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EXTROVERSION AS A MODERATOR OF THE RELATIONSHIP BETWEEN
WORKSPACE CHARACTERISTICS AND JOB SATISFACTION

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

in Partial Fulfillment
of the Requirements for the Degree
Master of Science
in
Psychology:
Industrial/Organizational

by
Timothy Paul Hickey

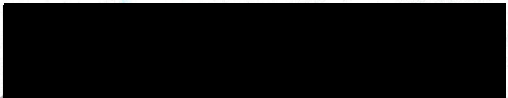
June 2000

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Timothy Paul Hickey
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ABSTRACT

Many conflicting findings have surfaced in the body of research that seeks to explain the effects workspace characteristics have on employee job satisfaction. This study proposed that the level of extroversion an individual possessed acted as a moderating variable in the relationship between three types of physical characteristics of workspaces and employee job satisfaction. Specifically, this study proposed that three physical characteristics, architectural accessibility, density, and openness, were related to job satisfaction. Moreover, it was predicted that the level of extroversion an individual possesses would moderate each of these relationships. To test these hypotheses, a questionnaire was given to office workers in three organizations. The questionnaire assessed levels of job satisfaction, extroversion, and the extent to which architectural accessibility, density and openness were present in the subjects offices and workspaces. Although the findings of the study were mixed, partial support was provided for the existence of a relationship between density levels and job satisfaction, moderated by extroversion. Limitations of

TABLE OF CONTENTS

ABSTRACT	iii
LIST OF TABLES	vi
CHAPTER ONE	
Introduction	1
CHAPTER TWO	
Method	31
CHAPTER THREE	
Results	44
CHAPTER FOUR	
Discussion	56
APPENDIX A: Questionnaire	68
REFERENCES	78

LIST OF TABLES

Table 1.	Variable Descriptives	44
Table 2.	Intercorrelations: Physical Characteristics, Job Satisfaction, and Extroversion.....	46
Table 3.	R Squared Change Statistics	51
Table 4.	Split Correlations	52

CHAPTER ONE INTRODUCTION

In today's competitive business world, successful corporations are those that recognize the importance of having a high level of employee satisfaction because of its associations with positive aspects for the organization, such as lower turnover, higher morale, and higher productivity. In their attempts to attain a competitive edge through the boosting of employee satisfaction, corporations have begun to make modifications to the traditional elements of work. These new changes include widespread innovations, ranging from more flexible work schedules, to providing daycare to working parents, to even altering the physical environment of offices and workspaces themselves, all in attempts to make employees more satisfied with their jobs.

One way in which organizations are attempting to gain a competitive edge is through their efforts to increase employee satisfaction. Organizations have only relatively recently begun to tinker with the office environment, hoping that it may be the key to increasing employee satisfaction. Indeed, organizations are just beginning to discover that the physical characteristics that make up the office environment can be a powerful influence on the employee's

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work experience. In his article "Seven Office Evaluations: A Review," Goodrich (1982) commented on the newfound importance and the potential that the office holds: "Now, office design needs to provide a responsive environment, interior spaces which encourage productivity by facilitating task performance, by supporting user needs, by allowing for meaningful communication and work relationships, and by providing a stimulating, meaningful organizational climate" (p. 354). Although this seems to be a tall order for the office setting to accomplish, many corporations are beginning to attempt to manipulate their offices in order to create the ideal environment for the employee, specifically, an environment that fosters satisfaction. The purpose of the current study was to determine if these environmental manipulations are related to an employee's level of satisfaction. Further, this study assessed whether or not this potential relationship was moderated by an employee's level of extroversion.

Employees, as well as the organizations they are a part of, are aware that their office environment is important to their way of life at work. Louis Harris and Associates conducted a national survey twenty years ago, which "found that a majority of office workers recognize that their satisfaction with their office surroundings affects their

job performance a great deal and feel that doing their job well, in turn, is central to both job satisfaction and getting the things they want out of life" (Goodrich, 1982, p. 372). The scientific community has shown only a limited degree of interest in assessing how office setting affects employee job satisfaction. Over the past several years, a handful of studies have been done to determine which elements or characteristics of the workspace affect the satisfaction of employees. An interesting dimension that several studies explored was that of how office characteristics facilitated interpersonal contact, and how this affected satisfaction. In the literature, interpersonal contact (IC) has been loosely defined as verbal or visual communication between employees. Interpersonal contact occurs whenever workers talk to one another, gesture to one another, or even see each other.

Three variables that have been examined as facilitators or inhibitors of interpersonal contact across several studies have been called architectural accessibility, density, and openness. Architectural accessibility (AA) was a term coined by authors Oldham and Rotchford (1983) that pertains to the degree that an individual's workspace is accessible to others. This construct has also been conceptualized in terms of the number of partitions

surrounding a workspace. A workspace that is totally enclosed by partitions would be considered highly inaccessible, while a workspace with no partitions enclosing the space would be highly architecturally accessible. A simple example can be used to demonstrate the varying degrees of accessibility of workspaces with different levels of AA. As mentioned above, a workspace with a very high level of AA would have no partitions surrounding it. It would be highly accessible to other employees, because there are no visual or physical boundaries on any side to keep others out. If another worker wanted access to the employee in a highly architecturally accessible workspace, he or she needs only to approach the employee from any side, and walk right up to the individual. Further, the worker need only to look at the employee from anywhere in the same room, because there are no visual boundaries preventing them from doing so. A workspace that has four partitions surrounding it would be inaccessible to others (low AA), due to the presence of the four walls. These four walls would require outsiders that desired access to the employee inside to pass or look into the workspace through one location only, because they cannot simply approach the workspace from any side and gain admittance or the desired view.

Density, social density, or spatial density, is a construct that has been generally defined as the average number of square feet per employee (Arkkelin 1979; Oldham & Rotchford 1983). A highly dense office setting or workspace would have many employees occupying a small amount of square feet. Openness, a related concept, "refers to the overall openness of the office, more specifically, to the ratio of total square footage of the office to the total length of its interior walls and partitions. If square footage is kept constant, then offices with few interior boundaries are considered more open than offices with many walls and partitions" (Oldham & Rotchford, p. 542). It should be noted that these three spatial characteristics are interrelated. Density and openness are both affected by the total square footage of the office, while AA and openness are also both affected by the prevalence of partitions or walls in the office.

In previous research, it was thought that as the distance between individuals decreased, the amount of social interaction between these individuals would increase. Therefore, it follows that interpersonal contact (IC), or social interaction, between individuals would increase with increasing levels of density. For example, two individuals sitting within a few feet of each other would be more likely

to make an occasional comment to each other throughout the course of their workday than would two employees with fifty feet of office space between them. Such an expanse of space between two people would require special effort to have any meaningful communication. It is likely that over time, people in such a situation would tire of making such an effort, if only for the purpose of discussing last night's ball game. IC was also proposed to be facilitated by high degrees of openness and high levels of architectural accessibility. If an office is open, and any given workspace is highly accessible, there should be only very slight boundaries to verbal and visual contact and communication. An example of such an office would be one that has few partitions and internal walls. Employees in such a work setting could easily communicate with others from their desks, or as they are passing by their coworkers' desks, since there would be none of the verbal or visual hindrances to communications that arise from walls or partitions (Fried, 1990; Oldham, 1988; Oldham & Fried, 1987; Oldham & Rotchford, 1983).

Further evidence that would suggest the facilitation of IC by certain levels of these three dimensions of workspace characteristics comes from social psychology's studies on proximity. It has been discovered that proximity, or how

close people are to each other, influences the degree of interaction. Specifically, proximity is best defined in terms of what is called functional distance. Functional distance is roughly defined as how often people's paths cross, or how often they encounter one another. People with a short functional distance between them are likely to interact with each other, and those that have a great functional distance between them, are likely to interact with each other only rarely, if at all. Applying the principle of functional distance to the office setting provides more support for the idea that workspace characteristics influence interpersonal contact (Monge & Kirste, 1980; Darley & Berscheid, 1967; Myers, 1993).

For example, a workspace with a high level of density could be a small ten by fifteen room with three employees in it. These employees would constantly encounter one another while doing their jobs, making their functional distance between each very low. This low functional distance between each of the employees would likely result in high degrees of interaction. This interaction, encouraged by the high density of the workspace, would likely be in the form of verbal and or visual communication, thereby resulting in a high level of IC. Open and accessible workspaces would also likely increase people's proximity to others. An employee

in a workspace that has no partitions, being highly architecturally accessible, would have a short functional distance from others, because there are no boundaries to visual or verbal contact. Passersby could simply stop and talk, or even visually communicate with this employee with great ease. This workspace, being highly proximal to others, would allow for high amounts of interaction among the worker stationed there and other employees. This high amount of interaction resulting from the workspace's high level of AA and the great openness of the office, would as a rule, result in high levels of IC.

In scientific research, these three office and workspace characteristics have been shown to be related to a number of phenomenon. Architectural accessibility has been found to be positively related to employee work fatigue and psychosomatic complaints. That is, the fewer the number of partitions (high AA) that created enclosures for employees to work in, the more employees felt ill, fatigued, and generally unhappy on the job (Fried, 1990). Another study that investigated the effects of openness, AA, and density, in addition to darkness, found that these characteristics of the office accounted for 31% of the variance in work satisfaction among employees (Oldham & Fried, 1987). Other research has indicated that density had a significant impact

on satisfaction. Low levels of density "...had a positive impact on employees' work satisfaction" (Oldham 1988, p. 257). In addition to density affecting satisfaction, it has been discovered that AA affects satisfaction: "...moving from an open office to either a partitioned office or an open office with relatively low levels of spatial density can have positive effects on individuals" (Oldham 1988, p. 257). Finally, Oldham and Rotchford (1983) examined the effects of several office characteristics including density, openness, and AA, and discovered: "Dense, accessible...offices are correlated with low satisfaction..." (ps. 550-1). Openness of the office was also found to be positively related to satisfaction.

The concept that the environment influences the individual employee is further supported by the notion of organizational culture. One example of organizational culture influencing the workspace characteristics and thus individuals in the workspace, comes from the "bullpen" environment used by Procter & Gamble. This organization had a culture that valued teamwork and group involvement, and demanded high motivation and involvement levels from its employees. The environment that best reflected and allowed for these values was this bullpen office. Essentially, this office could be characterized as being highly dense, open,

and having very accessible workspaces, because there were many desks close together in a room devoid of any partitions (Goodrich, 1982). This set of characteristics allowed for much interaction and teamwork amongst the employees.

Strong support for the influence culture has on workspaces comes from research gathered and conducted by the Herman Miller company, an office furniture and systems manufacturer. In their manual, "Understanding Relay," they assert that the culture of an organization should dictate how the office should be spatially arranged. The manual proceeds to state that the arrangement and physical characteristics of offices "...constitute a silent language of the organization that can be used to reflect, reinforce, and enhance culture and values. The organization of space needs to mesh with the structure of the organization..." (Hall 1959, Schein 1988, Waterman 1990, p. 13). It is later asserted that it has been found to be important that organizations have furniture and office systems that not only demonstrate their corporate culture and values to their employees, but also communicate the purpose and identity of the business to employees and customers.

To provide a more concrete example of how culture should guide the workspaces' characteristics, the text provides examples in the form of "application profiles." In

these profiles, various businesses are detailed, including their cultural values, and recommendations are made as to how their corresponding offices should be arranged to best impart their cultural values on the workforce. One business that is detailed is the headquarters unit of a banking institution, whose culture espouses to more conservative business values such as status and hierarchy, and is highly image conscious. The recommended office design calls for the upper management to have enclosed offices, that would be considered to have low density and be highly inaccessible and very open. These characteristics serve to set apart the management from the lower ranks of employees, and serve as a status symbol. In this business, the next lowest employees in the hierarchy, the professionals and mid-level managers, are to have somewhat more architecturally accessible offices, with partitions partially closing off their workspaces, and slightly more dense and slightly less open characteristics. These middle range characteristics of their workspaces serve to set them in the middle of the status hierarchy, while still making these individuals somewhat accessible to the lowest ranks of employees in the hierarchy. Finally, the lowest clerical and technical workers are placed in a bullpen setup, with high architectural accessibility (no partitions), high density,

and low openness. In a culture that values hierarchy and status and regards spacious and inaccessible workspaces as signs of accomplishment and power, it makes sense that the lowest levels of technical and clerical workers should have the lowest levels of these characteristics in their workspaces.

The second business that is of interest here is a high technology manufacturing firm, whose culture values creativity, decentralization, flexibility in rules, and is dynamic, informal, and not very image conscious. In contrast to the banking institution, this organization represents a nearly polar opposite in cultural values, and the recommended office characteristics reflect this fact. In this organization, no one has an enclosed office. Even the upper management in this organization has workspaces of varying degrees of accessibility, density and openness, as these individuals utilize partitions and shared spaces, like all others in the organization do. The enclosed workspaces in this organization are shared conference rooms. Since this organization espouses the values of flexibility and creativity, many workspaces are flexible and varied in the degrees to which they are architecturally accessible, dense, and open. An important characteristic of the workspaces of this organization that reflects the cultural value on

creativity is the presence of open areas built into all areas of the office building. This high level of openness is designed to encourage interpersonal interaction amongst all levels of workers, in the hopes that new ideas will be exchanged across the workforce (Hall 1959, Schein 1988, Waterman 1990). This organization's culture paints a radically different environmental picture in which the employees work than does the previous organization. It is clear, from this and other evidence in the literature, that the work environment is related to outcomes for organizations and employees.

Despite this presentation of a unified body of results, as with many cases in research, there are conflicting findings. Many other studies present findings that are directly opposite these results. In fact, there seems to exist a duality in the results across the board.

Goodrich (1982) provides one of the many examples of employee reactions that were contrary to the findings that assert AA and density have a negative impact on job satisfaction. He studied an office where 4 professionals and their 3 secretaries were placed into one office room, with no partitions between any of them. It was discovered that "The close quarters, the minimal acoustical privacy, and the spatial arrangement of the furniture supported close

working relationships between them" (Goodrich 1982, p. 360). Also, "Secretaries reported feeling highly involved in their work, a sense of professionalism and personal responsibility for the work they did, and high morale. Professionals reported feeling like a member of a team, with high morale and a strong sense of group purpose" (Goodrich 1982, p. 360). Further contradictory evidence was furnished when a different office was analyzed. In this company, work groups of five or six people were examined. These groups operated in what that company called a "bullpen." The "bullpen" was essentially a crowded, open work area, described as "unprivate, noisy, and unattractive" (Goodrich 1982, p. 361). Despite these surroundings, the people in these settings were very productive, and had a high degree of identification with their work groups.

Another example of the duality of the impact of interpersonal contact on satisfaction comes from Oldham and Rotchford (1983). They describe various conflicting claims made by researchers. High levels of density, for example, has been shown to produce both high and low levels of satisfaction in employees. In one study, it was found that "...professional employees who experienced an increase in density reported...greater work satisfaction..." and "...employees who experienced a decrease in density reported...less work

satisfaction" (p. 544). Meanwhile, other studies have found "...significant decreases in... work and social satisfaction, after employees moved from a conventional to an open office" (p. 545). Finally, Fried (1990) makes a comment on the duality of findings in the literature: "A number of studies have indicated that such workspace characteristics as high number of people (i.e. social density), few enclosures, or high setting openness have modest deleterious effects on employee attitudes and behaviors. However, other studies have demonstrated... a modest positive effect of these workspace characteristics on individual reactions" (p. 267). Although there seems to have been no great movement to unify findings in this area, there have been theories offered up that try to explain the discrepancies in employee satisfaction with workspace characteristics that facilitate or hinder interpersonal contact.

One major theory that attempts to explain the differences between individuals related to their polar reactions to workspace characteristics is the screening theory. This idea states that the differences between individuals as to how they react to their settings are due to whether or not they possess an important trait - the ability to "screen." According to screening theory, individuals are either "screeners" or "nonscreeners."

Screeners are people who are able to filter stimuli as they come to them, or selectively attend to various pieces of information. A screener can "effectively reduce the stress of numerous inputs by imposing priority-based patterns of attention on information" (Fried, 1990, p. 270). People with the trait for screening are able to work unhindered in environments that provide them with high levels of arousal, because of their propensity for selective or priority-based attention to stimuli. Such an office environment would be one that has high levels of both density and AA. On the other hand, nonscreeners "...are individuals who appear less able to impose such priorities" (p. 270). Nonscreeners would not react well to situations that present them with much stimulation, because they cannot handle the high levels of mental arousal that come from high degrees of stimulation from the environment. In fact, research suggests that nonscreeners would prefer an environment that offers a low level of such stimulation, like a workspace with low AA and low density would. "Thus, nonscreeners should react more positively to the introduction of partitions and to the reduction in spatial density than do screeners, simply because nonscreeners should benefit most from the protection from excessive stimulation that the design changes provide" (p. 254, Oldham 1988).

Another theory that attempts to explain individual reactions to workspace characteristics is overstimulation theory. This theory states that "...characteristics of the physical environment (e.g. open space, close proximity of others, and densely populated areas) can expose individuals to excessive stimulation. People are expected to respond to this overstimulation both behaviorally and attitudinally..." (Oldham 1988, p. 253). Oldham and Fried (1987) comment on this theory's implications for the workplace: "In the context of a work organization, employees might physically withdraw from an overstimulating environment and experience dissatisfaction with the work they do in that environment" (p. 75). Essentially, this theory posits that employees who are in offices with high AA, low openness, and high density will experience dissatisfaction. These theories may help to explain specific, individual reactions due to workspace characteristics, but they fail to address the whole body of literature and all of its conflicting findings.

Clearly, it has been shown that the physical characteristics of the workspace influence an employee's satisfaction. It has also been shown that there are differences across individuals, as to how they react to various levels of workspace characteristics. Another important fact about workspace characteristics is that in

addition to influencing employees, they themselves are influenced by a powerful force. This force is organizational culture.

As mentioned earlier, studies have found conflicting results as to how people react to workspace characteristics. Similarly, just as individuals have been shown to react differently to different workspace characteristics, they have different reactions to varying organizational cultures. Research has shown that the cause of these differences across people, as to how they react to different cultures, is individual differences. Individuals will desire to work in cultures or environments which match their personality needs related to environmental arousal and stimulation (McElroy, Morrow, & Ackerman 1983). Perhaps, an individual who has an extroverted personality - sociable, gregarious, and talkative - will be content and thrive in an environment that affords them with much social stimulation. Such an environment would be provided by an organization whose culture is heavily team based with plenty of interpersonal contact. The culture that creates this type of environment would be one that provides a high level of mental arousal, due to the presence of so much stimuli. This would make such a culture especially appealing to an extroverted personality, because they require higher levels of arousal

to be satisfied. "However, sociability and affiliation are not the only characteristics of extroverts...In fact, biological research shows that extroverts have higher levels of arousal..." (Judge & Cable, 1997 p. 365).

Other arguments for the interaction of personality and culture or environment affecting satisfaction of employees come from the person-environment, or person-situation fit literature. O'Reilly, Chatman, and Caldwell (1991) cite the logic of this position, saying that satisfaction results from "a harmonious relationship between the individual and his environment, suitability of the individual to the environment and vice versa" (p. 489). Individuals with a personality that needs interpersonal contact, as extroverts do, would get satisfaction from an organization whose culture promoted openness and interaction among employees. Similarly, the authors state that "Empirical results have typically supported the hypothesis that congruence between individuals' personalities and the demands of their occupations are associated with positive affect..." (p. 488).

Another person-environment fit theory that proposes that the interaction between these two factors influences satisfaction comes from Pervin (1968), as quoted by George (1992). "...for each individual there are environments (interpersonal and noninterpersonal) which more or less

match the characteristics of his [or her] personality. A 'match' or 'best fit' of individual to environment is viewed as expressing itself in high performance, satisfaction, and little stress in the system whereas a 'lack of fit' is viewed as resulting in decreased performance, dissatisfaction, and stress in the system" (p. 195).

This study proposes that, just as the individual differences in reactions to organizational culture are related to personality, the polar nature of findings of employee satisfaction with workspace characteristics is a result of individual differences in personality across employees. These individual differences, caused by the enduring traits of employees, can only be attributed to the effects of personality. Specifically, as in the case of reactions to cultures, the personality trait of extroversion/introversion may be the key to understanding the polar reactions of employees to office conditions that promote or inhibit interpersonal contact. Before this argument for interaction can be made, some understanding of this personality trait is necessary. Extroversion has typically been defined in the literature as a trait that exists as a combination of being socially outgoing and even possibly aggressive. Individuals that are said to possess the trait of extroversion are usually thought of as being

talkative, assertive, active, gregarious, and sociable (Barrick & Mount, 1991).

There have been numerous studies conducted to determine the influence of personality on various aspects of organizational life. This particular personality dimension, extroversion, has been operationalized in a number of ways. The "Big Five" model of personality is perhaps the best known conceptualization of personality. The extroversion/introversion dimension of this model is the object of interest for this study. Barrick and Mount (1991) conducted a study to determine which Big Five dimensions affected job performance, and discovered that extroversion was a valid predictor of performance for managerial and sales positions. Since both of these job types are thought to have a high degree of interpersonal contact and interaction, extroverts would naturally excel in these situations. Therefore, it follows logically that these individuals would experience satisfaction stemming from their skillful job performance.

Additional studies have examined related concepts. One group of researchers applied Holland's theory of person-environment fit to examine how individuals of differing personality characteristics solve problems, and how this affects their levels of satisfaction in a work group setting

(Wampold, Ankarlo, Trinidad-Carrillo, Baumler, and Prater, 1995). There are six types of personality in this theory: realistic, artistic, investigative, conventional, enterprising, and social. The social type of person can be expected to have the greatest amount of social relations or interchanges with others, as compared to any other type of personality in this model. Additionally, social types will participate in more social activities, will use social means to solve problems, and are generally more empathetic than any other type (Wampold et al, 1995). This study found that individuals who could be classified as social relied "heavily on close personal relationships and the exchange of social support..." (p. 377) to solve problems. An additional finding was that the more similar the characteristics of the situation are to an individual's personality type, the more satisfied they will be.

Another examination of the effects of personality on organizational attraction links the Holland type of social, back to the Big Five dimension of extroversion. The researchers, in the course of studying extroversion, neuroticism, and openness, "...found significant relations between these traits and facets of the Holland vocational interest typology. For example, extroverts expressed interest in social...vocations..." (Judge & Cable 1997 p. 385).

The simplicity with which this one aspect of personality can, in these comparable models, be reduced to a common dimension (extroversion), demonstrates the robustness of this personality dimension, and how it affects many aspects of organizational life.

Finally, the dimension of extroversion has been seen as being highly related to "positive affectivity (PA)." George (1992), in her study on the role personality plays in organizational life, explains the characteristics of individuals high in PA. "Individuals high on PA have an overall sense of well-being and view themselves as active, self-efficacious, and pleurably engaged both interpersonally and in terms of achievement" (p. 188). Her article details the findings that PA is essentially at the root of job satisfaction, and that "...correlational studies have found that job satisfaction is significantly and positively associated with PA..." (p. 189). Also important is the fact that PA is highly related to the extroversion dimension. PA has been found to correspond greatly to the dimension of extroversion, with "...PA forming the core of extroversion" (George 1992, p. 188).

Clearly, personality has been shown to have an effect on job satisfaction. An important fact that is apparent after a review of the literature, is that despite the fact

that this personality dimension has been operationalized and tested differently across many different studies, it can still be simplified to one basic, robust, unified trait or dimension. This is the dimension of personality known as extroversion.

Now, after having a basic understanding of how personality (extroversion) can influence job satisfaction, an interesting connection between elements in the literature can be made. This connection is between the theories of screening and overstimulation relative to satisfaction due to workspace characteristics that were mentioned earlier, and the research on the personality dimension of extroversion. Specifically, it can be said that the theories of screening and overstimulation are simply another way of describing the effects personality has on the relationship between workspace characteristics and job satisfaction. The integration of the material from these two areas lends support to this idea.

As mentioned earlier, screening theory proposes that individuals are either screeners or non screeners. Screeners are those individuals who have the ability or desire to selectively attend to multiple stimuli or inputs, and are able to thrive in bustling, active environments. Nonscreeners do not desire this, and become flustered and

frustrated when presented with the high levels of stimuli or information input that come from a high energy, bustling environment (Fried 1990, p. 270). The other main theory of interest, overstimulation theory, proposes that characteristics of the physical environment regulate the levels of stimulation an individual receives. Different people have different levels of what they consider to be acceptable stimulation for themselves. Individuals respond both attitudinally and behaviorally when these levels are met, or exceeded (Oldham 1988, p. 253).

These two theories support the idea that there are individual differences in environmental preferences. These individual differences can be explained in terms of an individual's degree of extroversion. Screening theory's screeners and non-screeners can be explained in terms of extroversion by examining the characteristics of extroverts versus the characteristics of introverts. Personality research states that extroverts are typically lively, outgoing, highly responsive individuals. It follows that such individuals would be able to thrive in an environment that provided them with much stimulation, as an open, dense, and accessible office would. Conversely, personality research states that introverts, (those with a low degree of extroversion), tend to be more calm, controlled, and

peaceful. It also follows that such individuals would not like to be in environments that were extremely active and bustling or even at times chaotic, like an open plan bullpen office would be.

Overstimulation theory can be explained in terms of personality also, by examining physiological research connected to personality. It has been discovered that there is a relationship between an individual's autonomic arousal system and their personality. Specifically, individuals who are extroverted seek a higher level of arousal or stimulation from their environment because their levels of brain arousal are low. Conversely, introverted individuals seek less stimulation from their environment because their autonomic arousal systems are not as reactive as the extroverted individuals' systems (Eysenck 1990, Myers 1992). Integrating these findings with overstimulation theory suggests that individuals who are extroverted are more likely to be satisfied and happy in an environment that provides them with higher levels of stimulation, such as an open, dense, and accessible office would. This environment would provide the extrovert with a substantially suitable level of arousal or stimuli. An introvert in the same environment, however, would be overly stimulated and thereby unhappy and dissatisfied, because they normally would not

require the large amount of stimuli or arousal that an open, dense, and accessible office would provide.

Future research is necessary to further explore the often proposed but never determined relationship between workspace characteristics or the physical environment and personality and how they affect job satisfaction. Research has been done to determine the effects of personality, as well as the effects of workspace characteristics separately, on the job satisfaction of employees. Studies conducted that examined the effects of personality have found that approximately thirty percent of the variance in job satisfaction can be attributed to effects of personality (George 1992). While this advances the understanding of job satisfaction, it still leaves approximately seventy percent of the variance unexplained. George (1992) said of this: "It is likely that a large portion of this unexplained variance is attributable to situational factors and their interactions with personality" (p. 187). George also commented: "...it may be that personality and situational factors, in addition to having main effects, also interact to determine levels of job satisfaction" (p. 189). Another similar statement was made by Holland (1996), when he stated that the studies of personality "...are incomplete, however, in that they focus on personal characteristics and neglect

environmental characteristics" (p. 400). There is a lack of research that assesses the effects of the interaction between the employees' physical environmental characteristics or the workspace characteristics, and personality, on job satisfaction. This study attempted to fill this theoretical void.

Hypotheses

Hypothesis One

- A: There will be a relationship between architectural accessibility and job satisfaction.
- B: The relationship between architectural accessibility and job satisfaction will be moderated by the level of extroversion an individual possesses.

Hypothesis Two

- A: There will be a relationship between density and job satisfaction.
- B: The relationship between density and job satisfaction will be moderated by the level of extroversion an individual possesses.

Hypothesis Three

- A: There will be a relationship between openness and job satisfaction.
- B: The relationship between openness and job satisfaction will be moderated by the level of extroversion an individual possesses.

The main purpose of this study was to look for moderated relationships between workspace characteristics and job satisfaction, which can be seen in Part B of each

hypothesis. However, it was necessary to add a Part A to each hypothesis, because it was first important to establish the magnitude of the relationships between each of the characteristics variables and satisfaction before proceeding to the main thrust of the study. There were two main reasons for carrying out this initial analysis. First, while the relationship between workspace characteristics and job satisfaction was expected to be moderated by personality, it was also expected that there would be a slight correlation between satisfaction and the workspace variables (Arnold 1982). Second, in literature discussing examinations of moderated relationships between two variables, it is recommended that a baseline relationship between the two variables be established first, before testing for a moderated relationship (Zedeck 1971). For these reasons, part "A" of each hypothesis was first examined in order to detect the magnitude of any correlational relationships that may have existed between each workspace characteristic and job satisfaction.

CHAPTER TWO METHOD

Research Setting & Subjects:

This research was conducted in several organizations, in order to sample a wide range of workspace environments and employees. 129 subjects were utilized, in order to tap a broad spectrum of individuals. The decision to target approximately 120 subjects for this study was based on sample sizes of previous studies that examined similar variables, such as work performed by Oldham (1988), Oldham and Rotchford (1983), and others. These studies found moderate effect sizes ($R^2 = .35$) using samples of approximately 120 subjects. Given the number of variables analyzed by the current study, it was anticipated that similar effect sizes would be found by utilizing a roughly equivalent sample size. Only employees that worked in office settings, as opposed to employees in positions such as manufacturing or fieldwork operations, were assessed.

The respondents to this study belonged primarily to three organizations, Southern California Edison, a large utility corporation which comprised 56.6% of the population, Awana, a publishing company that accounted for 24.8% of the population, and Stepan, a chemicals research and development company whose employees comprised 11.6% of the population.

The remainder of the respondents was mixed across a large number of companies, and comprised 7.2% of the population. These three organizations provided a variety of office environments and employees, likely due to the differences in the three fields of industry or service. All subjects were assessed using the survey instrument created specifically for this study, entitled the Work Environment Survey.

A pilot test of the instrument was conducted in order to determine whether there were any problems, such as subjects misunderstanding concepts, subjects missing or skipping items, and so forth. The instrument was tested on a small population of employees at Southern California Edison. An ocular analysis of the data and descriptive statistics revealed no problems such as comprehension difficulties, formatting issues, or other complications. Further analyses were conducted using the pilot data, including the testing of the reliabilities of the scales in the instrument. The sections of the survey where published scales were utilized included the satisfaction and personality sections. The scale used in the satisfaction section, general job satisfaction, indicated an internal consistency of .72. The scale utilized in the personality section, the Mini Marker, indicated an internal consistency of .88. There was one scale that was created specifically

for this study that measured a subject's level of perceived architectural accessibility. This scale demonstrated an internal consistency of .68. These reliabilities were considered acceptable, based on criteria by Robinson, Shaver, and Wrightsmith (1991), who suggest that values of internal consistency over .60 are acceptable.

Procedure:

Data was collected through employee responses recorded on the questionnaire that was administered. The questionnaire, entitled The Work Environment Survey, consisted of three sections, the first of which ascertained the employee's level of general job satisfaction. The second section measured the employee's personality - specifically the degree of extroversion/introversion, while the third section assessed the level of each of the three physical workspace characteristics. It should be noted that the construct of job satisfaction is generally considered to be composed of many different facets. For purposes of this study, the holistic, overall level of job satisfaction was of primary interest. This study chose to focus on general job satisfaction in order to obtain results in a more parsimonious manner, and in order to more fully test the robustness of the anticipated effect of the proposed relationship between environmental characteristics and

personality on the satisfaction of employees. Before responding to the questionnaire, employees were informed about the purpose of the research, and were given the option to refuse to participate, if they so desired. The employees also were informed that all responses would remain confidential, and were told that they had the option to obtain feedback on the results of the research, if they desired.

Measures:

Workspace/office characteristics section: This section of the questionnaire assessed the degree to which each of the three characteristics were present in the employee's "workspace," as well as in their "general office area." The distinction between these two categories of space was made as follows: a workspace consisted of the immediate area in which the subject worked, and the general office area included all of the nearest cubicles or the entire open room where the subject and their co-workers' workspaces were located. This section of the questionnaire was created based on the constructs or characteristics of architectural accessibility, density, and openness, which have been defined in the literature. Although these three theoretical concepts or constructs exist in the literature, to the author's knowledge, there is no published measurement device

surrounding physical environment. Architectural accessibility was also measured in another way.

The second way architectural accessibility was assessed was by examining the subject's perceptions about their workspace, in reference to their accessibility. Three questions were asked of subjects, inquiring as to how isolated and how physically separated they felt from others, and how physically accessible they felt to others, while they were in their personal workspace. For example, question number one, which inquired as to how isolated subjects felt from others, asked: "How isolated from others do you feel when you are in your workspace?" Subjects then could respond to this question using a five point scale, which ranged from "Very isolated" to "Not at all isolated". This examination of subjects' perceptions of this characteristic was conducted in parallel with the more factually-based descriptive measurement, because of the complex composition of this concept. There are many individual factors that make up architectural accessibility, ranging from heights and shapes of walls, to types of materials, to numbers of doors, and other elements. In addition to capturing a few of the many physical elements in the descriptive measure, it was thought prudent to examine the more all-encompassing and fluid dimension of individual

perceptions, in order to prevent any limitations a survey might artificially impose when assessing this characteristic. These perceptual questions were in the form of a five-point scale, and responses were averaged to create the perceived architectural accessibility scale, which demonstrated an internal consistency of .68.

Density: The survey instrument sought to assess density in the subject's surroundings, by examining their perceptions of both their workspaces and general office areas. First, subjects' perceptions of density in their immediate workspaces were measured. The level of this characteristic present in the workspace is typically defined in the literature as the ratio of number of people per square feet in the workspace. In the current study, two questions provided the responses used to compute this density ratio of subjects' workspaces. The first question asked subjects to report how many people were in their workspace (including themselves). The second question assessed subjects' perceptions of the size of their workspace area, by having them choose one of five descriptions of differently sized workspaces. The descriptions for this question ranged from "compact workspace area," to "Large workspace area." Subjects' responses to the perceptual, description question were

assigned numerical values. These values were then divided by the number of persons they stated as working in their workspace areas. This is how the density ratio for workspaces was calculated.

The second way in which density was measured was on a larger scale, that being the general office area density. The level of density in the general office area is calculated in the literature by taking the ratio of number of people in the general office area per the square feet of the area. In this study, the density of the general office area was again measured perceptually, as workspace density was. The subject was asked to perceptually assess the spaciousness of their general office area by choosing one of five descriptions which ranged from "compact general office area," to "large general office area." As was the case in calculating the workspace density ratio, the five descriptions were assigned numerical values. The numerical value of the selected description was then divided by the number of persons reported to be working in the general office area. The resulting ratio provided a measure of the general office area density.

Density was not assessed on a strictly factual or descriptive basis. The main reason for this was that unlike measuring accessibility, where subject's could easily report

how many walls surrounded them, the measurement of the square footages of workspaces and offices required to obtain a factual basis for a measure of density was considerably more difficult. Although the concept of density is less abstract than architectural accessibility, collecting factual data for this characteristic would have been prohibitively impractical. To address this difficulty, a section was placed at the end of the survey, where subjects had the option to provide the physical dimensions of their workspaces and offices, if they were able to make the estimations or measurements. This data, when available, was used as a validity check on the perceptual measurements of density.

Openness: This characteristic was assessed in terms of the subjects' general office areas. In the literature, this characteristic is determined by the ratio of total square footage of the office area to the total length of interior walls and partitions in the general office area. High levels of openness result from having a large office area with few interior walls or partitions. This survey determined the openness of general office areas by asking subjects to make a perceptual rating. Subjects were presented with one question that asked them to select the description that best described how open their office was.

There were five options, ranging from "Open office (no partitions/interior walls are in this general office area)" to "Not at all open office (many partitions and walls are in this general office area, and nearly all workspaces are completely enclosed)." The five descriptive choices were each given numerical values, which represented the level of openness present in the general office area. This concept was assessed in the perceptual domain only, for the same reasons that applied to the concept of density. Subjects were given the opportunity to provide a measurement of the total length of internal walls in their office area at the end of the survey, along with their estimations for density.

These three measures are adaptations of environmental dimensions created by Oldham & Rotchford (1983) and Fried (1990). These select dimensions were developed to differentiate between the varying levels of physical characteristics of workspace environments, related to how they affected social interactions between workers, or, how they regulated interpersonal contact. The three measures were written based on the theoretical definitions used by Oldham & Rotchford and Fried.

Personality section: The personality section of the questionnaire assessed the degree to which employees were either extroverted or introverted in their personalities.

This section consisted of items from the Saucier "Mini-Marker Scale." This instrument is a shortened version of Goldberg's inventory of the "Big Five" personality traits. The Mini Marker was selected for this study for several reasons. First, it was designed to be more "user-friendly" than the original inventory, and its length allows for a much briefer administration time. These two attributes of this instrument made it especially appealing for use in this study, considering it was administered to individuals who did not possess much knowledge of personality psychology. Secondly, the Mini Marker is a high quality instrument, displaying simple structure for all personality traits that it measures, and having a good reliability for assessing extroversion (internal consistency of .88) (Saucier 1994). In this study, those items used from this instrument were those which assessed the degree of extroversion/introversion to measure this aspect of employee personality. These eight items were adjectives, four of which described introverted qualities such as "bashful," while the remaining four described extroverted qualities, such as "bold." Subjects were asked to rate how well each adjective described them, using a nine-point scale that ranged from "extremely accurate" to "extremely inaccurate."

Job satisfaction section: In this section of the questionnaire, an employee's level of general satisfaction with their job was assessed. In order to determine the subjects' level of general job satisfaction, five questions were asked. Subjects were asked questions such as number two, "I frequently think about quitting this job." Respondents could answer using a seven point scale, which ranged from "Agree strongly" to "Disagree strongly." The questions used in this section were taken from the Job Diagnostic Survey, developed by Hackman & Oldham. This instrument has eighteen separate scales that diagnose various elements of the individual's reactions to their job. However, the results obtained from the scale that assesses a worker's overall, general satisfaction level were the main focus of this study. The Job Diagnostic Survey (JDS) was selected for this study for several reasons. First, it is a device that has been supported in the field, having been applied many times over since its inception in 1974. Additionally, the JDS has been the instrument of choice in other research that has assessed similar phenomenon - specifically, satisfaction with the working environment. Secondly, this instrument contains easily understood items, making it "user-friendly," and further, the general satisfaction scale is brief. Both of these characteristics

allow for an easier administration of the survey. Finally, all of the scales of the JDS possess good reliability, with the general satisfaction scale having a published internal consistency of .76 (Oldham 1975). In the current study, this scale yielded an internal consistency of .72.

CHAPTER THREE
RESULTS

Before hypothesis testing, descriptive statistics were run using SPSS. In the job satisfaction section of the instrument, the mean and standard deviation of general job satisfaction were assessed (Table I). The mean for this variable was found to be slightly higher than 4, which was the central point of the seven-point scale used to assess this element. This is consistent with past literature on job satisfaction, where the variable is generally positively skewed.

Table I
Variable Descriptives

Variable	Mean	Standard Deviation
Job Satisfaction	5.18	1.06
Extroversion	6.11	1.42
Perceived AA	3.05	0.75
Descriptive AA	12.20	2.30
Workspace Density	2.78	1.18
General Office Area Density	0.48	0.79
Openness	2.40	1.19

The next section of the survey instrument assessed the subjects' personality, specifically the level of extroversion they possessed. Extroversion was measured on a nine-point scale, where one represented extreme introversion and nine represented extreme extroversion. As seen in Table I, the mean for the survey population on this measure was

above the mid-point of the scale, perhaps suggesting self-selection among those who returned the survey.

The third section of the survey examined the physical workspace characteristic variables, architectural accessibility, density, and openness. Architectural accessibility was assessed by one scaled measure, the perceived architectural accessibility scale. This scale ranged from one to five, on which five represented the highest levels of accessibility. Table I indicates that the mean for this scale was very near the central point for this scale. Architectural accessibility was also assessed by a series of items asking factual questions about the workspace environment. These questions comprised the descriptive measure of this feature. This variable was the sum value of the descriptive ratings, with a total possible of 26 points, which would have indicated high levels of accessibility. The mean for this variable was near the middle range of points possible on this dimension (Table I).

This section of the survey also assessed density, which was measured perceptually as workspace density and general office area density. As shown in Table I, the mean for the workspace density ratio variable suggests that the majority of subjects in this study worked in workspaces alone. This phenomena gave rise to the relatively large value for this

variable. However, many people worked in offices with many other coworkers, and the mean for the general office area density ratio variable reflected this (Table I).

Openness was the third physical characteristic that was measured. This variable was assessed on a five point scale. As shown in Table I, the mean for this variable fell near the middle of the scale.

The correlational relationships between all physical characteristic variables were examined as shown in Table II.

Table II
Intercorrelations: Physical Characteristics, Job Satisfaction, and Extroversion

	Perc. AA	Desc. AA	Work-Space Dens.	Gen. Office Area Dens.	Openness	Job Sat.	Extroversion
Perc. AA	1.00						
Desc. AA	.39**	1.00					
Work-space Dens.	-.07	.06	1.00				
Gen. Office Area Dens.	-.04	-.10	-.11	1.00			
Openness	.38**	.28**	-.23*	.09	1.00		
Job Sat.	-.12	-.05	-.20*	-.03	-.01	1.00	
Extroversion	.17	.19*	-.11	-.11	.18*	.05	1.00

(* = Significant at $p < .05$, ** = Significant at $p < .01$)

(Perc. AA = perceptual AA, Desc. AA = descriptive AA, Work space Dens. = workspace density, Gen. Office Area Dens. = general office area density, Job. Sat. = job satisfaction)

Of those physical characteristic variables that were measured in multiple forms, only the two forms architectural accessibility (perceptual and descriptive) were found to be significantly related to each other ($r=.39$ $p<.01$). This indicated that subjects seemed to perceive their levels of accessibility to a degree that was in line with the actual physical characteristics of the workplace that would be expected to create these feelings. Further, this finding may lend some validity to the idea that AA is a construct, considering that when it was assessed by two different measures, this significant relationship between the perceptual and descriptive forms was uncovered.

Workspace density and general office area density were not found to be significantly related to each other. This may indicate that these two elements are distinct concepts. It is possible that although an individual may work in a dense workspace, that level of density is not necessarily reflective of the entire office area, and vice versa. This would seem to indicate that the characteristics of many workspaces are not standardized across entire offices.

Of the relationships between the three physical characteristics, several were significant. Perceived architectural accessibility was found to be significantly related to openness ($r=.38$ $p<.01$) (Table II), and

descriptive architectural accessibility was found to be related to openness at $r=.28$ $p<.01$ (Table II). Considering that openness was also a perceptually based variable, the slightly stronger relationship with perceived accessibility is not surprising. These results follow logically from the literature, which indicated that accessibility and openness are somewhat intertwined. This indicated that when individuals feel accessible, it is somewhat likely that their office environment is a more open one, with fewer partitions or walls, and vice versa. Conversely, the relationship between workspace density and openness was also found to be significant, at $r=-.23$ $p<.05$. This also follows logically, and would seem to indicate that when individuals feel they are in a dense immediate environment, they are also somewhat likely to feel that their office is less open.

Finally, the relationships between extroversion and the other variables in this study were examined. Extroversion was found to be significantly related to two variables. Descriptive AA and extroversion were related at $r=.19$ $p<.05$. Also, extroversion and openness were related at $r=.18$ $P<.05$. Additionally, it was found that extroversion and job satisfaction had no significant relationship to each other, thus limiting the possibility of confounding effects involving these two variables.

To assess the assumption of normality, histograms were generated and the resulting graphs were compared to the normal curve. Job satisfaction was slightly negatively skewed. However, none of the variables were found to have a degree of skew drastic enough to warrant carrying out any transformations on the data.

There were three hypotheses posed in this study, each stated that one of the three physical workspace characteristics would have a relationship with job satisfaction, and that this relationship would be moderated by personality. In order to test for the presence of any moderated relationships, moderated regression analyses were run. These regression analyses examined whether the interaction between extroversion and each workspace characteristic accounted for any additional variance in a subject's level of job satisfaction. This potential interaction was assessed by creating interaction terms, each of which was a product of extroversion and the particular workspace characteristic being assessed by that analysis. To determine if extroversion moderated a relationship between a given physical characteristic and job satisfaction, the corresponding interaction term was included in each physical characteristic's respective hierarchical regression analyses. This was accomplished by

entering both the appropriate workspace characteristic variable and extroversion in the first step of the regression, and then entering the appropriate interaction term in the second step of the regression. The R squared change obtained from these regression analyses was the focus of attention for this study, as a significant value would indicate support for the existence of an extroversion-moderated relationship between physical workspace characteristics and job satisfaction.

After having conducted the regression analyses to test Part B of each hypothesis, a split correlation analyses was performed to augment the findings of each regression analyses. The variable of extroversion was dichotomized, to split the population into two groups - those having average or higher levels of this personality trait, and those having and below average levels of this trait, relative to the survey population. The existing relationships between the workspace characteristics and job satisfaction were examined, split along this dichotomized variable. The results that pertain to each of these hypotheses are as follows.

Hypothesis One Part A stated that there would be a relationship between architectural accessibility and job satisfaction. In order to address Part A of this

hypothesis, the relationship between each type of accessibility and general job satisfaction was examined. The correlational analysis that was conducted revealed that there was no apparent relationship between either perceived accessibility and job satisfaction ($r = -.12$), or descriptive accessibility and job satisfaction ($r = -.05$) (Table II).

To proceed to explore this hypothesis and test Part B, which stated that the relationship between accessibility and job satisfaction would be moderated by the level of extroversion that an individual possessed, a moderated regression analysis was conducted, once for each type of accessibility. As shown by the R squared change statistics in Table III, neither the analyses for perceived accessibility ($r = .00$) nor described accessibility ($r = .02$) revealed a relationship that was moderated by the level of an individual's extroversion.

Table III
R Squared Change Statistics

Interaction	R Square Change	Significance
Perceived AA * Extroversion	.00	.83
Descriptive AA * Extroversion	.02	.17
Workspace Density * Extroversion	.00	.47
General Office Area Density * Extroversion	.03	.05
Openness * Extroverion	.01	.35

A split correlation analysis was run, to further support the findings of the moderated regression analysis. As Table IV shows, no significant relationship between either perceived ($r=-.04$: introverts, $r=-.19$: extroverts) or descriptive ($r=-.21$: introverts, $r=.02$: extroverts) architectural accessibility and job satisfaction could be detected. These results were consistent with the findings of the moderated regression analysis.

Table IV
Split Correlations

	Personality	Job Satisfaction
Perceived AA	Introvert	-.04
	Extrovert	-.19
Descriptive AA	Introvert	-.21
	Extrovert	.02
Workspace Density	Introvert	-.35**
	Extrovert	-.07
Gen.Of.Area Density	Introvert	.09
	Extrovert	-.19
Openness	Introvert	.04
	Extrovert	-.09

(**=Significant at the $p<.01$ level)

These results indicate that there is no support for Part A or Part B of Hypothesis One. There is no indication of a relationship between either perceived architectural accessibility and job satisfaction, or between descriptive architectural accessibility and job satisfaction. Further, this study finds no support for the existence of a relationship, moderated by extroversion, between either type of accessibility and job satisfaction.

Hypothesis Two, Part A, stated that there would be a relationship between density and job satisfaction. In order to address Part A of this hypothesis, a correlational analysis was conducted to examine the strength of the relationships between both workspace density and job satisfaction and general office area density and job satisfaction. As shown in Table II, there was found to be a moderate negative relationship between workspace density and job satisfaction ($r = -.20$ $p < .05$). This would seem to indicate that one's surroundings might have some influence on one's level of job satisfaction. In this instance, a slight relationship between dense quarters and lower levels of job satisfaction seems to exist. However, when the analysis was examined for a potential relationship between general office area density and job satisfaction, no significant effect was found ($r = -.03$).

In order to test Part B of Hypothesis Two, a moderated regression analysis was conducted. This analysis found that there was not a significant change in the R squared value, (R squared change = .00, $p < .47$) (Table III) indicating that there was no solid evidence for the occurrence of an extroversion-moderated relationship between workspace density and job satisfaction. A moderated regression analysis was also conducted to test for the presence of a moderated

relationship between general office area density and job satisfaction. In this case, the presence of a moderated relationship was detected, with an R squared change of .03, significant at the $p < .05$ level.

A split correlation analysis was conducted to further explore these findings. The analysis found mixed results, indicating that for those individuals who are more introverted, a moderate negative relationship exists between workspace density and job satisfaction ($r = -.35$ $p < .01$), which may suggest that introverted employees are less satisfied with work situations that place them in close proximity to others. There was no relationship between more extroverted employees and workspace density ($r = -.07$) (Table IV). This duality suggested it was possible that extroversion had some form of effect on the relationship between satisfaction and workspace density, albeit it a small one. In examining the split correlations pertaining to potential interactions between general office area density and job satisfaction, no significant relationships for either extroverted or more introverted individuals were found.

Hypothesis Three, Part A stated that there would be a relationship between openness and job satisfaction. This was explored by first examining a correlation analysis. The

analysis revealed no significant relationship between openness and job satisfaction ($r = -.01$) (Table II).

To further test Hypothesis Three, Part B was examined utilizing a moderated regression analysis. The results from this analysis indicated that there was no support for the existence of a relationship between openness and job satisfaction that was moderated by extroversion (R squared change = .01. $p < .35$) (Table III).

Further support for these findings came from the split correlation analysis that was conducted. Results from this analysis confirmed the previous findings of no existing relationship between openness and job satisfaction, moderated or otherwise ($r = .04$) (Table IV).

These results indicate that there is no support for Hypothesis Three, Part A or B. There is no evidence of any relationship between openness and job satisfaction, nor is there any support for the existence of an extroversion-moderated relationship between these two variables.

CHAPTER FOUR DISCUSSION

This study attempted to address the theoretical void that exists in job satisfaction research. Specifically, the lack of explanation for the polarized and conflicting findings of many researchers relative to individual reactions in terms of job satisfaction to their surrounding physical environment. It was proposed that individuals' levels of extroversion might have been a moderating variable at work behind the scenes, influencing individuals to react either more positively or more negatively to their workspace characteristics, and that this would affect their level of job satisfaction accordingly. This study examined three of the physical characteristics or qualities that offices and workspaces possess, and tested for the existence of a relationship between each of these characteristics and job satisfaction, moderated by the level of extroversion the subject possessed. The results of this study were mixed, at best, in shedding any light into this theoretical void.

Of the three physical characteristics examined in this study, only density was found to be related to an individual's general job satisfaction. Specifically, only when one's perceptions of density applied to their immediate workspace, was there a relationship to their level of

satisfaction. These findings lend partial support to Hypothesis Two, Part A. In further testing of the Hypotheses of this study, it was found that density had an extroversion-moderated relationship with job satisfaction. Specifically, only individual perceptions about the density of their general office area as a whole were found to have a relationship with job satisfaction, moderated by level of extroversion. This finding lends partial support to Part B of Hypothesis Two, the only Hypothesis to receive support in this study. Further, split correlational analyses revealed that workspace density was the only variable that produced a relationship with general job satisfaction, lending support to the idea that density does influence job satisfaction.

Interpretation of these findings may help to cast some light as to why the results surfaced as they did. First, the only physical characteristic to find support of any kind was density. This may be because density is perhaps the clearest-cut of the three physical workspace properties. Density, being roughly a measure of how close one is to others, may have been easier for people to assess or relate to than the other two concepts. Openness, as described in the survey, asked people to make a judgement about the restrictions to open space in their overall office area. This concept may have been more difficult to grasp than the

density of the general office area. Further, architectural accessibility as a construct, while not too abstract, may have had too many factors feeding into it.

In looking at the split correlation analyses, it seems that for more introverted individuals, a negative relationship exists between workspace density and satisfaction. This follows the reasoning of both the screening and over-stimulation theories. If an introverted individual is presented with higher levels of interpersonal contact in their immediate personal space (as dense situations would do), it seems that they may be likely to react negatively to this. Given that the analysis found no significant related correlation that applied to extroverts, it could be argued that Hypothesis Two Part B received support. The fact that workspace density was found to be related to satisfaction for introverts and not extroverts indicates that there was a moderating variable at work. In this relationship, this moderating variable was shown to be extroversion.

It is not clear as to why workspace density did not surface as having a moderated relationship with satisfaction while general office area density did. It is possible that peoples' feelings about the two environments differed. Perhaps job satisfaction is more influenced by one's

perceptions about the general office area, rather than by one's feelings about the personal workspace.

One point of clarity can be distilled from the results of this study. Of the three tested physical workspace characteristics, density seems to have the most influence on job satisfaction. Further, there is support for idea that the relationship between density and job satisfaction is moderated by the level of extroversion an individual possesses.

The literature, specifically the theories of screening and overstimulation, provided some indication as to why density seems to be the most powerful workspace variable. These theories both pertain to amounts of stimulation that individuals receive from the environment. Each of the three workspace variables, to some degree, regulated or influenced the amount of this environmental stimulation people received. However, of the three variables, density had the most active effect on stimulation. This was because both architectural accessibility and openness merely set the stage for possible contact with other people. In other words, these two characteristics allowed for the possibility of interpersonal contact or stimulation, but they did not actively guarantee that it would occur. Density, on the other hand, had a more active influence on interpersonal

contact, and thereby stimulation. Research has shown that when people are closer together, they are more likely to interact than if they were farther apart from each other. Given this, it follows logically that greater levels of density resulted in people receiving higher levels of stimulation. According to the theory of screening, extroverts possess the ability to handle and filter more stimulation than do introverts. Other research has suggested that extroverts may even seek out environments that provide large amounts of stimulation. Introverts, who theoretically lack this screening ability, tend to dislike and avoid excessively stimulating environments. It follows that introverts would therefore be dissatisfied in environments that provide much stimulation. The current study has suggested there is evidence to support this theory. The current study also provides support to the theory of overstimulation, in that introverts seek to work in environments with lower levels of stimulation, because of their lower threshold for stimulation or interpersonal contact as compared to extroverts. When placed in an environment that introverts find overly stimulating, they react negatively. This results of this study echo this idea.

Limitations

As mentioned above, several of the findings of this study did not turn out as proposed. Some of this can be explained by several of the limitations that affected this study. One limitation of this study was the subject matter itself. Some of the physical characteristic concepts examined by this study may have been too abstract or ill-defined. Density, may have been a reasonably concrete spatial descriptor, more so than openness or architectural accessibility. Openness may have been a concept that was outside of many peoples' ability to accurately judge. The optional spatial estimate section of the survey provided some evidence to the fact that many people cannot accurately guess area measures. Further, architectural accessibility as a concept may have been too polluted with other variables. There are many physical factors that combine to make a person feel more or less accessible to others. It is very likely that this characteristic alone could have been the focus of an entire study. Other studies have examined other factors contributing to how accessible or private one feels, such as light, sound, and other variables. It would have been difficult to control for all such elements in the current study.

A further limitation of this study was its approach to the phenomenon being measured - the potential moderated relationship between physical characteristics and satisfaction. This study used the variable of general job satisfaction to determine whether or not this fragile relationship existed. It was theorized that if a relationship could be found using the diffuse and imprecise variable of job satisfaction, it could then be said that the relationship not only existed, but was robust as well. In retrospect, it seems that this phenomenon is more delicate, and cannot stand up to the use of a search instrument as blunt as the concept of general job satisfaction. Given the fact that Zedeck (1971) states that moderated effects are difficult to find unless large effect sizes are present, it is not surprising that the relationship proved somewhat elusive. Perhaps this relationship would have proved less elusive if this study would have assessed an individual's satisfaction with their environment, rather than their level of general job satisfaction.

This leads to the possibility that the measures of the physical characteristics used in this study were less than precise. It is likely that the custom-created section of the survey that assessed the physical properties of workspaces had several problems. First, this section of the

survey dealt with somewhat abstract concepts, as mentioned earlier. In order to aid in comprehension of these abstract constructs, explanation paragraphs were provided along with accompanying survey questions. It is possible that these written, somewhat lengthy, interpretations did not help subjects, and possibly could have lead to confusion. Additionally, this section of the instrument was last in the layout, and fatigue may have contributed to response errors. In connection with the idea of a rather blunt search methodology, it is possible that the survey sought to discover information on too many characteristics. In the future, it may be better to direct attention to one, more precise element of the workspace environment (e.g. strictly workspace density), in order to better focus the search for the relationship between physical surroundings and job satisfaction.

Another limitation to this study related to the survey was that the instrument was a self-report. There was no way to check the accuracy of the subjects' responses to the survey questions about their personalities or their level of job satisfaction. A final potential difficulty of this study was the possibility that the respondents to the survey were a self-selecting population. Given that the average value of extroversion was above mid point, this may indicate

that the respondents, as a group, possessed higher levels of extroversion. If this were the case, any findings of the study could have been based on restricted data.

Despite the somewhat disappointing results of this study, several aspects in this immediate area of research should receive further attention. For example, the property of density, whether in reference to the workspace or general office area, seems to have some form of relationship to job satisfaction, as well as have an extroversion-moderated relationship to satisfaction. If this variable was more focused to pertain to either the workspace or the general office area as a whole, a potentially valuable finding could emerge.

Also, further research could be conducted, using different methods or means of assessing the physical workspace characteristics. For example, findings may differ if the experimenter was to actually measure the physical dimensions of the subjects' workspaces and offices rather than rely on the subjects to provide data on their perceptions or their estimates of measurement. This study gave subjects the option to provide their own estimates or measurements of the levels of density and openness of their offices and workspaces. A qualitative analysis of this data set revealed that few individuals (29 of 129) provided

useable data on this section of the questionnaire. It seemed that subjects had difficulty estimating the degrees of density and openness in their workspaces and offices. Evidence for this apparent difficulty comes from the lack of a meaningful relationships between subjects' estimates on these variables and their survey responses. Subjects' measurements of their workspace density tended to slightly contradict their survey perceptions ($r = -.20$ $p < .05$), and their estimates about office area density seemed to have no relation whatsoever to their perceptions recorded in the survey ($r = -.13$ $p < .17$). Additionally, subjects' estimates of openness were not related to their perceptions recorded in the survey ($r = .03$ $p < .78$). As it can be seen, this data only served to illustrate that most people are unable to make accurate or realistic spatial estimations. In order to prevent this phenomenon from arising in future studies, it is suggested that researchers consider taking any necessary measurements themselves. In addition to simply measuring the workspace dimensions, researchers could actually manipulate the physical characteristics of the subjects' workspaces and office environments, thereby making the study more akin to a true experiment.

Another possible methodological change would be to change what is assessed in the workplace. Perhaps, instead

of assessing workspace characteristics that regulate amounts of interpersonal contact, interpersonal contact itself could be measured. In this way, a potentially moderated relationship between interpersonal contact and job satisfaction might come to light. Perhaps density would be the moderator in this potential relationship.

Implications

As mentioned earlier, the findings of this study were less robust than were hoped. However, there are still practical implications to be found. It seems from the results of this study that there is evidence for some form of relationship, moderated by personality, that links the physical environment to job satisfaction. Although this study only took one small step towards finding this phenomenon, some interesting information was uncovered. A key implication is that there is some evidence that people of different personalities react differently to their surroundings. This should indicate to managers that it might not be best to take a "one-size-fits-all" approach to positioning employees throughout the office area. Some employees will enjoy and seek out interpersonal contact, while others would prefer to keep it to a minimum. This difference is neither good nor bad, but it does seem to affect level of job satisfaction, to some extent. While it

might not be practical to give each employee the opportunity of configuring their environment as they would like, it might be prudent to allow some flexibility in tailoring workspaces and offices to fit personal needs.

This phenomenon, if explored further, may also prompt managers to attempt to better match individuals to the "wheres" and the "hows" of their work on the job. This would lend more support to existing concepts such as person-organization fit, and person-environment fit. Again, it is becoming increasingly apparent that a "one-size-fits-all" attitude towards employees and their jobs is not the best approach to take when staffing organizations.

In addition to providing accommodations to individuals in positions already, thought should be given as to how potential employees would react to the environments they may be placed in. Careful matching individuals' needs and desires with the environments they will potentially inhabit - physical, or cultural and otherwise, would be excellent preventative medicine for organizations in the future.

APPENDIX A: Questionnaire

The Work Environment Survey

Thank you for participating in this study! By filling out this survey, you will be aiding research that will contribute to improvements in the quality of life at workplaces. This study has been approved by the California State University San Bernardino Psychology Department Institutional Review Board, and is being conducted by Tim Hickey under the supervision of Dr. Janelle Gilbert, Associate Professor of industrial/organizational psychology at California State University, San Bernardino.

This survey questionnaire is divided into three parts, and deals with employee work environments. At the beginning of each section there will be instructions and a brief explanation about what is being measured. Please read these instructions and explanations carefully, as they may help you to better understand what the questions are asking. Each question requires you to circle a response or fill in a number from a rating scale. The survey questionnaire should take you approximately 10-15 minutes to complete. The information you provide on this survey (i.e. your responses) will be anonymous. Responses to this survey will be reported at the group level only; no individual responses will be revealed. At no time will your name be asked or reported with your responses.

While the risks to you from participating in this research are minimal, California State University San Bernardino requires you give your consent before participating in this study. Please understand that your participation in this study is totally voluntary, and you may withdraw at any time without penalty. You may also remove any data you have contributed to the study, should you choose to withdraw.

Should you have any questions about this study, feel free to contact Tim Hickey at 909-880-5587. Reports of the results of the findings of this research will be available in May of 2000, and will be distributed upon request. If you are interested in receiving a copy of the results of this study, contact Tim Hickey, at 909-880-5587.

BY PLACING A MARK IN THE SPACE PROVIDED BELOW, I ACKNOWLEDGE THAT I HAVE BEEN INFORMED OF, AND UNDERSTAND, THE NATURE AND PURPOSE OF THIS STUDY, AND I FREELY CONSENT TO PARTICIPATE. BY THIS MARK I FURTHER ACKNOWLEDGE THAT I AM AT LEAST 18 YEARS OF AGE.

Give your consent to participate by making a check or 'X' mark here: _____

Today's date is: _____

SECTION ONE

This section of the survey will ask a series of questions about your reactions to your job. Please use the rating scale that corresponds to each group of questions and record the response that best describes how you feel.

For this set of questions, please indicate how you personally feel about your job.

How much do you agree with the statement?

Rating Scale

1-----2-----3-----4-----5-----6-----7
Disagree Disagree Disagree Neutral Agree Agree Agree
Strongly Slightly Slightly Slightly Strongly Strongly

- 1) _____ Generally speaking, I am very satisfied with this job.
- 2) _____ I frequently think about quitting this job.
- 3) _____ I am generally satisfied with the kind of work I do in this job.

For this set of questions, think of other people in your organization who hold the same job as you do, or a job that is similar to yours. Please indicate how accurately you think these statements describe the feelings of those people.

How much do you agree with the statement?

Rating Scale
1-----2-----3-----4-----5-----6-----7
Disagree Disagree Disagree Neutral Agree Agree Agree
Strongly Slightly Slightly Slightly Strongly Strongly

- 1) _____ Most people on this job are very satisfied with the job.
- 2) _____ People on this job often think of quitting.

For this set of questions, please indicate how satisfied you are with each aspect of your job listed below.

How satisfied are you with this aspect of your job?

Rating Scale
1-----2-----3-----4-----5-----6-----7
Extremely Dissatisfied Slightly Neutral Slightly Satisfied Extremely
Dissatisfied Dissatisfied Satisfied Satisfied Satisfied

- 1) _____ The people I talk to and work with on my job.
- 2) _____ The chance to get to know other people while on the job.
- 3) _____ The chance to help other people while at work.

*For this question, please describe your job as objectively as you can.
Circle the number which is the most accurate description of your job.*

1) To what extent does your job require you to *work closely with other people* (either "clients" or people in related jobs in your own organization)?

1-----2-----3-----4-----5-----6-----
-----7

Very little; dealing with other people is not at all necessary in doing this job.

Moderately; some dealing with others is necessary.

Very much; dealing with other people is an absolutely essential and crucial part of doing the job.

For this set of questions, please indicate how accurate or inaccurate each statement is in describing your job.

How accurate is the statement in describing your job?

Rating Scale

1-----2-----3-----4-----5-----6-----
-----7

Very	Mostly	Slightly	Uncertain	Slightly	Mostly
Very					
Inaccurate	Inaccurate	Inaccurate		Accurate	Accurate
Accurate					

- 1) _____ The job requires a lot of cooperative work with other people.
- 2) _____ The job can be done adequately by a person working alone – without talking or checking with other people.

Please proceed to the next section.

SECTION TWO

This section asks you to describe yourself. There are no right or wrong answers. Look at the following list of common personality traits. Using the nine-point scale provided, rate how accurately, or inaccurately, each of these adjectives describes you. Please describe yourself as you see yourself right now, not as you would like to be. Describe yourself as you typically are, as compared to other people you know of the same gender as you, and roughly your same age. Write the number you select for each trait in the space provided next to each word.

How accurately can you describe yourself?

Rating Scale

<u>Inaccurate</u>								<u>Accurate</u>
Extremely	Very	Moderately	Slightly	Neutral	Slightly	Moderately	Very	Extremely
1-----	2-----	3-----	4-----	5-----	6-----	7-----	8-----	9

EXAMPLE:

_____ Organized

_____ Talkative

_____ Withdrawn

_____ Extroverted

_____ Shy

_____ Bold

_____ Energetic

_____ Quiet

_____ Bashful

Please proceed to the next section.

SECTION THREE

This section of the survey will ask you questions about the physical characteristics of your *workspace*, and the *general office area* you work in. For purposes of this survey, your personal *workspace* will be defined as the immediate area in which you work. For example, the area inside your cubicle or immediately around your desk or workstation would be considered your *workspace*. Your *general office area* would be the entire room in which all of the nearest cubicles are located, or the open room in which your and your coworkers desks or workstations are located.

There are three parts to this section. Each part corresponds to a different physical quality that this study is interested in measuring. The meanings of each term will be explained at the beginning of each part. For each question, circle the response that best describes your *workspace* or office. At the end of this section is a brief series of questions that asks about the *actual* physical dimensions of your *workspace* and office area. If you are able, please fill in the measurements these questions ask for. Your input on these questions will be greatly appreciated, however, completion of this section is strictly optional.

PART ONE: ACCESSIBILITY

This part of the survey will ask questions that will determine how accessible your *workspace* is. This accessibility is measured by how easily others can get to you, or, how accessible you are, physically, to your coworkers when you are in your *workspace*. This accessibility is affected by the presence or absence of walls or partitions around your desk or workstation. For example, if you worked at a desk in the middle of an open room, with no partitions or walls around you to prevent others from looking at you and/or walking up to you, you would be working in a very accessible *workspace*. On the other hand, if you worked in a cubicle with four partitions or walls around you, and there is a door that separates you from others, your coworkers could not simply walk up to you from any side of your *workspace* and gain access to you. They would have to go through your doorway, because this *workspace* is not very accessible. The following questions will ask you about the walls or partitions surrounding your *workspace*, if you have any, in order to determine how accessible your *workspace* is to others.

1. How isolated from others do you feel when you are in your *workspace*?

1-----2-----3-----4-----5
Very Somewhat Neutral Not very Not at all
isolated isolated isolated isolated

2. How physically separated from others do you feel when you are in your *workspace*?

1-----2-----3-----4-----5
Very Somewhat Neutral Not very Not at all
separated separated separated separated

3. To what extent do you feel physically accessible to others when you are in your *workspace*?

1-----2-----3-----4-----5
Very Somewhat Neutral Somewhat Very
inaccessible inaccessible accessible accessible

4. How many walls or partitions is your *workspace* next to, or surrounded by?

None 1 2 3 4

5. Are any of the partitions counter-tops, or similar surfaces designed for interacting with customers or others?

YES NO

If *yes*, how many? 1 2 3 4

6. Does your *workspace* have a doorway space? YES NO

7. Does your *workspace* have a solid door? YES NO

8. How high are the walls/ partitions around your *workspace*?

_____ Middle height (offering seated privacy)
_____ ³/₄ height (offering standing privacy about six feet tall)
_____ full or ceiling height (walls extend completely to the ceiling)

9. Is it possible to see through any part of the partitions surrounding your *workspace*?

YES NO

10. If it is possible to see through part of any of the partitions around your *workspace*, is it because they contain or are made of (circle the choice that is correct for your *workspace*):

gaps or holes clear glass frosted glass can't see
in partition/s or plastic or plastic through partitions

PART TWO: DENSITY

This part of the survey will ask a series of questions that assess the density of both your *workspace* and your *general office area*. Density is a measure of how much space there is for each person in their *workspaces* and in the *office as a whole*. Essentially, density is measured in terms of the number of people per square feet. For example, a *workspace* that consisted of a ten foot by six foot cubicle with three employees in it would have a higher density than a *workspace* that has one person in an eight foot by eight foot cubicle. The following questions will be divided into two parts, one will measure the density of your *workspace*, and the other will measure the

density of your *general office area*. For each question, you have the option of either selecting from the prepared estimates provided, or recording your measurements of your *workspace* taken with the tape measure provided.

WORKSPACE DENSITY (*workspace would be defined as the immediate area in which you work*)

1. Is your *workspace* an "open *workspace*" (it has no walls on any side)?
YES NO
2. Do you share your cubicle or desk with another person?
YES NO
3. Do you share your personal *workspace*, and if so, how many people are in your *workspace*, including yourself? _____
4. Please check the spatial estimate that most closely describes the size of the area of your *workspace*:

- _____ compact *workspace* area (enough room for a small desk and chair)
- _____ small *workspace* area (enough room for a small desk and chair, and a filing cabinet or other small piece of furniture)
- _____ mid-sized *workspace* area (enough room for a mid-sized desk and chair, another work surface or piece of furniture, and filing cabinet)
- _____ mid-to-large *workspace* area (enough room for a mid-sized desk and chair, two other work surfaces, an extra chair, another small piece of furniture, and filing cabinets)
- _____ large *workspace* area (enough room for a large desk with several work surfaces and chair, several extra chairs, a table and other furniture, and several filing cabinets)

GENERAL OFFICE AREA DENSITY (*general office area would be defined as the entire room in which all of the nearest cubicles are located, or the open room in which your and your coworkers desks or workstations are located*)

5. How many people are in your *general office area*, including yourself?

6. Please check the spatial estimate that most closely describes the size of your *general office area*.

Compact *general office area* (only one or two *workspaces* are in this area of the building)

Small *general office area* (less than 10 *workspaces* are in this area of the building)

Mid-sized *general office area* (more than ten *workspaces* are in this area, along with an open area for meetings, and an informal gathering area such as a water cooler or coffee bar)

Mid-to-large sized *general office area* (approximately 30 *workspaces* are in this area, along with several open areas for meetings, and a few informal gathering areas such as water coolers or coffee bars)

Large *general office area* (many *workspaces* are in this area, along with many open areas for meetings, and many informal gathering areas such as water coolers, coffee bars, or fountains or other landscaping)

PART THREE: OPENNESS

This part of the survey will ask a series of questions that assess the openness of the *general office area*. Openness is affected by the number of interior walls or partitions in the *office*. For example, an office area that had no walls or partitions around any *workspaces* would be a very open *office*. On the other hand, an office that has only four-walled cubicles and no open areas would not be a very open *office area*. Openness is the ratio of the total area of the *general office area* to the total length of the interior walls or partitions. For each question, you have the option of either selecting from the prepared estimates provided, or recording your measurements of your *general office* openness taken with the tape measure provided.

1. Please check the estimate that most closely describes the amount of interior walls or partitions present in your *general office area*.
(*general office area would be the entire room in which all of the nearest cubicles are located, or the open room in which your and your coworkers desks or workstations are located*)

Open *office* (no partitions / interior walls are in this *general office area*)

Mostly-open *office* (only a very few partitions / interior walls, partially enclosing a few spaces, are in this *general office area*)

Somewhat open *office* (a few partitions / interior walls, partially enclosing several *workspaces*, are in this *general office area*)

Not very open *office* (Several partitions / interior walls are in this *general office area*, partially to fully enclosing many *workspaces*)

Not at all open *office* (Many partitions and walls are in this *general office area*, and nearly all *workspaces* are completely enclosed)

Please answer the following questions if you are able to estimate, or have specific knowledge of, the actual dimensions of your workspace or office. Any input you are able to provide will be greatly appreciated.

1. The area of your *workspace* in square feet is: (for example, a cubicle that is about eight feet by ten feet would have an area of approximately 80 square feet) _____
2. The area of your *general office area* in square feet is: _____
3. The total length of all interior walls and/or partitions in your *general office area* is: _____

***THIS CONCLUDES THE SURVEY
THANK YOU FOR YOUR PARTICIPATION***

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