with lower levels of emotional reactivity.

The effect of the independent variable(s) (i.e., the job characteristic factors) is presumed to vary linearly with respect to each moderator, where a gradual, steady change is observable in the effect of the job characteristic factors on job satisfaction as
the level of each moderator changes. Cohen and Cohen (1983) explain that the linear hypothesis is tested by adding the product of each moderator and each job characteristic factor to the regression equation. Therefore, job satisfaction will be regressed on each job characteristic factor, each moderator, and the product of each job characteristic factor and each moderator. Moderator effects will be indicated by the significant effect of the product of each job characteristic factor and each moderator, when each job characteristic factor and each moderator are controlled for.
CHAPTER III

RESULTS

This chapter presents the results of the study, beginning with a summary of descriptive statistics, followed by the results of the hypothesis tests. Specifically, results of an exploratory factor analysis (EFA) on one half of the data set, and a confirmatory factor analysis (CFA) on the other half, are presented to assess the factor structure of the job characteristics. Secondly, results of an analysis of variance assessing whether each job characteristic predicts job satisfaction is presented along with results detailing the hypothesized moderating influence of GNS and emotional reactivity on the relationships between the job characteristics and job satisfaction.

Data Cleansing

As with all data, this data set required cleansing in preparation for statistical analysis. Due to the relatively high number of participants and quality of the data, it was decided that if even one item was missing or out of range, that the entire case would be excluded from further analysis. Using this conservative standard, a total of 49 cases were excluded from the original sample of 541 participants, resulting in 492 participants analyzed in this study.

Descriptive Statistics

A total of 29 items were used to identify five hypothesized job characteristics (three items each), two moderating variables (six items for growth need strength (GNS), three items for emotional reactivity) and one outcome variable of job satisfaction (five
items). Reliabilities were fairly high for task variety (.879), task identity (.787), feedback (.838) and task significance (.703), with autonomy slightly lower (.662). The mean, range, standard deviation, skewness and kurtosis for each of the eight variables is provided in Table 3. Note that four of the five job characteristics were measured with a 5-point Likert-type scale, while task significance was measured on a 7-point scale. Growth need strength, emotional reactivity and job satisfaction were measured on 7-point scales (see Appendix C). Skewness and kurtosis results were within limits defining a reasonably normal distribution (Hair, Anderson, Tatham & Black, 1998), and are presented in Table 3.

The correlation matrix for all 29 items is provided in Table 4. Due to the fairly large sample ($N = 492$), most of the correlation coefficients were statistically significant. These results indicate issues with multi-collinearity, which are discussed later in this chapter.

**Factor Analysis of Job Characteristics**

In order to test the hypothesis that the job characteristics of the JCM will significantly predict levels of job satisfaction, the factor structure of the job characteristics must first be assessed. To accomplish this, an EFA was performed on a random split half of the data. Prior to this analysis, a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy test and Bartlett’s test of sphericity was performed to test the suitability of the data for factor analysis. The KMO value of .871 (well above the acceptable minimum of .500), and the significant chi-square test result for Bartlett’s test of sphericity ($X^2 (406, N = 492) = 9083.24, p < .001$), supported the suitability of the
data set for factor analysis. In order to further test the results of the EFA and provide
greater support for its findings as being representative of the general population, a CFA
was performed using the second half of the data. Results for each analysis are
presented below.

Exploratory Factor Analysis

The EFA resulted in a four-factor solution accounting for 65.5% of the total
shared variance. Task variety accounted for 33.9% of the variance, while task identity,
feedback and task significance accounted for 11.7%, 10.2% and 9.6% of the variance
respectively. The autonomy scale items failed to load as an independent factor. Two of
the items showed moderate loadings on other factors, while the third autonomy item
failed to load on any factor. The job characteristic of autonomy was therefore excluded
from further analysis. Four-factor solutions were also found by Dunham (1976), and
Dunham, Aldag and Brief (1977), the earlier of which favored combining autonomy with
Task variety. In accordance with guidelines suggested by Stevens (2002), items that did
not have a loading of at least .4 were excluded from further analysis.

The four-factor solution is observable using Cattell’s scree test, which is widely
regarded as a valid method with which to select the correct number of factors (Kline,
1994). A scree plot shown in Figure 2 shows a clear change in the slope of the line,
supporting a four-factor solution. This conclusion agrees with the four-factor solution
resulting from the application of Kaiser’s criterion advising that Eigenvalues should be
greater than 1.0 for factor selection (Dunteman, 1989). Table 5 shows the total variance
explained, while Table 6 provides the factor loadings and significance levels.
A correlation matrix was then run on the scales of the four job characteristics, as well as GNS, emotional reactivity and job satisfaction. All factors were significantly correlated, with the exception of GNS with feedback, GNS with emotional reactivity and GNS with job satisfaction. These results are presented in Table 7.

**Confirmatory Factor Analysis**

To test the four-factor conclusion of the EFA, two CFA models were run on the second half of the data set, the first for the four job characteristics, and the second for the two moderators of GNS and emotional reactivity. The model for the job characteristics is discussed first, followed by the model for the moderators.

For the CFA model of the four job characteristics, the standardized factor loadings were all significant \( (p < .001) \), ranging from .542 to .925. These results are presented in Table 8. The factor loadings of each item with each factor, the correlations between the various factors, and the standardized beta weights for each predictor with job satisfaction from the regression analyses are provided in Figure 3.

For the four-factor JCM, the chi-square goodness-of-fit index was not significant \( (X^2 (48, N = 246) = 58.05, p = .152) \), indicating that the model has an adequate fit with the data. The chi-square test, however, is sensitive to sample size; additional goodness-of-fit indices are less sensitive to sample size, including the normed fit index (NFI), the non-normed fit index known as the Tucker-Lewis Index (TLI), and the comparative fit index (CFI) (Hu & Bentler, 1999). For this model, the NFI (.955), TLI (.987) and CFI (.992) are all greater than .950, the minimum value considered acceptable in order to claim that the model is an adequate fit for the data (Hu & Bentler, 1999).
An additional goodness-of-fit index is the root mean square error of approximation (RMSEA). The RMSEA goodness-of-fit index is representative of the goodness-of-fit that could be expected if the model were estimated in the population, not just the current sample. For the RMSEA, a cut-off value of .05 or lower is indicative of a good fit for the model, while values of .08 or lower represent a moderate fit for the model. For this model, the RMSEA was .027 [.000, .050], well below the acceptable threshold of .08 (Hu & Bentler, 1999). It was therefore determined that the data showed an adequate fit to the model, indicating that the items in each scale correspond to the latent factors they were hypothesized to measure. The chi-square test results, accompanied by the goodness-of-fit indices, are presented in Table 9.

The second CFA model looked at the two moderators of GNS and emotional reactivity. For this model, the standardized factor loadings were all significant \( (p < .001) \), ranging from .771 to .936. These results are presented in Table 10. The factor loadings of each item with each factor, the correlations between the two factors, as well as the standardized beta weights for each predictor with job satisfaction from the regression analyses, are presented in Figure 4.

For this model, the chi-square test was significant \( (X^2 (27, N = 246) = 70.35, p < .001) \), indicating an inadequate fit of the model to the data. Hatcher (1998), however, cautions that the chi-square test must be used in conjunction with other goodness-of-fit indices to determine the true adequacy of a model. This is because the chi-square test can be influenced by factors other than the model’s adequacy, such as sample size and multivariate normality. Goodness-of-fit indices of NFI (.985), TLI (.984) and CFI (.990) are all well above the threshold of .950 (Hu & Bentler, 1999). In addition, the RMSEA
has a value of 0.055 [.039, .070], providing further support for an adequate fit of the model. Overall, there seems to be enough evidence that the model has an adequate fit, indicating that the items in each scale correspond to the latent factors they were hypothesized to measure. The chi-square test results, accompanied by the goodness-of-fit indices, are presented in Table 10. Note that Harman’s single-factor test was conducted to test for common method variance, which revealed that no single factor accounted for the majority of variance in the variables.

Regression Analysis

A three-model hierarchical linear regression analysis was performed to test the three hypotheses of this study. The first hypothesis was that job characteristics factors would predict levels of job satisfaction. To test this hypothesis, the four job characteristic factors of task significance, task variety, task identity and feedback were entered into the first regression model. When the regression analyses were first performed, high VIF numbers indicated likely multi-collinearity. To solve this problem, all variables were centered at zero according to the technique described by Aiken and West (1991), which resulted in VIF [1.045, 1.375] and tolerance [.727, .957] ranges within acceptable standards discussed earlier in the study (Kline, 1998).

Combined, the four job characteristics accounted for 32.8% of the variance in job satisfaction. All four job characteristics were found to be significant, positive predictors of job satisfaction levels. These findings provide partial support for the first hypothesis, with the job characteristic of autonomy failing to demonstrate a clear factor structure.
In the second model, the two factors of GNS and emotional reactivity were added as predictors in order to control for their influence. GNS and emotional reactivity accounted for a further 9.40% in the variance in job satisfaction. With these two factors controlled for, no changes were observed in the ability of the four job characteristics to significantly predict levels of job satisfaction from Model 1 \((p < .001; \text{task significance, task variety and task identity}), (p < .05; \text{feedback})\). Emotional reactivity was a significant negative predictor of job satisfaction levels \((p < .001)\), supporting its exploratory hypothesis, while GNS approached significance in negatively predicting levels of job satisfaction \((p = .074)\), failing to support its exploratory hypothesis.

In the third model, a total of eight interaction terms were added along with the four job characteristics, GNS and emotional reactivity to test for the moderating effects of GNS and emotional reactivity. These interactions consisted of GNS with each of the four job characteristics, and emotional reactivity with each of the four job characteristics. This model was run to test the second hypothesis, that GNS will moderate the relationships between each job characteristic and job satisfaction in organizations using work teams, such that levels of job satisfaction for employees with higher levels of GNS will be significantly higher than levels of job satisfaction for employees with lower levels of GNS. The same model will also test the third hypothesis stating that emotional reactivity will moderate the relationships between each job characteristic and job satisfaction in organizations using work teams, such that levels of job satisfaction for employees with higher levels of emotional reactivity will be significantly lower than levels of job satisfaction for employees with lower levels of emotional reactivity.
Together, these eight interactions in the third regression model accounted for an additional 2.50% of the variance in job satisfaction, controlling for the job characteristics, GNS and emotional reactivity as predictors. Specifically, three of the eight interactions (GNS and feedback, GNS and task significance, and emotional reactivity with task identity) were significant ($p < .05$), while a fourth (GNS and task variety) approached significance ($p = .063$). A summary of the regression model results is provided in Table 12, while more detailed information about each coefficient is provided in Table 13.

For illustrative purposes, interactions which were significant or which approached significance are depicted in Figures 5-8. Note that “high” and “low” levels of each moderator were defined by adding/subtracting each moderator’s standard deviation from that moderator’s mean.

GNS moderated the relationship between task significance and job satisfaction such that individuals with higher levels of GNS expressed higher levels of job satisfaction as task significance increased than did people who expressed lower levels of GNS (see Figure 5). This finding supported the second hypothesis for the job characteristic of task significance. Growth need strength also moderated the relationship between feedback and job satisfaction such that individuals with higher levels of GNS expressed higher levels of job satisfaction as feedback increased than did people expressing lower levels of GNS (see Figure 6). This finding supported the second hypothesis for the job characteristic of feedback.

Although the relationship only approached significance ($p = .063$), it appears that GNS may also be moderating the relationship between task variety and job satisfaction. Individuals with higher levels of GNS expressed lower levels of job satisfaction as task
variety increased than did people expressing lower levels of GNS (see Figure 7). This finding failed to support the second hypothesis. Growth need strength was not found to moderate the relationship between the job characteristic of task identity and job satisfaction, again failing to support the second hypothesis. In summary, GNS was found to significantly moderate the relationship between two of the four job characteristics (task significance and feedback) and job satisfaction such that the relationships between each of these job characteristics with job satisfaction were stronger in a positive direction for employees with higher levels of GNS versus employees with lower levels of GNS, thus providing partial support for the second hypothesis.

Regarding the third hypothesis, it was also found that emotional reactivity appears to moderate the relationship between task identity and job satisfaction, such that individuals with higher levels of emotional reactivity expressed higher levels of job satisfaction as task identity increased than did people expressing lower levels of emotional reactivity, which was in the opposite direction to what was hypothesized (see Figure 8). This finding therefore failed to support the third hypothesis for the job characteristic of task identity. Emotional reactivity was not found to significantly moderate the relationships between the job characteristics of task significance, task variety and feedback with job satisfaction. These findings failed to support the third hypothesis for these job characteristics. In summary, there was no support for the third hypothesis that emotional reactivity would as found to significantly moderate the relationship between one of the four job characteristics and job satisfaction. Overall, two of the hypothesized eight moderating interactions for GNS and emotional reactivity
supported the moderating hypotheses, while the remaining six interactions did not support these hypotheses.
CHAPTER IV
DISCUSSION

The following discussion explores various interpretations of the results of the study, with implications for theory and practice. Limitations of the study are also explained, along with ideas for future research.

Interpretation of Research Findings

The central findings of this study are interpreted below, including the four-factor solution and the predictive power of the job characteristics, growth need strength (GNS) and emotional reactivity. The section concludes with an analysis of the moderating influence of GNS and emotional reactivity.

Four-Factor Solution

The a priori dimensionality for the job characteristics of the job characteristics model (JCM) defined five factors of task significance, task variety, task identity, autonomy and feedback. The four-factor solution found by the exploratory factor analysis (EFA) and supported by the confirmatory factor analysis (CFA) in this study consisted of high and clean loadings for the job characteristics of task significance, task variety, task identity and feedback. This provides support for the dimensionality of the job characteristics of the JCM with employees in work team environments, and is the first piece of evidence arguing for the applicability of the JCM to work team environments comprised of highly skilled technical professionals.
The four-factor solution also supports the conclusion that the meaning of these factors is similar for employees regardless of whether they work in team or traditional environments. This is to be expected, given the research literature documenting the alignment in values between work teams and the JCM (Polley & Van Dyne, 1994). The principles of believing that one’s job has significance, being able to use different skill sets, being able to remain involved in a project from its inception to its completion, and having the opportunity to receive feedback on one’s performance seem to be present whether one works in a team or in isolation.

**Autonomy**

The job characteristic of autonomy did not load cleanly on a latent factor. Employees in work teams seem to perceive this construct differently than do employees in traditional organizations, as the three items do not measure the same construct. For review, the three items of the autonomy scale are provided here: “The freedom to do pretty much what I want on my job”, “How much are you left on your own to do your own work?”, and “To what extent are you able to act independently of your manager in performing your job function?” (Hackman & Oldham, 1980, p. 278).

The first item appears to be written in such a way as to measure autonomy in a workplace characterized by employees working as individuals. The nature of work teams is a fundamental interdependency of ideas, skills, and decisions (Katzenbach & Smith, 2001). “The freedom to do pretty much what I want on my job”, while perhaps befitting an individually based job with a trusting or laissez-faire manager, does not fit the construct of autonomy in team settings. The wording of this item seems to equate
freedom to make individually based decisions as opposed to team designs, where the decision making process involves all team members to varying extents.

The second item for autonomy seems very similar in this respect, almost implying that involvement from others is meddlesome or mildly irritating. Rather than being left alone, the major philosophical thrust behind working in a team environment is to collaborate and share with others in the work that is under collective ownership of the team. Indeed, being left on one’s own in a team environment could be indicative of a neglected or poorly functioning team.

The third autonomy item may also not be appropriate for employees working in teams. Team members may or may not have the same manager who may or may not be leading the team, or even hold membership on the team. The meaning of this item, therefore, may be very different for different employees, regardless of their responses on the other two items.

The preceding discussion is not meant to imply that autonomy is absent in teams or does not have a proper place in work team designs. Even in team settings, everyone needs a degree of individual autonomy. To measure individual autonomy in team settings, it may be important to frame individual autonomy in the context of team involvement. For example, an item might read “In between team meetings and work sessions, I have enough time to focus on my own work.”

Alternatively, autonomy in a team design may be more appropriately measured at a team, rather than on an individual level. Items assessing the freedom of the team to follow their own course, and to be left on their own to do their work, may have resulted in a cleaner factor loading for autonomy.
Predictive Ability of Job Characteristics

The first regression model's finding that each of the four remaining job characteristics significantly and positively predicted levels of job satisfaction provides support for the first hypothesis, as well as the applicability of the JCM in work team environments populated by highly educated technical professionals. By generalizing the applicability of the JCM to team settings, this study takes the job characteristics a step closer to being regarded as fundamentally aligned with human needs and preferences.

In the workplace, regardless of title, position or skill set, employees seem to prefer and respond positively to environments characterized by the four factors of task significance, task variety, task identity and feedback. Employees express higher levels of job satisfaction in jobs where they also believe that their tasks are important for the welfare of others, where opportunity is given to perform a variety of tasks, where involvement in projects is from inception to completion so as to facilitate understanding, and where regular feedback is provided concerning the quality of work performance. Efforts to create workplaces characterized by high levels of job satisfaction and workplace productivity, therefore, should design jobs that maximize these job characteristics. Although research has shown positive outcomes for job enrichment efforts amongst samples with varying education levels, it may be that as one’s level of education rises, they will continue to desire jobs that are perceived as significant, that require a variety of skills to perform, and that fit into a meaningful, well-communicated purpose, with feedback on performance regularly provided.
Predictive Ability of GNS and Emotional Reactivity

As mentioned in the introduction, exploratory hypotheses identified GNS and emotional reactivity as significant predictors of job satisfaction. These hypotheses were tested in the second model of the regression analysis. Although not statistically significant ($p = .074$), GNS approached significance as a negative predictor of job satisfaction, opposite of the hypothesized direction as well as the literature. One possible reason for this finding could be that some employees have levels of GNS so high that few workplaces or jobs could satisfy this need. Such individuals could therefore have very high levels of GNS, yet express lower levels of job satisfaction, than other employees with lower levels of GNS. Another possibility is that GNS is seen or perceived as something that can be only achieved individually, and is being inhibited by the fact that employees in these organizations are working in teams. When one studies the items measuring GNS, however (e.g., having opportunity to learn, to be creative, to grow and develop, having a sense of accomplishment), they seem to be well aligned theoretically with the job characteristics of task significance, task variety, task identity and feedback, as well as the values of work teams (Polley & Van Dyne, 1994).

Emotional reactivity emerged as a significant negative predictor of job satisfaction. This is in line with other research showing negative prediction of job satisfaction from emotional reactivity (Keenan & Newton, 1984), as well as interpersonal aggression (Storms & Spector, 1987). The ability of emotional reactivity to predict job satisfaction provides support for a dispositional component to the nature of job satisfaction. What is not known is the extent to which emotional reactivity is purely dispositional in nature as a personality trait versus the extent to which it may be aroused
by situational factors such as job characteristics. More research is needed to explore
the ability of dispositional and situational factors to influence each other.

To the extent that emotional reactivity can be determined as dispositional in
nature, organizations would be wise to assess various jobs for their inherent tendency
to cause emotional reactivity, and work to change those jobs and/or ensure that people
selected for those positions can handle work conditions likely to elicit feelings of
frustration and annoyance. To the extent that emotional reactivity can be determined as
being caused by job characteristics, it gives even more importance to the proper design
of jobs at their inception, so as to minimize the likelihood that emotional reactivity will
become an impediment to job satisfaction and workplace productivity.

Including GNS and emotional reactivity as predictors of job satisfaction did not
change the status of the four job characteristics as significant positive predictors of job
satisfaction. This result provides further support for the independence of the effects of
the four job characteristics in predicting job satisfaction from GNS and emotional
reactivity.

*Moderating Influence of GNS and Emotional Reactivity*

In the third regression model, three of the eight interactions between the
moderators of GNS and emotional reactivity with each of the four job characteristics
were significant (GNS with task significance, $p < .05$; GNS with feedback $p < .05$; and
emotional reactivity with task identity, $p < .05$), while a fourth interaction (GNS with task
variety, $p = .063$) approached significance. For the relationship of task significance with
job satisfaction, as well as feedback with job satisfaction, employees with higher levels
of GNS expressed greater job satisfaction as their ratings of task significance and feedback rose than did employees with lower levels of GNS. Recall the definitions of task significance (“the degree to which the job has a substantial and obvious impact on the lives or well-being of others, either within or outside the organization”), (Hackman & Oldham, 1980, p. 82), and GNS (“the employee’s needs for personal growth, development and accomplishment in the job environment”), (Hackman & Oldham, 1980, p. 83). These definitions have similarity with each other; two of the six items in the GNS scale ask employees to rate the degree of “worthwhile accomplishment” in work, a concept that would seem to be very much aligned with task significance. It may be that for many employees, a sense of accomplishment is a natural result of believing that one’s work meaningfully impacts the lives of others. With this in mind, it follows that jobs rated as high in task significance may also be perceived as stimulating and challenging, bringing with them many opportunities to learn and develop.

The ability of GNS to moderate the relationship between feedback and job satisfaction may be a result of the reinforcement that regular feedback provides for one’s sense of accomplishment (whether it be from managers, peers or evidence of quality work performance), as well as the extent of their learning and development. The feedback could serve as objective evidence of the belief or perception that one is indeed learning, growing, and accomplishing. Positive or negative feedback could also reinforcing one’s perception that they are learning new things, that they are creative, and that they are developing areas of knowledge and skill.

Note that the moderating influence of GNS is changing only the magnitude, not the direction, of the relationship between each of task significance and feedback with
job satisfaction. Employees expressing lower levels of GNS are still reporting higher levels of job satisfaction as levels of perceived task significance and feedback rise, just not to the degree that employees expressing higher levels of GNS are. According to this study, efforts to enrich jobs through principles of task significance and feedback are likely to result in higher levels of job satisfaction for employees, regardless of their levels of GNS, providing support for their inclusion in job design efforts.

The moderating influence of GNS on the relationship between task variety and job satisfaction approached significance in the opposite direction of what was hypothesized. This result is difficult to explain theoretically. One possible explanation is that as levels of task variety rise, the opportunity to master certain skills and bodies of knowledge declines, essentially creating a situation where employees expressing high levels of task variety are feeling that they are a “jack of all trades, master of none”. In such an environment, where they are involved in a wide variety of activities, employees may be less likely to feel the strong sense of accomplishment that comes with achieving a high level of proficiency and expertise in one or a few skills. They may be learning, but the learning is so diverse and hurried that integration of new skills and knowledge is not being achieved, and thus their GNS needs are not being met. In this environment, employees with higher levels of GNS may feel that they are experiencing too much variety, and are less satisfied with their jobs since they do not have the time to master new skills. Employees with lower levels of GNS, however, may not view their lack of integration as an issue. If this is true, job design efforts should be careful to balance the need for task variety with the need for people to acquire proficiency and expertise in certain skills and tasks before being asked to learn new skills.
The finding that GNS failed to moderate the relationship between task identity and job satisfaction, when viewed in light of the fact that task identity is a significant positive predictor of job satisfaction, indicates that as ratings of task identity increase, employees with all levels of GNS are expressing higher levels of job satisfaction.

The finding that the relationship between task identity and job satisfaction is not moderated by GNS comes as a surprise. It could be that employees with higher levels of GNS simply do not respond as favorably to greater levels of task identity in their jobs as they do with greater levels of task significance and feedback. Alternatively, it could be that employees with lower levels of GNS respond to task identity more favorably than they do to either task significance or feedback. Regardless, task identity is an important predictor of job satisfaction, and should be included as a factor in job design. When interpreting the moderating influence of GNS, the strong negative skew on this factor should be taken into account. This result introduces a possible statistical artifact due to the restriction of range of the item scores. If this is the case, the moderating influence of GNS may be artificially attenuated, and therefore underestimated. The negative skew for GNS on this sample may be representative of the highly educated technical professional population.

Emotional reactivity moderated the relationship between task identity and job satisfaction such that employees with higher levels of emotional reactivity expressed higher levels of job satisfaction than did employees with lower levels of task identity. This finding is the opposite of what was hypothesized. One possible explanation for this finding is that employees expressing higher levels of task identity in their jobs are more likely to be focusing on fewer projects or work areas. Rather than being peripherally
involved in many projects, they are deeply involved in a few. Employees are able to focus on fewer things, which may be characterized by less variety, less change and greater control over their environments, with more time and opportunity to deal with obstacles. Perhaps the ability to focus on a few projects from start to finish, rather than being minimally involved on a large number of projects, is a better fit for those with higher levels of emotional reactivity, who express higher levels of annoyance, frustration and anger at work.

If this is true, one might expect to see emotional reactivity moderating the relationship between task variety and job satisfaction, such that as levels of task variety rise, employees expressing higher levels of emotional reactivity would report progressively lower levels of job satisfaction than would employees with lower levels of emotional reactivity. Results do not support this conclusion, however, as the moderating influence of emotional reactivity on task variety and job satisfaction was not significant. Regardless of the level of emotional reactivity, employees express higher levels of job satisfaction as levels of task variety rise, which only serves to highlight its importance in job design efforts.

Finally, emotional reactivity also failed to moderate the relationships between each of task significance and feedback with levels of job satisfaction. Regardless of the level of emotional reactivity, employees express higher levels of job satisfaction as levels of task significance and feedback rise. It seems that for these job characteristics, and three out of four overall, that emotional reactivity does not inhibit the relationships between each job characteristic and job satisfaction. Although it makes intuitive sense that jobs should be designed so as to minimize unnecessary annoyance and frustration,
perhaps dispositional factors such as emotional reactivity lie more within the sphere of
the individual to handle. When interpreting the moderating influence of emotional
reactivity, the moderate negative skew on this factor should be taken into account.
Although not as strong as the negative skew for GNS, this result still introduces a
possible statistical artifact due to the restriction of range of the item scores. If this is the
case, the moderating influence of emotional reactivity may be artificially attenuated, and
therefore underestimated. Regardless, these participants are indicating a fairly high
level of frustration, anger and annoyance. This could be a natural result of the
sometimes tedious nature of their work; it could also be a reflection of the relatively
young team environments that many of the participants were in. Many of these
organizations were relatively new to teams, and as with any transition, moving from a
traditional hierarchy to a team based organization can be a frustrating experience.

Implications for Theory
The findings of this study offer several implications for the JCM as a theory.
Firstly, in agreement with most research, the critical psychological states should be
dropped from the model as complete mediators, due to the ability of the job
characteristics to predict levels of job satisfaction without their inclusion. Secondly, the
role of autonomy needs to be assessed at the team level. The failure of autonomy to
load on its own factor in this study is at least partly due to the difference in meaning
between individually based and team based autonomy. While the other four job
characteristics did load cleanly, they nevertheless are worded with the individual, and
not the team, in mind. The JCM would only be strengthened if these other items were
re-worded to reflect team dynamics. Finally, while offering little in the way of substantive results for this study, emotional reactivity warrants future research focus. The finding that emotional reactivity significantly negatively predicted levels of job satisfaction in this study is evidence of its influence.

Implications for Practice

This study provides strong support for the application of the JCM in settings characterized by highly educated technical professionals working in teams. Regardless of whether they work in teams or in isolation, employees respond favorably to jobs which are designed to be meaningful, requiring a variety of skills, are part of an easily observable whole and which have regular opportunities for feedback. In addition, practitioners would be wise to carefully assess each employee's level of GNS, and provide commensurate growth and development opportunities. Investing in self-taught professional development resources such as e-learning tools could enable individuals to tailor their development activities to their level of GNS, thereby removing the challenge of individual assessment from the organization. Finally, employers would be wise to assess the emotional reactivity accompanying different jobs, and inform prospective job holders of the degree of frustration and annoyance that are likely to be experienced in these positions, allowing individuals with higher levels of emotional reactivity to select positions better suited to their emotional temperament.

Limitations of the Study

This study was affected by all the major weaknesses associated with opinion
research in the field. Such problems include: (a) common method variance; (b) non-response error; (c) bias introduced by the survey's design; (d) response bias; (e) primacy and recency effects; (f) interviewer bias; and (g) the inherent instability of opinions.

The degree of non-response error is difficult to determine in this study, partly due to the fact that surveys were not tracked until they were returned by respondents. There is no way of knowing what the response rate was overall, by industry or even by organization. Future studies of this nature should track all outgoing copies of survey questionnaires.

This study was particularly susceptible to possible non-independence of observations rooted in social desirability and groupthink (commonly defined a phenomenon whereby individuals intentionally or unintentionally conform to their perception of the group’s opinion or consensus), which is very common in work teams. Employees working in teams have much more in common in their environment, and have the opportunity to discuss their thoughts and opinions to a greater extent than do individuals working in relative isolation (Polley & Van Dyne, 1994). Independence of observations is an important assumption of factor analysis, and may not have been met in this study. A non-independence of assumptions leads to an underestimation of standard error, and can lead to false claims of relational significance.

There is also an issue of whether objective changes in job characteristics are recognized by incumbents and reflected in subjective ratings. Several studies have investigated this issue of alignment between objective change and subjective ratings;
most have found that objective changes are accurately reflected in subjective ratings (e.g., Fried & Ferris, 1987; Johns, Xie & Fang, 1992).

Ideas for Future Research

This study has helped fill a gap in the research literature for the applicability of the JCM to work teams, however, much more remains to be studied in this area. There are a host of work models that have support in the literature for traditionally-styled organizations, yet with more and more organizations transitioning to structures characterized by work teams, these models need to be re-tested, and in many cases, refined. In the case of the JCM, the job characteristic of autonomy could certainly benefit from research focusing on the difference between individual and team autonomy, and if the latter form is viable in a team oriented JCM. Future studies looking at the JCM would benefit by being longitudinal in nature, to assess the stability of perceptions as well as dispositional elements such as GNS. While it may not serve as a moderator, the ability of emotional reactivity to predict levels of job satisfaction in this study warrants further investigation of how this factor may be influencing other relationships in the JCM. Finally, while it has been shown that self-report measures are a valid and valuable source of data, findings of future research studies in this area can only be strengthened by the addition of objective performance measures.

Conclusion

This study has provided support for the applicability of the JCM to technical professionals working in teams. By broadening the viability of the job characteristics of
task significance, task variety, task identity and feedback, it gives credence to theories espousing their universal importance across work settings and cultures. Likewise, the value of GNS as a moderator between some job characteristics and job satisfaction provides theorists and practitioners alike with the challenge of how to motivate employees to recognize their need for growth, and how to create jobs that fulfill this basic human need.

Table 1
Demographics of 25 Interviewees

<table>
<thead>
<tr>
<th>Control Variable</th>
<th>Mean (yrs.)</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
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</tr>
<tr>
<td>Sex</td>
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<td></td>
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<tr>
<td>Education</td>
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<tr>
<td>Doctoral degree</td>
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<tr>
<td>No. of subordinates</td>
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<tr>
<td>Years in industry</td>
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<tr>
<td>Years in profession</td>
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<tr>
<td>Tenure with co.</td>
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<tr>
<td>Work team life</td>
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<tr>
<td>Member of work team</td>
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Table 2
Demographics of 541 Survey Participants

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<th>Response %</th>
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</tr>
<tr>
<td>Masters or doctoral degree</td>
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</tr>
<tr>
<td>Supervise one or more workers</td>
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<td>25.0</td>
</tr>
<tr>
<td>Years in present job</td>
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<td>2.8</td>
</tr>
<tr>
<td>Tenure with co.</td>
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<tr>
<td>Work the day shift</td>
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<tr>
<td>SMWT life</td>
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<tr>
<td>Member of SMWT</td>
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<tr>
<td>Team assignments:</td>
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<tr>
<td>Full-time with one team</td>
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<td>Loaned to a variety of teams</td>
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<td>Home team and loaned as needed</td>
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Table 3
Industries Represented in 117 Work Groups

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<tr>
<th>Industries</th>
<th>No. of Companies</th>
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<tbody>
<tr>
<td>Computers, office equipment</td>
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</tr>
<tr>
<td>Aerospace</td>
<td>3</td>
</tr>
<tr>
<td>Electronics, electrical equipment</td>
<td>3</td>
</tr>
<tr>
<td>Petroleum refining</td>
<td>1</td>
</tr>
<tr>
<td>Scientific, photographic, control equipment</td>
<td>1</td>
</tr>
<tr>
<td>Plastics materials, synthetic resins</td>
<td>1</td>
</tr>
<tr>
<td>Industrial gases</td>
<td>1</td>
</tr>
<tr>
<td>Aluminum processing</td>
<td>1</td>
</tr>
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Table 4  
*Descriptives of All Variables (N = 492)*

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<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
<th>Rel</th>
<th>Skewness</th>
<th>SE</th>
<th>Kurtosis</th>
<th>SE</th>
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<tr>
<td>Task significance</td>
<td>1.0 – 7.0</td>
<td>5.335</td>
<td>1.342</td>
<td>.703</td>
<td>-.913</td>
<td>.110</td>
<td>.508</td>
<td>.220</td>
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<tr>
<td>Task variety</td>
<td>1.0 – 5.0</td>
<td>3.329</td>
<td>.946</td>
<td>.879</td>
<td>-.371</td>
<td>.110</td>
<td>-.524</td>
<td>.220</td>
</tr>
<tr>
<td>Task identity</td>
<td>1.0 – 5.0</td>
<td>3.774</td>
<td>.832</td>
<td>.787</td>
<td>-.744</td>
<td>.110</td>
<td>.487</td>
<td>.220</td>
</tr>
<tr>
<td>Autonomy</td>
<td>1.0 – 5.0</td>
<td>3.846</td>
<td>.727</td>
<td>.662</td>
<td>-.782</td>
<td>.110</td>
<td>.932</td>
<td>.220</td>
</tr>
<tr>
<td>Feedback</td>
<td>1.0 – 5.0</td>
<td>2.833</td>
<td>.924</td>
<td>.838</td>
<td>-.083</td>
<td>.110</td>
<td>-.658</td>
<td>.220</td>
</tr>
<tr>
<td>GNS</td>
<td>1.0 – 7.0</td>
<td>5.239</td>
<td>1.607</td>
<td>.968</td>
<td>-.587</td>
<td>.110</td>
<td>-.786</td>
<td>.220</td>
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<tr>
<td>Emotional reactivity</td>
<td>1.0 – 7.0</td>
<td>4.543</td>
<td>1.656</td>
<td>.890</td>
<td>-.326</td>
<td>.110</td>
<td>-.838</td>
<td>.220</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>1.0 – 7.0</td>
<td>5.409</td>
<td>1.122</td>
<td>.803</td>
<td>-.954</td>
<td>.110</td>
<td>.660</td>
<td>.220</td>
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Table 5

Complete Bivariate Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
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<th>10</th>
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<tbody>
<tr>
<td>TS-v58</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>TS-v59</td>
<td>0.479**</td>
<td>1.00</td>
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<td>TS-v60(R)</td>
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</tr>
<tr>
<td>TV-v207</td>
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</tr>
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<td>TV-v225</td>
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<td>0.789**</td>
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<tr>
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<td>0.155**</td>
<td>0.162**</td>
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<td>1.00</td>
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<td>TI-v212</td>
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<td>0.247**</td>
<td>0.527**</td>
<td>0.439**</td>
<td>0.437**</td>
<td>0.324**</td>
<td>0.198**</td>
<td>0.188**</td>
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<td>0.249**</td>
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<td>0.369**</td>
<td>0.381**</td>
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<td>0.357**</td>
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<td>0.150**</td>
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<td>0.219**</td>
<td>0.114**</td>
<td>0.246**</td>
<td>0.211**</td>
<td>0.199**</td>
</tr>
<tr>
<td>FD-v210</td>
<td>0.212**</td>
<td>0.199**</td>
<td>0.234**</td>
<td>0.343**</td>
<td>0.313**</td>
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<td>0.289**</td>
<td>0.309**</td>
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<td>0.213**</td>
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<tr>
<td>GNS-v215</td>
<td>0.067</td>
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<td>0.131**</td>
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<td>0.126**</td>
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<td>0.125**</td>
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<td>0.087</td>
<td>0.109**</td>
<td>0.074</td>
<td>0.128**</td>
<td>0.098**</td>
<td>0.056</td>
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<td>0.105**</td>
<td>-0.105</td>
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<td>0.149**</td>
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<td>0.121**</td>
<td>0.121**</td>
<td>0.135**</td>
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*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).

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*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).
### Table 6

**Common Variance**

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<th>Factor</th>
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<th>Total</th>
<th>% of Variance</th>
<th>Cumulative %</th>
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<td>1.755</td>
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<td>3  (Feedback)</td>
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<td>4  (Task significance)</td>
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### Table 7

**EFA Factor Loadings & Variance Accounted For**

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<tr>
<th>Item</th>
<th>Factor &amp; Variance Accounted For</th>
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<td></td>
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<tr>
<td></td>
<td>2 (11.7%)</td>
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<tr>
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<td>3 (10.2%)</td>
</tr>
<tr>
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<td>4 (9.6%)</td>
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<td>Task variety (v207) “The opportunity to do a number of different things.”</td>
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<td>Task variety (v211) “The amount of variety in my job.”</td>
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<td>Task variety (v225) “How much variety is there in your job?”</td>
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<tr>
<td>Autonomy (v208) “The freedom to do pretty much what I want on my job.”</td>
<td>.487</td>
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<td>Task identity (v209) “The degree to which the work I’m involved in is handled from beginning to end by myself.”</td>
<td>.828</td>
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<td>Task identity (v212) “The opportunity to complete work I start.”</td>
<td>.690</td>
</tr>
<tr>
<td>Task identity (v213) “The opportunity to do a job from the beginning to end (i.e., the chance to do a whole job).”</td>
<td>.563</td>
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<tr>
<td>Autonomy (v226) “How much are you left on your own to do your own work?”</td>
<td>.465</td>
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<tr>
<td>Autonomy (v229) “To what extent are you able to act independently of your manager in performing your job function?”</td>
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</table>

(table continues)
Table 7 (continued).

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor &amp; Variance Accounted For</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1 (33.9%) 2 (11.7%) 3 (10.2%) 4 (9.6%)</td>
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<td>Feedback (v210) “The opportunity to find out how well I am doing on my job.”</td>
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<td>Feedback (v227) “To what extent do you find out how well you are doing on the job as you are working?”</td>
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<td>Task significance (v58) “My work is important for the lives or well-being of other people.”</td>
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<td>Task significance (v59) “This job is one where a lot of other people can be affected by how well the work gets done.”</td>
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<tr>
<td>Task significance (v60R) “The job itself is not very significant or important in the broader scheme of things.”</td>
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Table 8

*Complete Scale Correlation Matrix*

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**Correlation significant at the 0.01 level (2-tailed).**
Table 9

*Standardized Factor Loadings for Job Characteristics Items*

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<td>Task significance (v59) “This job is one where a lot of other people can be affected by how well the work gets done.”</td>
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</tr>
<tr>
<td>Task significance (v60R) “The job itself is not very significant or important in the broader scheme of things.”</td>
<td>.563***</td>
</tr>
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<td>Task variety (v207) “The opportunity to do a number of different things.”</td>
<td>.762***</td>
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<td>Task variety (v225) “How much variety is there in your job?”</td>
<td>.901***</td>
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<td>.542***</td>
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<td>Task identity (v212) “The opportunity to complete work I start.”</td>
<td>.863***</td>
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<tr>
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<td>.925***</td>
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<td>Feedback (v206) “The feedback from my manager on how well I’m doing.”</td>
<td>.728***</td>
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<td>Feedback (v210) “The opportunity to find out how well I am doing on my job.”</td>
<td>.837***</td>
</tr>
<tr>
<td>Feedback (v227) “To what extent do you find out how well you are doing on the job as you are working?”</td>
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***. $p < .001$

Table 10

*Goodness of Fit Indices for Job Characteristics*

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<th>Sig.</th>
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### Table 11
**Standardized Factor Loadings for GNS and Emotional Reactivity**

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<td>GNS (v215) “Stimulating and challenging work.”</td>
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</tr>
<tr>
<td>GNS (v216) “The feeling of worthwhile accomplishment I get from doing my job.”</td>
<td>.915***</td>
</tr>
<tr>
<td>GNS (v217) “Opportunities to learn new things from my work.”</td>
<td>.936***</td>
</tr>
<tr>
<td>GNS (v218) “Opportunities to be creative and imaginative in my work.”</td>
<td>.909***</td>
</tr>
<tr>
<td>GNS (v219) “Opportunities for personal growth and development in my job.”</td>
<td>.916***</td>
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<tr>
<td>GNS (v220) “A sense of worthwhile accomplishment in my work.”</td>
<td>.879***</td>
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<td>EmoRx (v153) “There are times at work when things really make me angry.”</td>
<td>.891***</td>
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<td>EmoRx (v154) “I sometimes feel quite frustrated over things that happen at work.”</td>
<td>.911***</td>
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<td>EmoRx (v155) “Things hardly ever annoy me at work.”</td>
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***. p < .001

### Table 12
**Goodness of Fit Indices for GNS and Emotional Reactivity**

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### Table 13
**Model Summaries for Regression Analyses**

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Model 1 Predictors: (Constant), TS, TV, TI, FD
Model 2 Predictors: (Constant), TS, TV, TI, FD, GNS, EmoRx
Model 3 Predictors: (Constant), TS, TV, TI, FD, GNS, EmoRx, GNSTS, GNSTV, GNSTI, GNSFD, EmoRxTS, EmoRxTV, EmoRxTI, EmoRxFD
Dependent Variable: GENSAT
Table 14
Regression Coefficients

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Figure 1. Job characteristics model (Adapted from Hackman & Oldham, 1976).
Figure 2. Scree plot of Eigenvalues.
Figure 3. Predictor model of job characteristics and job satisfaction.
Figure 4. Predictor model of GNS and emotional reactivity with job satisfaction.
Figure 5. GNS moderating job satisfaction and task significance.
Figure 6. GNS moderating job satisfaction and feedback.
Figure 7. GNS moderating job satisfaction and task variety.
Figure 8. Emotional reactivity moderating job satisfaction and task identity.
APPENDIX

QUESTIONNAIRE ITEMS
**Task significance**

1. My work is important for the lives or well-being of other people (v58) (Beyerlein, 1993).

2. This job is one where a lot of other people can be affected by how well the work gets done (v59) (Hackman & Oldham, 1980).

3. The job itself is not very significant or important in the broader scheme of things (v60R) (Hackman & Oldham, 1980).

**Task variety** (Sims, Szilagyi & Keller, 1976).

1. The opportunity to do a number of different things (v207).

2. The amount of variety in my job (v211).

3. How much variety is there in your job (v225)?

**Task identity** (Sims, Szilagyi & Keller, 1976).

1. The degree to which the work I’m involved in is handled from beginning to end by myself (v209).

2. The opportunity to complete work I start (v212).

3. The opportunity to do a job from the beginning to end (i.e., the chance to do a whole job) (v213).

**Autonomy** (Sims, Szilagyi & Keller, 1976).

1. The freedom to do pretty much what I want on my job (v208).

2. How much are you left on your own to do your own work (v226)?

3. To what extent are you able to act independently of your manager in performing your job function (v229)?

**Feedback** (Sims, Szilagyi & Keller, 1976).

1. The feedback from my manager on how well I’m doing (v206).

2. The opportunity to find out how well I am doing on my job (v210).
3. To what extent do you find out how well you are doing on the job as you are working (v227)?

**Growth need strength** (Hackman & Oldham, 1980).

1. Stimulating and challenging work (v215).
2. The feeling of worthwhile accomplishment I get from doing my job (v216).
3. Opportunities to learn new things from my work (v217).
4. Opportunities to be creative and imaginative in my work (v218).
5. Opportunities for personal growth and development in my job (v219).
6. A sense of worthwhile accomplishment in my work (v220).

**Emotional reactivity** (Keenan & Newton, 1984).

1. There are times at work when things really make me angry (v153).
2. I sometimes feel quite frustrated over things that happen at work (v154).
3. Things hardly ever annoy me at work (v155R).

**Job satisfaction** (Hackman & Oldham, 1980).

1. Generally speaking, I am very satisfied with this job (v38).
2. I frequently think of quitting this job (v44R).
3. I am generally satisfied with the kind of work I do on this job (v48).
4. Most people on this job are very satisfied with the job (v52).
5. People on this job often think of quitting (v61R).
REFERENCES


