Social Information Processing and Job Characteristics

A Simultaneous Test of Two Theories With Implications for Job Satisfaction

TIMOTHY G. POLLOCK
University of Wisconsin-Madison
ROBERT C. WHITBRED
Texas Tech University
NOSHIR CONTRACTOR
University of Illinois at Urbana-Champaign

This study simultaneously tested 2 theories that attempt to explain differences in job satisfaction: job characteristics theory (Hackman & Oldham, 1976) and social information processing theory (Salancik & Pfeffer, 1978). The theories were tested using data collected from the civilian employees of the public works division at a U.S. military base. The results indicated that individuals' social environments had significant effects upon their attitudes. Multiple social networks were used to operationalize individuals' social environments. The results also suggested that job characteristics had an independent main effect upon job satisfaction, in addition to the effects of the social environment. Based on prior research, employees' past experience and self-monitoring were tested as moderators of the effects of the social environment, and growth need strength was tested as a moderator of the effects of job characteristics upon job satisfaction. Only self-monitoring was found to have a significant moderating effect on the relationship between information from the social environment and job satisfaction, and growth need strength had no significant moderating effect.

One of the most frequently studied facets of organizational behavior concerns the factors in the work environment that influence individual attitudinal states, such as job satisfaction

---

Timothy G. Pollock (Ph.D., University of Illinois at Urbana-Champaign, 1998) is an assistant professor in the Management and Human Resources Department of the University of Wisconsin at Madison. *Robert Whitbred* (Ph.D., University of Illinois at Urbana-Champaign, 1999) is an assistant professor in the Department of Communication Studies at Texas Tech University. *Noshir Contractor* (Ph.D., University of Southern California, 1987) is an associate professor in the Departments of Speech Communication and Psychology at the University of Illinois at Urbana-Champaign. This research was supported by National Science Foundation Grant No. ECS-94-27730. The opinions expressed here are those of the authors and not the National Science Foundation. We would like to thank Peter Monge and Greg Oldham for their helpful comments on earlier versions of this paper. Please direct all correspondence about this manuscript to: Tim Pollock, University of Wisconsin-Madison, 4255 Grainger Hall, 975 University Ave., Madison, WI 53706; 608-262-1942 (voice), 608-262-8773 (fax), tpollock@bus.wisc.edu.

Human Communication Research, Vol. 26 No. 2, April 2000 292–330
© 2000 International Communication Association

Copyright © 2000. All rights reserved.

(Dean & Brass, 1985; Fried & Ferris, 1987; Hackman & Oldham, 1976; Head, Molleston, Sorenson, & Gargano, 1986; Ibarra & Andrews, 1993; Judge & Hulin, 1993; Kulik, Oldham, & Langner, 1988; Rice & Aydin, 1991; Salancik & Pfeffer, 1978; Sims, Sziliagyi, & Keller, 1976; Staw & Ross, 1985). During the last 20 years, two schools of thought receiving a great deal of attention re- garding this issue are job characteristics theory (Hackman & Oldham, 1976; Sims et al., 1976) and social information processing theory (Salancik & Pfeffer, 1978). Although both of these theories are used to examine perceptual and behavioral outcomes in addition to attitudinal outcomes (Fried & Ferris, 1987; Zalesny & Ford, 1990), their impact upon job satisfaction is the focus of the present study.

Early research and theoretical development of job characteristics theory has its roots in needs satisfaction models (Argyris, 1957; Hackman & Oldham, 1976; Herzberg, 1968; Maslow, 1943; Vroom, 1964). The basic assumptions of this theory are that individuals have different sets of needs that have to be satisfied and that jobs possess certain objective characteristics that can meet these needs and increase individuals' levels of satisfaction. Tests of job characteristics theory have met with widespread acceptance and consistent empirical support (Fried & Ferris, 1987; Hackman & Oldham, 1980; Kulik, Oldham, & Langner, 1988). However, the job characteristics approach has still been criticized on both theoretical and methodological bases (Roberts & Glick, 1981; Salancik & Pfeffer, 1977; Staw & Ross, 1985).

Social information processing (SIP) theory (Salancik & Pfeffer, 1978) was developed as an alternative to needs satisfaction theories. According to SIP theory, individual needs and perceptions of job characteristics are not fixed; rather, they are influenced by the social environment, or the network of social and informational relationships, in which a person is embedded. Salancik and Pfeffer (1978) argued, "The social context has two general effects on attitude and need statements: (a) it provides a direct construction of meaning through guides to socially acceptable reasons for action; (b) it focuses an individual's attention on certain information, making that information more salient, and provides expectations concerning individual behavior and the logical consequences of such behavior" (p. 227). Although SIP has been applied with some success in studying the adoption and use of new technologies (e.g., Burkhardt, 1994; Contractor, Seibold, & Heller, 1996; Rice & Aydin, 1991, Schmitz & Fulk, 1991), the empirical findings have been inconsistent when the theory is applied to task design (Blau & Katerberg, 1982; Spector, 1992; Thomas & Griffin, 1983; Zalesny & Ford, 1990). SIP has also been critiqued as providing an oversocialized view of individual satisfaction and for not articulating the process through which the social environment influences individual attitudes and perceptions (Blau & Katerberg, 1982; Staw & Ross, 1985).

Copyright © 2000. All rights reserved.

We argue that the failure to find consistent empirical support for SIP is due to its inadequate articulation in previous research, rather than to a fundamental theoretical flaw. We suggest that the adoption of the theoretical perspectives and research methodologies provided by a social network framework addresses many of the theoretical and methodological limitations in current SIP research and that the adoption of a network perspective should lead to more useful and consistent empirical results when testing the SIP model.

We also suggest that these theoretical models need not continue to be examined separately. It is possible that both the characteristics of the job and elements of the broader social environment operate simultaneously to influence job satisfaction. However, to date we have been able to identify only one study (Griffin, 1983) that has attempted to test these theories simultaneously in a field setting. Griffin found that both the objective changes in the jobs themselves and the positive social information cues provided by supervisors significantly influenced individual job satisfaction, although no interaction effect between the two factors was found. He also found that both factors significantly influenced individual perceptions of the characteristics of the jobs and that social cues interacted significantly with two job characteristics—task variety, or the degree to which a job required performing different activities, and task identity, or the degree to which a job requires completion of a whole and identifiable piece of work. In the present study, both job characteristics and SIP theories are combined into an integrated model and tested in a real organizational setting.

In the remainder of this paper, we briefly review the basic elements of each model and lay out our research hypotheses. We review the criticisms of each model and consider the ways in which a social network perspective can be used to enhance the SIP model. Then, we combine the elements of both models into a single, integrated model of job satisfaction and test the model using data obtained from a study of the civilian employees of a U.S. military base's public works division. We conclude with a discussion of the results, and we identify the contributions and limitations of the study and look at potential future research directions.

THEORIES AND HYPOTHESES

The Job Characteristics Model

Job characteristics theory (Hackman & Oldham, 1975, 1976) specifies the relationship between five core job characteristics (skill variety, task identity, task significance, autonomy, and feedback) and individual job

Copyright © 2000. All rights reserved.

outcomes. The first three job dimensions are said to prompt the psychological state, "experienced meaningfulness of the work" (Hackman & Oldham, 1976, p. 257). The fourth dimension, autonomy, prompts the psychological state, "experienced responsibility for outcomes of the work" (Hackman & Oldham, 1976, p. 257). Feedback, the final dimension, prompts the psychological state, "knowledge of the actual results of the work activities" (Hackman & Oldham, 1976, p. 258).

The five core dimensions of a job are combined to determine the job's motivating potential score (MPS). The greater a job's MPS, the more satisfied individuals are likely to be with the job and the more motivated they will tend to be by the job. Some of the beneficial outcomes expected from enriched jobs that contain these characteristics include high motivation, high job satisfaction, higher quality performance, and lower absenteeism and turnover (Hackman & Oldham, 1976, 1980).

Thus, according to the job characteristics model, an individual's perceptions of the objective characteristics of a job can, in and of themselves, affect the jobholder's attitudes and satisfaction. Job design researchers (Maslow, 1943; Herzberg, 1968; Hackman & Oldham, 1976, 1980) have long held that the more complex and enriched a job, the more likely the job will be to meet an individual's needs and the greater will be the individual's satisfaction with the job. Prior research has suggested that measures of job characteristics obtained from multiple sources (i.e., the job incumbents themselves, supervisors, and independent observers) relate positively with job satisfaction (Hackman & Oldham, 1980). This suggests the following hypothesis:

H1: The greater the level of job complexity and enrichment in individuals' jobs, the greater these individuals' job satisfaction will tend to be.

Moderator of Job Characteristics

In addition to the main effects of job characteristics upon individual job satisfaction, the individual's growth need strength (GNS) has been theorized to moderate the relationship between job characteristics and job satisfaction. GNS is the degree to which people have a high need for personal growth and development (Hackman & Oldham, 1976). The greater an individual's need for personal fulfillment, the greater the influence of the characteristics of the job upon the individual's level of satisfaction. Two meta-analyses (Fried & Ferris, 1987; Loher, Noe, Moeller, & Fitzgerald, 1985) of studies using GNS as a moderator found evidence supporting this claim. The following hypothesis is therefore proposed:

Copyright © 2000. All rights reserved.

H2: The greater an individual's level of growth need strength, the greater the influence of the characteristics of the job upon the individual's level of job satisfaction.

The Social Information Processing Model

Salancik and Pfeffer (1978) point out that individuals spend much more time dealing with the consequences of their actions than they spend plotting out these actions. The social information processing (SIP) perspective emphasizes the effects of social context, the individual's past actions and experience with the job, and the individual's perceptions of the job's characteristics in predicting job satisfaction, rather than individual predispositions and rational decision-making processes. Salancik and Pfeffer note that, "Individuals, as adaptive organisms, adapt attitudes, behaviors and beliefs to their social context and to the reality of their own past and present behavior and situation" (1978, p. 226).

Rather than being viewed as a stable individual characteristic, SIP theory views a need as an outcome produced by an individual. Individual needs, and the job characteristics that supposedly satisfy these needs, are considered to be socially constructed realities, rather than fixed and immutable characteristics that existed prior to the individual taking the job. The social information cues that individuals receive from their environment will be used to help construct and shape these realities. Thus, if individuals tend to be exposed to more positive social cues regarding individual satisfaction, these individuals will themselves be more likely to express positive feelings of satisfaction. The SIP model, therefore, suggests that:

H3: The greater the overall job satisfaction in an individual's social environment, the greater the individual's job satisfaction will tend to be.

Moderators of the Social Environment

Blau and Katerberg (1982) have suggested that the influence of the social environment on an individual's job satisfaction may be moderated by the individual's degree of past experience with the job. When a person is new to a job, the parameters of the job and the accepted modes of behavior within the job and the organization may appear ambiguous. Therefore, the individual may look to the environment more frequently for cues about how to act or feel, as compared to a person who has been in the job longer and has more knowledge and direct experience (Katz, 1978; Moscovici, 1976; Vance & Biddle, 1985; Weick, 1979). Individuals who are experienced at a job will have had a greater opportunity to develop atti-

Copyright © 2000. All rights reserved.

tudes and opinions based upon their own experiences, and they will look less to others for information regarding how to feel and behave. This suggests that past experience may act as a moderator between the social environment and individual job satisfaction. Specifically:

H4: The greater an individual's past experience with the job, the weaker the influence of the social environment upon individual job satisfaction.

Individual dispositional factors have also been suggested by previous research as moderators of the relationship between the social environment and job satisfaction (Burkhardt, 1994). An individual's disposition can influence the salience of information, focusing the individual on information that confirms his or her world view (Festinger, 1954). Variance in individual dispositions can cause identical social cues to be interpreted in very different ways and can influence which cues will be more salient to the individual. Burkhardt (1994) examined the moderating effects of self-monitoring (Lennox & Wolfe, 1984), a personality variable that influences the extent to which individuals utilize social cues to determine the appropriateness of their attitudes and behaviors. High self-monitors use social cues to adjust their behavior; low self-monitors behave and feel the same way across situations irrespective of the social information cues they receive (Lennox & Wolfe, 1984). Burkhardt (1994) found that network links in the social environment influenced high self-monitors more than low self-monitors. Hence, individuals who are high self-monitors are more likely to attend to, and be influenced by, the level of job satisfaction indicated by individuals with whom they interact. Burkhardt's (1994) work therefore suggests the following hypothesis:

H5: The higher an individual's level of self-monitoring, the more likely the individual is to be influenced by the social environment.

The hypotheses proposed in this section are similar to those tested in prior research concerning job characteristics theory and SIP. However, as mentioned earlier, the results reported in prior SIP research have been inconclusive. We believe that the inconsistencies in previous empirical research can be attributed to two general explanations. First, from a theoretical standpoint, the mechanisms offered by job characteristics theory and social information processing theory are often posited as competing, even though they are not logically exclusive. Clearly, a simultaneous test of the two models would not be logically inconsistent and may explain why one or the other mechanism is more influential in certain contexts. Second, the inconsistent findings in prior research may also be attributed

Copyright © 2000. All rights reserved.

to methodological weaknesses in the design of the studies, as well as in the specific analytic techniques used. The next section addresses in greater detail the theoretical and methodological limitations of previous research. The discussion of these weaknesses serves as a rationale for the use of social networks as an analytic framework and the proposed integrated model of job satisfaction.

LIMITATIONS OF PREVIOUS RESEARCH

Limitations of Job Characteristics Theory

Job characteristics theory has been critiqued on both conceptual and methodological grounds (e.g., Roberts & Glick, 1981; Salancik & Pfeffer, 1977, 1978; Spector, 1992; Taber & Taylor, 1990). Six major criticisms have been articulated. First, Salancik and Pfeffer (1978) argued that the causal ordering implied by the model (i.e., that individual needs exist prior to, and are satisfied by, the characteristics of the job) should be reversed and that needs are socially constructed in response to external stimuli. Second, Salancik and Pfeffer (1977, 1978) asserted that there is insufficient support for the claim that individual needs are stable internal constructs, as opposed to socially constructed and fluctuating constructs based upon changes in environmental stimuli. Third, Roberts and Glick (1981) have suggested that most studies testing the model have been measured on a "within-person" (comparing an individual's self-reported satisfaction with their self-reported characteristics of the job) instead of a "person-situation" (multiple individuals' reports of satisfaction with the same job) basis. Fourth, Roberts and Glick also suggested that, although the theory discusses the effects of the objective characteristics of the job, most studies testing the theory have used perceived characteristics as reported by the job incumbents themselves to test the theory. A fifth criticism is that the theoretical model unnecessarily limits the job factors considered (Taber & Taylor, 1990). These authors suggested that other job characteristics, such as speediness, time pressure, physical danger, and amount of effort required, could also be considered. The final major criticism is that the theory does not take into account past experience with the job (Spector, 1992). The first two criticisms are part of the fundamental difference between the job characteristics and SIP approaches to job design. The remaining four criticisms are more methodological in nature and are specifically addressed in the design of this study and in the instrument used to measure job characteristics. These are discussed in greater detail in the Method section.

Copyright © 2000. All rights reserved.

Limitations of Social Information Processing Research

In the years immediately following the introduction of the SIP model, a number of empirical (primarily laboratory) studies and meta-analyses (Spector, 1992; Thomas & Griffin, 1983; Zalesny & Ford, 1990) were conducted. Although generally supportive of SIP, these studies found inconsistent results regarding whether or not social-contextual factors influence an individual's job satisfaction and his or her perceptions of the job. Thomas and Griffin (1983) found consistent support for the effects of social information cues upon satisfaction in the lab, but found that these results did not generalize well to the field. Spector (1992) found similar results. Zalesny and Ford (1990) reported that 10 of the 18 studies in their analysis found a significant relationship between social cues and job satisfaction. They also found that in 5 of 8 studies, this relationship was moderated by task experience, source credibility, and field dependence. All three meta-analyses found weaker and more contradictory findings for the relationship between social information cues and task perceptions.

The results of this body of research suggest that, although initial support for the theory exists, definitive support from field settings is still lacking. This may be due, in part, to certain methodological weaknesses inherent in lab studies (the research method most frequently used in SIP research to date) and, in part, due to a lack of clarity in the theory regarding just how social and contextual factors influence individual satisfaction. In the remainder of this section, we will discuss the weaknesses of existing SIP job satisfaction research and how social network analysis can be used to overcome some of these weaknesses. We will also briefly examine how social network theory and methodological techniques have been used to inform the application of SIP in organizational communication research.

Two methodological limitations and one theoretical limitation have potentially affected the adequacy of past SIP research and the significance of its findings. The first methodological limitation concerns the way in which researchers have attempted to manipulate social cues, and the second methodological limitation concerns the duration of the studies themselves. Theoretically, the SIP model fails to articulate the mechanism by which social information from the individual's environment influences individual perceptions and attitudes.

Manipulation of Social Cues

As mentioned earlier, much of the research on SIP has been conducted in the laboratory. The experimental design used in all of these lab studies was a 2 x 2 factorial design. Social information was treated as a variable

Copyright © 2000. All rights reserved.

that could be manipulated by the researcher. Job enrichment was manipulated by providing the subjects with instructions on how to carry out the task. Information cues (either all positive or all negative) were provided in written form in the instructions (e.g., Kilduff & Regan, 1988; O'Reilly & Caldwell, 1979; White & Mitchell, 1979), with reinforcement cards (O'Connor & Barrett, 1980), with sample evaluation forms (e.g., Griffin, Bateman, Wayne, & Head, 1987; O'Reilly & Caldwell, 1979), through confederates (e.g., Vance & Biddle, 1985; White & Mitchell, 1979;), and verbally by the researcher during the experiment (e.g., Adler, Skov, & Salvemini, 1985; Griffin, 1983; Kilduff & Regan, 1988). When oral cues were provided, statements such as, "This job becomes more fulfilling as you go along" and, "Now you're getting the hang of it" were used by the researcher or confederates to provide positive cues. In other cases, the subjects were told that their level of job satisfaction was high or low, compared to others who had performed the same job (Adler, Skov, & Salvemini, 1985; Jex & Spector, 1989).

Blau and Katerberg (1982), in reviewing many of the early studies, observed that the studies failed to adequately consider key issues in operationalizing the social environment. They identified four factors that help in understanding how social information cues affect task perceptions: the salience of social cues, source credibility, individual differences in susceptibility to social cues, and task ambiguity (p. 544). The more salient or important the information is to an individual, the more credible the source of the information, the more susceptible the individual to social cues, and the more ambiguous the task (as measured by the amount of experience the individual has with the task), the more likely the social cues are to have an effect upon the individual.

Rice (1993) notes an additional limitation of these studies. The methods used to manipulate the social cues received don't actually measure the attitudes of others in an individual's social environment. Rather, they rely on the subjects' projections of their own attitudes onto others' attitudes. Thus, these studies really only find consistency between one's own attitudes and their projections, rather than between the attitudes of the subject and the attitudes of actual others in their social environment.

Finally, Blau and Katerberg (1982) point out that the social information provided in all of the studies they examined was unanimous in that the manipulations contained either all positive or all negative social cues. This is also true for all of the SIP lab studies cited here that were published subsequent to their review. Such an assumption regarding the nature of the information that an individual receives is unrealistic. In a real job setting, it is certainly possible that an individual will be exposed to a mixture of positive and negative social information cues. How conflicting information influences an individual's own attitudes and behaviors has not been examined.

Copyright © 2000. All rights reserved.

Duration

A second weakness of laboratory tests of SIP is the duration of the studies. The development of trust, the identification of opinion leaders, the creation of friendship and advice networks, the gaining of experience and familiarity with the job, and many other factors all take time. A laboratory study that lasts between 30 minutes and 2 hours can touch on only some of these elements, and even then only in the most superficial ways. It would be very difficult to determine the strength of relationships in the lab, and no provision for indirect influences can be made.

One field experiment (Griffin, 1983) responds to the criticisms regarding duration and the lack of relational independent variables. This study took place over a 3 month period at two different manufacturing plants and attempted to determine the effects of changes in the design of the jobs and of the frequency and nature of positive social information cues from supervisors on employee satisfaction and perceptions of the characteristics of their jobs. Although this study made some positive advances over previous laboratory research, it still considered only one possible source of social information—the supervisor—and focused solely on positive information cues by attempting to manipulate the social information presented to respondents.

Even with all of their limitations, laboratory studies still support the notion that social information plays a role in influencing an individual's perceptions of and reactions to the characteristics of a job, and that information can be gained from sources other than just the job itself. Different sources of information, both human and nonhuman, delivered through different media, were found to have significant effects upon individual perceptions of both job characteristics and job satisfaction.

SIP Theory Specification

Not all of the problems associated with SIP research are due to the choice of laboratory designs. Although social information processing theory (Salancik & Pfeffer, 1978) suggests that environmental factors and social relationships can influence individual attitudes and job satisfaction, the theory does not provide a causal mechanism suggesting how this may be accomplished (Monge & Contractor, in press). The following section suggests an alternative approach—social network analysis—that responds to the theoretical weaknesses of the SIP model itself and avoids many of the problems of the traditional methodologies outlined above.

Copyright © 2000. All rights reserved.

Network Analytic Framework for the Study of Social Information

Network analysis can make both theoretical and methodological contributions to the study of social information processing. Theoretically, social network analysis offers explanations regarding how social information can be transmitted (Rice, 1993). Methodologically, the tools of social network analysis can be used to eliminate many of the weaknesses inherent in laboratory research.

The concept of social contagion (Burt, 1987; Hartman & Johnson, 1989; Contractor & Eisenberg, 1990) has been used to help articulate how an individual's attitudes and satisfaction are socially influenced by those with whom they communicate (the relational or cohesion model) or by those who have similar patterns of communication (the positional or structural equivalence model).

The cohesion model focuses on socialization of individuals by their networks of relationships. The strength of the relationship and the frequency of the communication determine the network's level of influence (Burt, 1987). When confronted with ambiguous issues, individuals discuss such issues with others in their social network. A normative, consensual understanding of the issue and of the associated costs and benefits is sought, thereby reducing the issue's uncertainty for the individual.

Methodologically, network analysis offers the ability to collect relational data on naturally occurring networks and test propositions regarding the manner and extent to which individual attitudes and satisfaction are influenced by the social information they receive and process. These tools, developed from an explicitly social structural perspective, have the advantage of being able to identify and analyze the relative strengths and influences of the different actors in an organization's various communication networks. These techniques can be used in longitudinal as well as cross sectional studies.

The use of social contagion models to study social information processing is not new. A substantial literature has studied the role of social contagion in the adoption, use, and perceptions of electronic messaging and computer information systems (e.g., Burkhardt, 1994; Contractor, Seibold, & Heller, 1996; Rice & Aydin, 1991; Rice, Grant, Schmitz, & Torobin, 1990; Schmitz & Fulk, 1991). Network measures and methodology have also been used to examine: the effects of social interactions upon perceived job characteristics (Dean & Brass, 1985); the extent to which network factors, such as instrumental network proximity and friendship network centrality, can influence individuals' perceptions regarding their jobs (Ibarra & Andrews, 1993); the extent to which supervisors influence individual perceptions of e-mail usefulness and the richness of e-mail as

Copyright © 2000. All rights reserved.

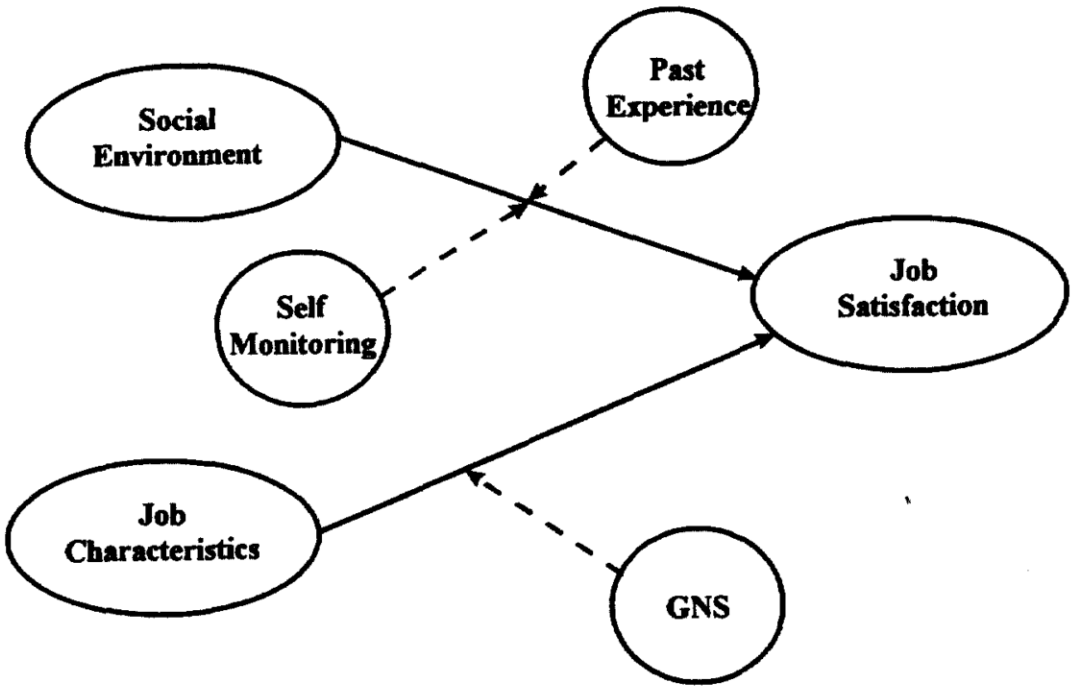


Figure 1: Integrated Model, Where Job Satisfaction is Predicted by an Individual's Social Environment and the Characteristics of an Individual's Job
NOTE: Past experience and self-monitoring may moderate the relationship between social environment and job satisfaction; growth need strength may moderate the relationship between job characteristics and job satisfaction.

a communication medium (Schmitz & Fulk, 1991); and, the degree to which attitudes and behaviors become more homogeneous after an organizational change (Burkhardt, 1994). In addition, Burkhardt (1994) has found evidence that dispositional factors such as self-monitoring moderate how individuals react to social information cues. In the next section, we propose a job satisfaction model that combines the characteristics of a job, a network formulation of the social environment, and their respective moderators into a single, integrated framework.

Integrated Model Of Job Satisfaction

The proposed model (see Figure 1) is a social contagion model, where focal individuals are influenced by their network relationships and by the objective characteristics of their jobs. The effects of the social networks and of job characteristics are moderated by their own dispositions and past experiences. The model is represented by the following equation:

$$\mathbf{S}_i = a(\mathbf{JC}_i) + b(\mathbf{SE}_i) + c(\mathbf{GNS}_i)(\mathbf{JC}_i) + d(\mathbf{P}_i)(\mathbf{SE}_i) + e(\mathbf{SM}_i)(\mathbf{SE}_i).$$

Copyright © 2000. All rights reserved.

More specifically, individual i's job satisfaction (S_i) is influenced by individual i's job characteristics (JC_i) and individual i's social environment (SE_i). Further, the influence of individual i's job characteristics on job satisfaction is moderated by his or her level of growth need strength (GNS_i)(JC_i). The influence of individual i's social environment on job satisfaction is moderated by the individual's past experience with the job (P_i)(SE_i) and individual i's level of self-monitoring (SM_i)(SE_i). The five terms on the righthand side of this equation correspond, respectively, to hypotheses one, three, two, four, and five proposed earlier.

The sets of network relationships that comprise an individual's social environment in this model are the individual's relationships with coworkers, supervisors, subordinates, and friends in the organization. These various relationships incorporate interactions mandated by task requirements, as well as interactions of a more personal and supportive nature, and can influence individual perceptions in unique ways. Ibarra & Andrews (1993) considered the roles played by similar types of networks in their study. The direct influence each network member will have upon the focal individual is the result of (a) the amount of time the focal individuals spend communicating with every other individual in the network, and (b) whether or not the focal individuals consider each person with whom they communicate to be a friend. The total influence of the social environment upon the focal individual is the combined effects of both these social networks.

Weighting the attitudes of others in an individual's communication networks using intensity of exposure and friendship status responds to two of Blau and Katerberg's (1982) criticisms of prior SIP research. Because individuals tend to perceive information provided by those with whom they spend more time and with whom they have personal relationships as more important and more credible (Ibarra & Andrews, 1993; Rice & Aydin, 1991), the use of task communication and friendship networks as weighting factors adjusts for source credibility when estimating the effects of the information received from the social environment. In addition, using self-monitoring and past experience as moderating variables in the integrated model responds to two additional criticisms by Blau and Katerberg (1982). Self-monitoring takes the sensitivity of individuals to their environment into account, and past experience reflects individual levels of task ambiguity based upon past experience with the job. The network operationalization used in this study responds to Blau and Katerberg's last criticism in that it allows for the effects of both positive and negative social information to be taken into consideration. Finally, this operationalization responds to Rice's (1993) criticism of prior SIP research by using the actual attitudes of others, rather than respondent projections, in modeling the focal individuals' social environments.

Copyright © 2000. All rights reserved.

METHOD

Sample

The data used in this study were collected as part of Project City, an interdisciplinary research project among researchers in communication, engineering, and computer science. The organization used in this study was the public works division (PWD) of a 35,000-person military base located in the southeastern United States. The PWD's duties include the maintenance of existing civil infrastructure and buildings, designing and overseeing construction projects, meeting the housing needs of military personnel, and ensuring that activities on the base are in compliance with environmental regulations.

At the time of the study, the PWD employed 66 people; 48 were male and 55 were white. The mean (median) age was 44.98 (46.00), with ages ranging from 25 to 63. The mean (median) length of time employees had worked for the PWD was 10.63 (8.50) years, ranging from a low of 2 months to a high of 30 years. The mean (median) job tenure was 4.72 (4.65) years, ranging from a low of 1 month to a high of 20 years. All 66 employees participated, for a response rate of 100%.

Data Collection

Each PWD employee participated in a series of structured interviews. The length of each interview ranged from 25 to 90 minutes. Interviews were conducted in private offices by a member of the research team. Upon entering the office, each employee was given a copy of a cover letter that briefly explained the purpose of the survey and guaranteed confidentiality, and each was asked if he or she had any questions before proceeding. Both the surveyor and employee had a copy of the questionnaire. For each section, the surveyor read the instructions to the employees and made sure they were understood. Respondents read the questions and orally responded while the surveyor recorded all responses. Both surveyor and employee requested clarifications when needed.

Instrumentation

Job Satisfaction

The dependent variable, job satisfaction, was measured with the work scale section of the Job Description Index (Smith, Kendall, & Hulin, 1969). This measure provided respondents with 18 descriptors that indexed different aspects of work satisfaction. For each item, respondents were asked

Copyright © 2000. All rights reserved.

to respond "yes" if they agreed with the description, "no" if they did not agree with the description, and "?" if they could not decide. A "yes" was coded 3, a "?" was coded 2, and a "no" was coded 1. Cronbach's alpha for this measure was .79.

Job Characteristics

The job characteristics used in this study were the objective characteristics of the job that formed the basis of the PWD's job evaluation system. One weakness of previous research on job characteristics is that it has frequently operationalized the characteristics of a job with self-report scales measuring individuals' perceptions of job characteristics (Roberts & Glick, 1981). Following Blau and Katterberg's (1982) suggestion regarding how to overcome this limitation, we acquired the official job evaluations for the 48 distinct jobs represented in our sample. These evaluations were either completed or approved by the human resources department at the base.

The base used three separate systems to evaluate the jobs included in this study and to place them in a single pay grade structure. Point factor job evaluation systems, such as those used by the base, provide a rationalized, quantitative method for evaluating and grading disparate jobs, based upon a set of core job dimensions, or factors (Milkovich & Newman, 1993). In order to standardize the job characteristics used in this study, we chose the nine-factor job evaluation system employed by the base and used it to evaluate all of the jobs (see Table 1). The nine-factor system was used because it appeared to be the most comprehensive in its coverage of different core job characteristics, and because this system had already been used to evaluate more of the jobs in our sample than either of the other two systems.

Of the 48 different jobs represented in our sample, 30 jobs were not previously rated using the nine-factor system. In order to rate these jobs, two researchers independently completed evaluations of each job using the nine-factor system. After ranking each job in accordance with the base's official job evaluation guidelines, rankings for each job were compared on a factor by factor basis. Interrater reliability was evaluated using Cohen's kappa (Cohen, 1968). Interrater agreement for each of the nine categories was beyond what would be expected by chance. Table 1 provides the Cohen's kappas for each category, with scores ranging from .55 to .85. After making the initial comparisons, any discrepancies in category assignments within each factor were resolved by the two raters. Finally, the point totals associated with each factor were summed, to assure that as a result of our reevaluation the job was still classified as falling into

Copyright © 2000. All rights reserved.

TABLE 1
Job Characteristics Used in the Nine-Factor Plan

Job factor	*Description*	*Cohen's kappa*	*Number of levels*	*Minimum/ maximum*
Knowledge required by position	Amount and technical level of task-specific knowledge and skills incumbent must possess.	.67	8	350 - 1550
Supervisory controls	Amount of guidance supervisor provides to incumbent and amount of supervisory authority exercised by incumbent.	.72	5	25 - 650
Guidelines	Extent to which incumbent must either adapt existing guidelines to practical situations, or must develop procedures when needs arise.	.74	5	25 - 650
Complexity	Amount of variability inherent in the job.	.55	5	25 - 325
Scope and effect	General breadth and impact of job, both within and outside the organization.	.76	5	25 - 325
Personal contacts	Nature of organizational relationships, authority, or influence level at which these occur, and difficulty in preparing for personal contacts.	.70	4	10 - 110
Purpose of contacts	Reason for contacts, such as negotiating, advising, or representing the organization.	.71	4	20 - 220
Physical demands	Nature of work in regards to physical demands on the incumbent.	.75	2	5 - 20
Work environment	Environmental conditions within which incumbent works.	.85	2	5 - 20

NOTE: This table describes each of the nine different job characteristics used to evaluate the jobs included in this study. The Cohen's kappas reflect the amount of interrater agreement in initially ranking these jobs, the number of levels refers to the number of different point values available to rank each job, and the range presents the minimum and maximum point levels possible for each of these job characteristics.

the base's originally assigned pay grade. Although part of the reason for using the nine-factor plan was to capture additional job dimen-

Copyright © 2000. All rights reserved.

sions not included in the Hackman-Oldham model, it is possible that the dimensions used in our study might not reflect the five original characteristics identified by Hackman and Oldham (1976). In order to verify that these characteristics were being included, we first collected self-report information, using the Job Diagnostic Survey (JDS), from each of our respondents. Next, we calculated a canonical correlation to assess the global association between the objective measures and the JDS scales. A canonical correlation analysis focuses on the correlation between a linear combination of two sets of variables (Johnson & Wichern, 1992). The pair of linear combinations having the largest correlation provides an index of the strength of association between the two sets of variables. The canonical correlation of .58 ($F < .0001$) suggests that the objective job characteristics used in our study do indeed capture the information reflected in the JDS scales. However, our measures capture other information about the jobs, as well.

As a final test, we correlated each individual Hackman-Oldham job dimension with each characteristic in the nine-factor plan, as summarized in Table 2. For ease of interpretation, only the significant relationships are presented. The results reveal that each of the Hackman-Oldham characteristics correlated significantly with at least one of the dimensions included in the nine-factor plan. Skill Variety correlated with every job factor except for Physical Demands of the Work and Work Environment. Task Identity correlated with Complexity, Personal Contacts, and Purpose of Contacts. Task Significance correlated with Scope & Effect. Autonomy correlated with Complexity, Scope & Effect, and with the two Contacts factors, and was negatively correlated with Work Environment. Feedback was positively correlated with Purpose of Contacts and negatively correlated with Work Environment. The fact that the correlations are moderately, but not overwhelmingly, large also supports the claim that the job characteristics included in the nine-factor plan reflect other elements of the job not captured by the Hackman-Oldham model.

Social Environment

Each respondent was provided a roster of the employees in the organization. For each employee, the respondent was asked how many minutes or hours per week in the last 2 months he or she had spent communicating with this person about task-related issues (communication could have occurred via conversations in person, in meetings, by phone, via electronic mail, or by memoranda). Respondents were also asked whether or not they considered this person to be a friend. These two communication networks—time spent communicating and friendship—were then used to determine the weighted average job satisfaction of the respondents in their social environment.

Copyright © 2000. All rights reserved.

TABLE 2
Correlations Between Perceived Hackman-Oldman Job Characteristics and Nine-Factor Plan Characteristics

H-O job characteristic	*Knowledge required*	*Supervisory controls*	*Guidelines*	*Complexity*	*Scope & effect*	*Personal contacts*	*Purpose of contacts*	*Physical demands*	*Work environment*
Skill variety	.384	.286	.350	.398	.308	.285	.335		
Task identity				.309		.358	.312		
Task significance					.276				
Autonomy				.318	.270	.426	.288		-.306
Feedback						.333			-.265

NOTE: In order to simplify the reading of the table, only the significant correlations were included. All correlations listed are significant at $p < .05$ or better.

Copyright © 2000. All rights reserved.

Data collection resulted in two 66 by 66 matrices. In the time spent communicating matrix ($\mathbf{T}_{ij}$), each cell ij indicated the number of minutes per week individual i reported communicating with individual j. In the friendship matrix ($\mathbf{F}_{ij}$), cell ij was coded 1 if i reported j as a friend and 0 otherwise. These matrices were used to weight the job satisfaction of the individuals in each respondent's communication networks.

Each weighting matrix ($\mathbf{W}_{ij}$) was made row stochastic by summing the entries for each row and dividing each individual entry in a row by the row's sum. Making the matrices row stochastic provided a weighting method based upon the relative, rather than the absolute, strength of the individual's links with others in the network, thus controlling to some extent for a person's ability to globally overestimate (or underestimate) his or her reports of friendships and time spent communicating. This method thus estimates the proportional amount of influence each individual j would have on individual i. A vector containing the job satisfaction scores of all the individuals at the PWD ($\mathbf{S}_j$) was then multiplied by each network weighting matrix to create predicted satisfaction values for the individuals' social environments. The social environment influence vectors ($\mathbf{SE}_i$) were thus created using this equation:

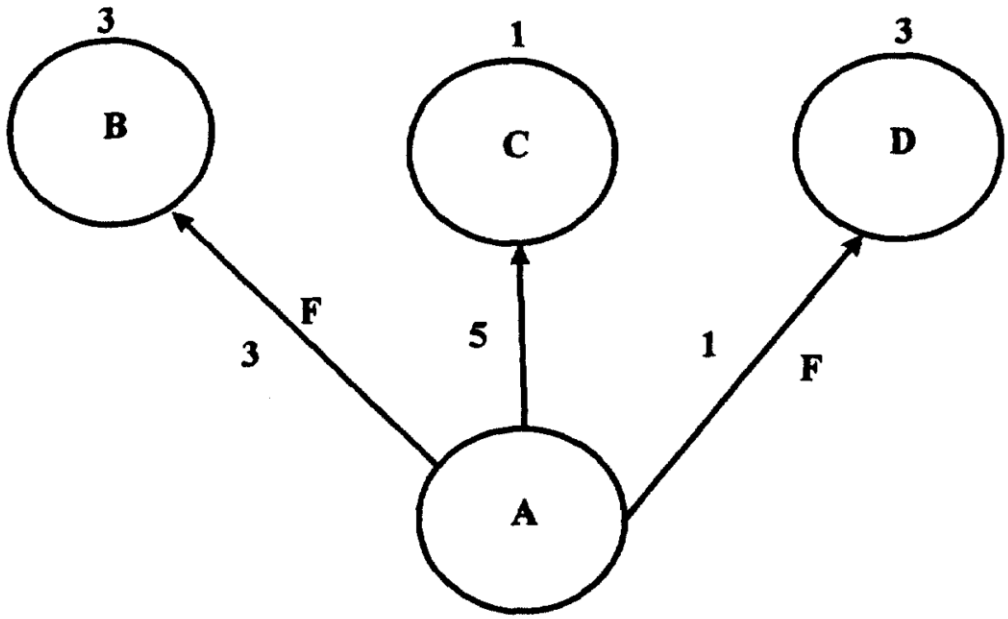
$$\mathbf{SE}_i = \Sigma\, \mathbf{W}_{ij} * \mathbf{S}_j \quad i \neq j.$$

Higher values of $\mathbf{SE}_i$ indicate that the contacts in individual i's communication and friendship networks were more satisfied; this would imply that they were more likely to convey positive social information to individual i, thereby increasing the likelihood that individual i would be more satisfied.

Figure 2 provides an example of how this weighting scheme works. Individual A spends 3 hours per week communicating with individual B, whose job satisfaction is 3; 5 hours a week communicating with individual C, whose job satisfaction is 1; and 1 hour per week communicating with individual D, whose job satisfaction is 3. In addition, individual A considers both B and D to be friends, but does not consider C to be a friend. The equations below the figure show how the weighted average influence for each network is calculated. A's social environment (SE) weighted by her task communication network is about 1.9, and A's social environment (SE) weighted by her friendship network is 3.

An examination of our data reveals that, although time spent communicating and friendship networks are related (QAP correlation = .15, $p <$ .001), they still represent distinct components of an individual's social environment. The effects of these two measures may therefore be combined in a structural equation model to estimate the overall influence of an individual's social environment upon his or her job satisfaction.

Copyright © 2000. All rights reserved.



$$\text{Time Communicating} = \frac{(3x3) + (5x1) + (1x3)}{(3 + 5 + 1)} = 1.9$$

$$\text{Friendship} = \frac{(1x3) + (0x1) + (1x3)}{(1 + 1 + 0)} = 3.0$$

Figure 2: Example of How Each Individual's Social Environment Was Calculated
NOTE: Each individual's social environment was a combination of the weighted average influence of his or her communication and friendship networks.

Growth Need Strength

Growth need strength was measured using the 11-item scale included in the Job Diagnostic Survey (Hackman & Oldham, 1976). The questions were asked using a 7-point scale (from 4 to 10) indicating the degree to which the individual would like to have each characteristic present in his or her job. The endpoints for the scale were denoted by *would like having this only a moderate amount (or less)* and *would like having this extremely much*. Cronbach's alpha for this measure was .88.

Past Experience

Two proxies for past experience were used. First, organization tenure was measured by asking respondents the month and year they began working at the base. Second, job tenure was measured by asking respon-

Copyright © 2000. All rights reserved.

dents the month and year they began their current job, as defined by their current job title. Organizational tenure and job tenure were coded as the number of years, including fractional portions of years, that had elapsed between each respective starting date and the time of the interview. Because variables relating to time are often positively skewed, in analyses not reported here we logged organization tenure and job tenure and reran the analyses. Since there were no systematic differences in our results, we kept the original measures in our final analysis.

Self-Monitoring

Self-monitoring was measured using the revised self-monitoring scale (Lennox & Wolfe, 1984). In measuring the degree of self-monitoring, each individual was asked to respond to a set of 13 items using a 6-point scale ranging from *certainly or always false* to *certainly or always true*. Cronbach's alpha for this measure was .87.

Method of Analysis

The data were analyzed using the PLS-Graph software program (Chin, 1994), which employs the Partial Least Squares (PLS) structural equation modeling technique (Fornell & Bookstein, 1982; Fornell & Cha, 1994; Lohmöller, 1984; Wold, 1966, 1985). PLS is appropriate for this analysis for at least three reasons: First, PLS makes no a priori assumptions about the distribution of the data; rather, it allows the use of either bootstrap or jackknife estimation techniques to calculate the distribution for each equation independently. Second, PLS is a fixed-point estimation technique that uses OLS regressions in an iterative manner to minimize the residual variance in a model. Each component of the model is estimated separately, holding all other portions of the model constant. This iterative procedure is repeated until the total residual variance in the model has been minimized (Fornell, Lorange, & Roos, 1990). The use of single-component analysis makes this method appropriate for analyzing small data sets. The degrees of freedom lost in each regression are equal only to the total number of variables in the component being estimated, not to the number of variables included in the entire model. A large number of measures can thus be used to estimate the latent constructs with little or no consequence. Third, the PLS technique does not rely upon the assumption of independence of observations (Fornell & Cha, 1994), which is a potential problem when using social network data (Ibarra & Andrews, 1993; Wasserman & Faust, 1994).

Copyright © 2000. All rights reserved.

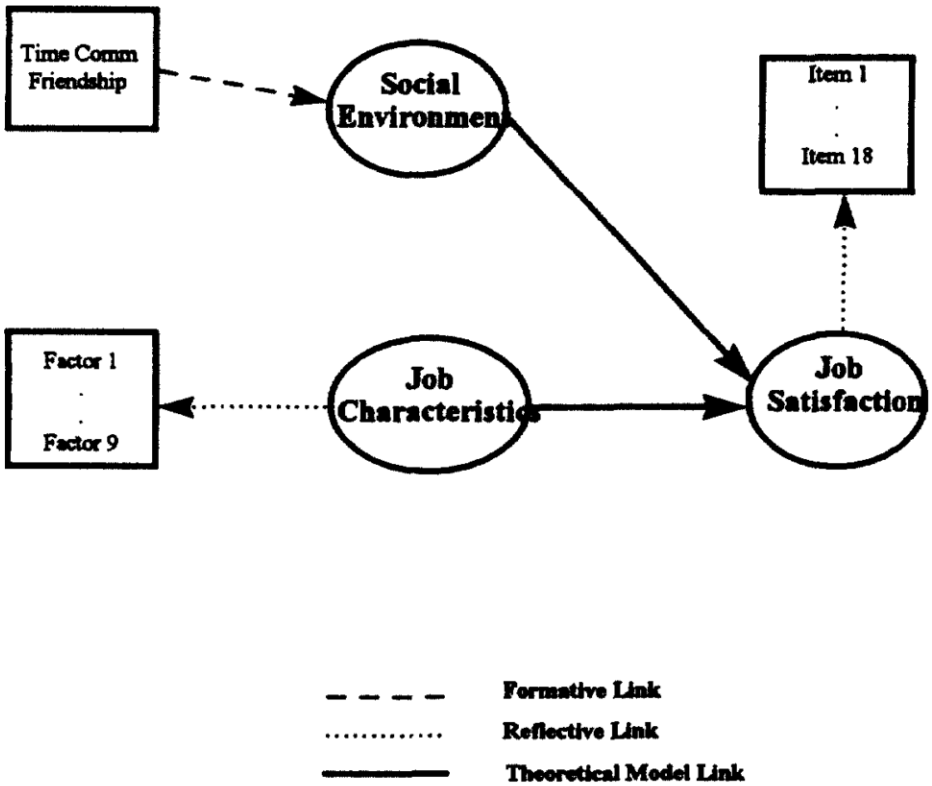


Figure 3: Base Model, Incorporating Main Effects of the Social Environment and Job Characteristics

Another distinctive feature of PLS is that it allows links between the measurement model and the latent constructs to be considered either reflective or formative (Fornell & Bookstein, 1982; Fornell & Cha, 1994; Lohmöller, 1984). A reflective link points outward from the latent construct to the measurement variable. The weight relation between a measurement item and a latent variable connected by a reflective link is calculated in a manner similar to a principal components factor analysis (Fornell & Cha, 1994). The weight relation based upon a reflective tie thus indicates how the manifest or measurement variable is influenced by the latent construct it represents. A formative link points inward from the measurement item to the latent construct. The weight relation between a measurement item and a latent variable connected by a formative link is the multiple regression coefficient of the measurement item from the regression, using the measurement items to predict the latent construct (Fornell & Cha, 1994). Formative links assume that the measurement items are a collection of variables informative about the latent construct, which is of unknown dimensionality and representativeness (Fornell & Cha, 1994). Traditional structural equation modeling techniques, such as LISREL, are equipped to handle reflective links, but not formative links.

Copyright © 2000. All rights reserved.

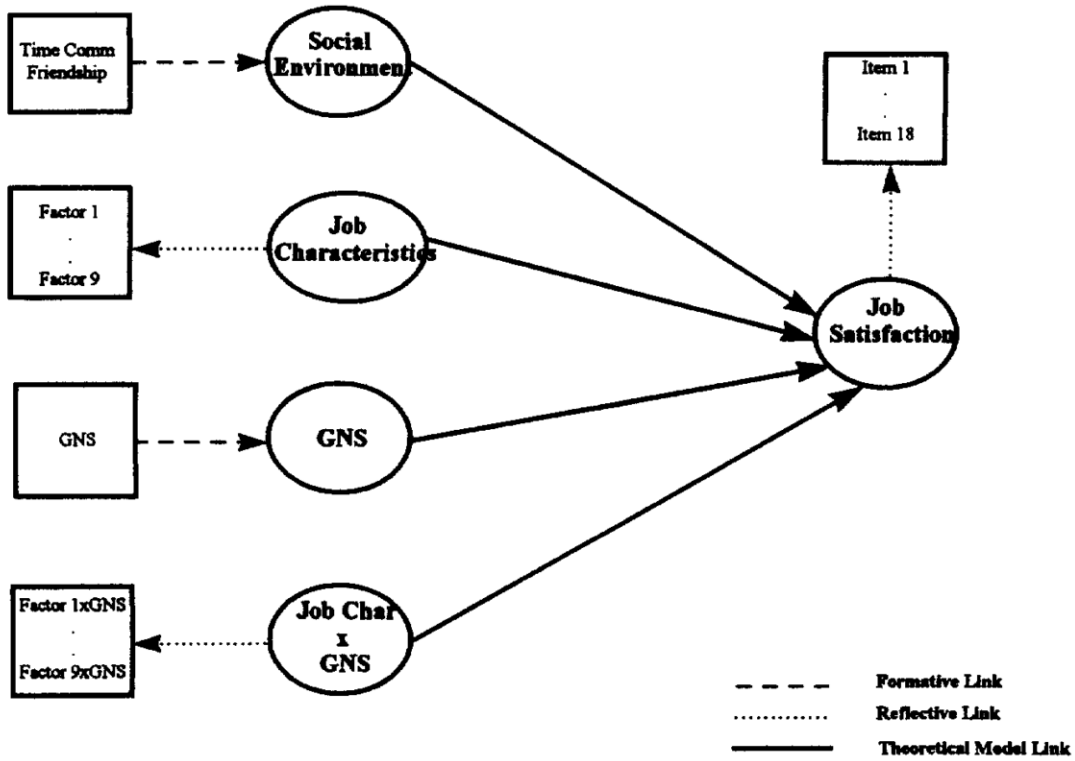


Figure 4: Interaction Model One, Incorporating Main Effects of the Social Environment and Job Characteristics, Along With the Interaction Between Growth Need Strength and Job Characteristics

The decision regarding which type of link to use for each latent construct rests upon the substantive theory underlying the variables. Reflective links are to be used when the measures included in the model imperfectly represent some abstract underlying construct, such as an attitude or belief. Formative links are used when several measures are treated as explanatory combinations of indicators used to create a latent construct of unknown dimensionality, for example, a company's marketing mix (Fornell & Cha, 1994).

In our study, formative links were used to establish the social environment latent variable, because the networks used in this study can combine to influence individual perceptions and attitudes and are not just observable indicators of some unobservable construct. In addition, the dimensionality of what constitutes an individual's social environment is not clearly defined or known. At best, we can identify those elements that we believe to be part of an individual's social environment and that we expect to have some influence on an individual's perceptions.

Copyright © 2000. All rights reserved.

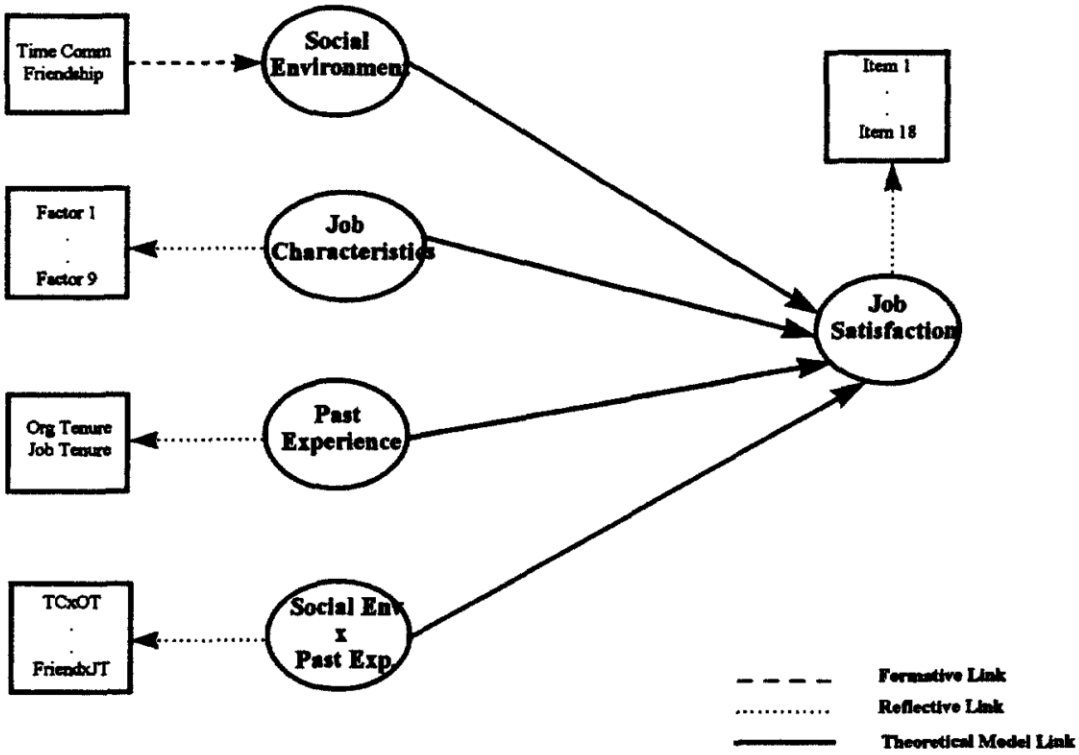


Figure 5: Interaction Model Two, Incorporating Main Effects of the Social Environment and Job Characteristics, Along With the Interaction Between Past Experience and Social Environment

Reflective ties were used for GNS, self-monitoring, and job satisfaction, because Fornell and Cha (1994) recommend the use of reflective ties to represent psychological constructs. Reflective ties were also used to estimate the job characteristics latent variable, because the characteristics were imperfect, observable proxies of the factors that elicit the psychological states responsible for individual motivation and for satisfaction with the job (Hackman & Oldham, 1976). Similarly, organizational tenure and job tenure are imperfect indicators of an individual's past experience with his or her job, so reflective links were used to estimate the past experience latent variable as well.

Several structural equation models were tested. Because of our small sample size, including multiple interaction terms in a single model might have created collinearity problems that could have masked potentially significant results. Therefore, we developed a set of models that tested each of the interactions separately. First, a base model, illustrated in Figure 3, tested the main effects of the social environment and of job characteristics upon job satisfaction. This model was

Copyright © 2000. All rights reserved.

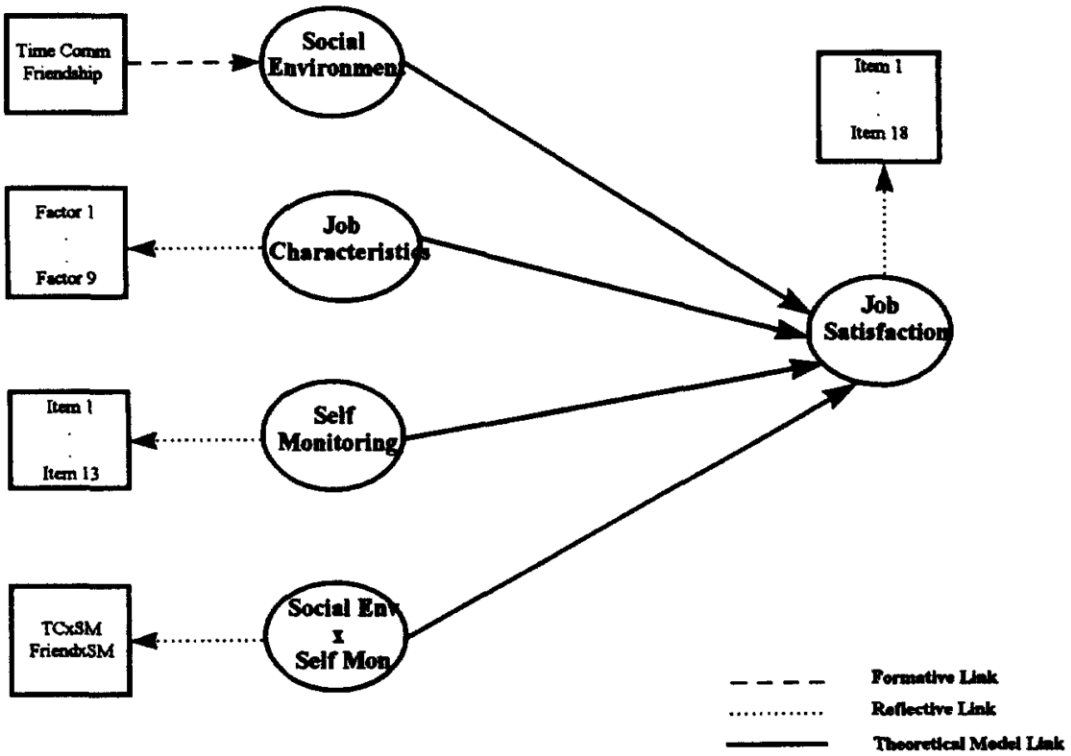


Figure 6: Interaction Model Three, Incorporating Main Effects of the Social Environment and Job Characteristics, Along With the Interaction Between Self-Monitoring and Social Environment

used to test H1 and H3. Our second model, shown in Figure 4, tested the moderating effects of GNS upon the relationship between the characteristics of the job and job satisfaction. The interaction term was created by multiplying an individual's GNS score by each job characteristic measurement variable. This model was used to test H2. Our third model, illustrated in Figure 5, tested the possible moderating effects of past experience on the relationship between the social environment and job satisfaction. Latent variables were created for the interaction term by multiplying each measure used to estimate the social environment by each measure used to estimate past experience. The resulting products were then used to estimate the latent variable interaction terms. This model was used to test H4. Our final model, shown in Figure 6, tested the moderating effects of self-monitoring upon the relationship between the social environment and job satisfaction. The interaction term was created by multiplying an individual's total self-monitoring score by each social environment measurement variable. This model was used to test H5.

Copyright © 2000. All rights reserved.

TABLE 3
Measurement Model Factor Weights and Loading - Original Model[a]

Variable	*Path coefficient*	*Standard error*	*t-statistic*	*Aggregate AVE[b]*	*Composite reliability[c]*
Outer model weight					
Social environment				.6300	.7600
Friendship network	.8587	.2450	3.5054		
Time comm. network	.3916	.2974	1.3169		
Outer model loadings					
Job characteristics				.5400	.8500
Knowl. required by job	.9257	.0570	16.2465		
Supervisory controls	.8148	.0601	13.5507		
Guidelines	.8339	.0845	9.8711		
Complexity	.7338	.1207	6.0782		
Scope & effect	.8703	.0580	14.9962		
Personal contacts	.5716	.1538	3.7162		
Purpose of contacts	.5912	.1492	3.9616		
Physical demands	.2085	.2165	.9629		
Work environment	.1526	.2168	.7039		
Past experience				.7400	.8500
Tenure in job	.8972	.3138	2.8592		
Tenure w/ organization	.7781	.3065	2.5384		
Self-monitoring				.5800	.9500
Item 1	.7407	.2933	2.5255		
Item 2	.5998	.3196	1.8769		
Item 3	.6808	.2461	2.7667		
Item 4	.7023	.2167	3.2408		
Item 5	.6540	.2589	2.5259		
Item 6	.8754	.2144	4.0834		
Item 7	.8638	.2352	3.6733		
Item 8	.7504	.2561	2.9304		
Item 9	.8167	.2189	3.7301		
Item 10	.8468	.2246	3.7705		
Item 11	.8183	.2143	3.8193		
Item 12	.8737	.2402	3.6375		
Item 13	.8549	.2442	3.5005		
Growth need strength				.4900	.8300
Item 1	.9559	.3711	2.5761		
Item 2	.7949	.2466	3.2228		

Copyright © 2000. All rights reserved.

TABLE 3 Continued
Measurement Model Factor Weights and Loading - Original Model[a]

Variable	*Path coefficient*	*Standard error*	*t-statistic*	*Aggregate AVE[b]*	*Composite reliability[c]*
Outer model weights					
Item 3	.4161	.3179	1.3088		
Item 4	.3011	.3596	.8374		
Item 5	.7439	.2413	3.0830		
Item 6	.8090	.2366	3.4192		
Job satisfaction				.8200	.2800
Item 1	.8938	.0919	9.7221		
Item 2	.8051	.1104	7.2896		
Item 3	.7503	.0998	7.5174		
Item 4	.6755	.1198	5.6380		
Item 5	.5713	.1562	3.6576		
Item 6	.5134	.1739	2.9520		
Item 7	.6121	.1607	3.8082		
Item 8	.5288	.1446	3.6562		
Item 9	.6043	.1170	5.1653		
Item 10	.5232	.1724	3.0345		
Item 11	.8703	.0922	9.4378		
Item 12	.6483	.1719	3.7718		
Item 13	.2408	.2214	1.0876		
Item 14	.0033	.1730	.0191		
Item 15	-.1277	.1645	-.7764		
Item 16	.1401	.1539	.9106		
Item 17	-.2011	.1331	-1.5111		
Item 18	-.0005	.1753	-.0029		

[a]The coefficients for the social environment measurement variables are based upon formative links with the latent variable and, thus, may be interpreted like regression coefficients, indicating the degree to which the measurement variables influence the latent construct. The coefficients for all of the other measures are based on reflective links and may be interpreted more like the coefficients in a principal components factor analysis, indicating the degree to which the measurement items are affected by the latent construct.
[b]The average variance explained (AVE) measures the amount of variance captured by the construct in relation to the amount of variance due to measurement error. If the AVE is less than .5, then the variance due to measurement error is greater than the variance captured by the construct.
[c]The composite reliability is evaluated in the same manner as a Cronbach's alpha, with values greater than .7 indicating acceptable levels of reliability.

Copyright © 2000. All rights reserved.

RESULTS

Table 3 contains the outer model weightings and factor loadings for each of the measures used in the original base model. The weight relations between the measurement items and the latent variables are calculated differently for reflective and formative links. Reflective link weight relations are factor loadings, similar to a principal components factor analysis, and formative link weight relations are multiple regression coefficients (Fornell & Cha, 1994). Therefore, factor weights are provided for the two network measures because they used formative links, and factor loadings are presented for all of the remaining measures because all of the other latent variables in this analysis were created using reflective links. Table 3 also provides the average variance extracted (AVE) and the composite reliability for each latent variable. The AVE measures the amount of variance captured by the construct in relation to the amount of variance due to measurement error (Fornell & Larcker, 1981). If the AVE is less than .5, then the variance due to measurement error is greater than the variance captured by the construct. The validity of the construct, as well as the validity of its individual indicators, therefore, may be questionable. The composite reliability is evaluated in the same manner as a Cronbach's alpha, with values greater than .7 indicating acceptable levels of reliability (Nunally, 1978).

Only the friendship network significantly predicted the latent variable social environment ($t = 3.51$, $df = 64$). The communication network was not significant. Both the AVE (.63) and composite reliability (.76) for social environment were within acceptable levels. Seven of the nine job characteristics loaded significantly on the job characteristics latent variable. Only the two factors dealing with physical context (work occurs indoors or outdoors) and physical exertion did not load significantly. The AVE (.54) and the composite reliability (.85) for this construct also fell within acceptable levels. Both job tenure and organizational tenure loaded significantly on past experience in this model ($t = 2.86$, $df = 64$, and $t = 2.54$, $df = 64$, respectively). The AVE indicates that these measures captured a significant amount of variance in past experience (.74) with good reliability (.85). Self-monitoring had high factor loadings, and the measurement items explained a significant amount of the variance in this measure (.58) with good reliability (.95). Growth need strength had an AVE just below the acceptable cutoff (.49), but had acceptable levels of composite reliability (.83). The factor loadings indicate that two of the items used to construct GNS did not load significantly on the latent variable. Although job satisfaction had acceptable levels of reliability (.82), this construct did not explain significant amounts of variance (.28). It is possible that collinearity among some of the measurement items, or poorly fitting items, increased

Copyright © 2000. All rights reserved.

TABLE 4
Measurement Model Factor Weights and Loading - Revised Model[a]

Variable	*Path coefficient*	*Standard error*	*t-statistic*	*Aggregate AVE*	*Composite reliability*
Outer model weights					
Social environment				.6300	.7600
Friendship network	.8499	.2533	3.3551		
Time comm. network	.4065	.3019	1.3465		
Outer model loadings					
Job characteristics				.7000	.9400
Knowl. required by job	.9381	.0271	34.5574		
Supervisory controls	.8045	.0486	16.5572		
Guidelines	.8668	.0532	16.2822		
Complexity	.8060	.0771	10.4533		
Scope & effect	.9062	.0255	35.6048		
Personal contacts	.6820	.1091	6.2485		
Purpose of contacts	.6885	.1100	6.2595		
Past experience				.7400	.8500
Tenure in job	.9345	.3056	3.0579		
Tenure w/ organization	.7160	.3116	2.2979		
Self-monitoring				.5800	.9500
Item 1	.5154	.2709	1.9026		
Item 2	.3297	.2868	1.1495		
Item 3	.7528	.1953	3.8544		
Item 4	.7803	.1749	4.4615		
Item 5	.8120	.1667	4.8707		
Item 6	.7181	.2107	3.4083		
Item 7	.6971	.1931	3.6104		
Item 8	.7318	.2204	3.3205		
Item 9	.7472	.1935	3.8608		
Item 10	.5756	.2508	2.2955		
Item 11	.6968	.1714	4.0653		
Item 12	.6448	.2139	3.0150		
Item 13	.5840	.2109	2.7687		
Growth need strength				.7900	.9400
Item 1	.9626	.2206	4.3642		
Item 2	.8113	.1904	4.2607		
Item 3	.7922	.1935	4.0950		
Item 4	.8304	.1794	4.6280		

Copyright © 2000. All rights reserved.

TABLE 4 Continued
Measurement Model Factor Weights and Loading - Revised Model[a]

Variable	*Path coefficient*	*Standard error*	*t-statistic*	*Aggregate AVE*	*Composite reliability*
Job satisfaction				.4300	.9000
Item 1	.8874	.0530	16.7564		
Item 2	.8013	.0890	9.0041		
Item 3	.7611	.0728	10.4591		
Item 4	.6796	.1001	6.7862		
Item 5	.5597	.1517	3.6887		
Item 6	.5177	.1446	3.5811		
Item 7	.6247	.1384	4.5148		
Item 8	.5460	.1299	4.2033		
Item 9	.6210	.0696	8.9191		
Item 10	.5496	.1344	4.0894		
Item 11	.6470	.1602	4.0388		
Item 12	.8617	.0452	19.0663		

[a]Items which did not load significantly on the latent constructs were dropped from the job characteristics, self-monitoring, growth need strength, and job satisfaction constructs.

the standard errors for the measurement items in this construct. Table 4 provides factor weights and loadings, as well as validity and reliability data on a revised model. The model was revised by dropping all items that did not load significantly on the job characteristics, the GNS, and the job satisfaction latent constructs. When the job factors of physical demands and work environment were dropped from the job characteristics construct, acceptable levels for the AVE (.70) and for reliability (.94) were achieved. Similarly, when the two nonsignificant items were eliminated from the GNS construct, the AVE achieved significance (.79), and the construct's reliability increased above its already acceptable prior level (.94). When the six nonsignificant items were removed from the job satisfaction measurement model, the AVE improved dramatically (.43), but it still failed to reach the cutoff point for significant levels of variance explained, even though the items showed significant levels of composite reliability (.90) and all items loaded significantly on the latent variable construct.

Both the original and the revised models were tested in the analysis, and there were no substantive differences in the results. However, due to the greater validity and reliability of the constructs in the revised model, only the results generated using this model have been presented in Table 5.

Copyright © 2000. All rights reserved.

TABLE 5
Path Coefficients and Standard Errors Predicting Job Satisfaction - Revised Model

Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Social environment	.4220***	.4230***	.5850***	1.0760***
	(.1169)	(.1174)	(.1839)	(.6456)
Job characteristics	.3907***	-.0840	.3360***	.3140***
	(.0944)	(.8453)	(.1038)	(.0964)
Past experience			.4210	
			(.5421)	
Self-monitoring				.9360**
				(.3757)
Growth need strength		-.3130		
		(.4032)		
Job Characteristics x GNS		.5100		
		(.9386)		
Social Environment x Past Experience			-.4580	
			(.5461)	
Social Environment x Self-Monitoring				1.0460**
				(.5059)
R-squared	.3014	.3161	.3252	.4607

** $p < .05$, *** $p < .01$ (two-tailed).

Model 1 in Table 5 shows the results of our analysis using the base model. Both the social environment ($B = .422$, $p < .01$) and job characteristics ($B = .585$, $p < .01$) were significantly related to job satisfaction. H1 and H3 are, therefore, supported. Model 1 suggests that the greater the weighted average satisfaction of an individual's social environment and the more enriched an individual's job, the greater an individual's job satisfaction tends to be. This model explains 30.14% of the variance in individual job satisfaction.

Model 2 shows the results of the interaction between job characteristics and GNS. The social environment continued to demonstrate a significant relationship with job satisfaction ($B = .423$, $p < .01$); however, the characteristics of the job were no longer significant, and GNS did not significantly moderate the relationship between job characteristics and job satisfaction. H2, therefore, is not supported.

Model 3 shows the results of our test of the moderating effect of past experience on the relationship between the social environment and job satisfaction. As posited in H1 and H3, the main effects of both the social environment and job characteristics were significant; however, the interaction between past experience and the social environment was not sig-

Copyright © 2000. All rights reserved.

nificant. This suggests that an individual's past experience with the job does not moderate the influence of the social environment on job satisfaction. Therefore, H4 is not supported. Because the effects of past experience may be nonlinear (Katz, 1978), in analyses not reported here we logged the past experience variables and reran the model. There was no change in the results. Given our small sample size, it is also possible that collinearity among the main effect terms and the interaction term could have masked significant findings. To try and reduce collinearity effects, we calculated z scores for the main effect and interaction variables. Once again, we found no change in our results.

Model 4 shows the moderating effect of self-monitoring upon the social environment. When the Self-Monitoring x Social Environment interaction term was included in the model, both the social environment and job characteristics continued to have significant effects upon job satisfaction ($B = 1.076, p < .01$ and $B = .314, p < .01$, respectively). In addition, both the main effect for self-monitoring ($B = .936, p < .05$) and the interaction between self-monitoring and the social environment ($B = 1.046, p < .05$) had positive and significant coefficients. H5 is, therefore, supported. These results suggest that high self-monitoring individuals, who use social information to judge the appropriateness of their attitudes and behaviors, are influenced by their social environment more than low self-monitors, who pay less attention to the social information they receive. This model also explains significantly more variance (46.07% vs. 30.14%) than the base model.

DISCUSSION

In this study, we attempted to simultaneously test two theories regarding the factors that influence job satisfaction in a real organizational setting. Further, in proposing an integrated model, we responded to the theoretical criticisms leveled against both the job characteristics and the social information processing approaches for being incomplete in their explanatory mechanisms. We also responded to methodological criticisms of both approaches. In the case of job characteristics research, we departed from the common practice of asking respondents for their perceptions of job characteristics by employing a systematic scale to measure the objective characteristics of jobs. In the case of SIP research, we joined others (e.g., Dean & Brass, 1985; Ibarra & Andrews, 1993; Rice & Aydin, 1991; Schmitz & Fulk, 1991) in attempting to respond to the limitations that have plagued previous social information processing research by using social network methodologies and the cohesion model of social contagion to test SIP theory. Even amongst those who have used network methodologies, we

Copyright © 2000. All rights reserved.

moved beyond projections of one's own attitudes onto perceptions of others' attitudes by measuring and using others' actual attitudes in constructing the social environment.

Our findings suggest that, consistent with the job characteristics approach, individuals' job satisfaction was significantly predicted by the objective characteristics of the job. In addition, consistent with SIP, an individual's level of job satisfaction is significantly influenced by the job satisfaction of others with whom the individual interacts.

Our results were also consistent with previous findings (Burkhardt, 1994; Kilduff, 1992) that suggest that the dispositional dimension of self-monitoring moderates the relationship between the social environment and job satisfaction. That is, all individuals are influenced to some degree by their social environments, but those individuals who are high self-monitors and who pay a great deal of attention to the social information they receive are influenced to an even greater degree than those individuals who are low self-monitors. Although not hypothesized, this study also identified a positive main effect of self-monitoring upon job satisfaction. It is possible that high self-monitors place more value on feedback and accomplishment because they feel that individual actions lead to outcomes. They would, therefore, naturally be more satisfied with work, because they are more likely to feel that the outcomes are due to their efforts.

The study failed to identify moderating effects of past experience upon the relationship between an individual's social environment and his or her job satisfaction, and of growth need strength upon the relationship between the characteristics of the job and individual job satisfaction. These findings suggest that, even after controlling for a person's experience with a job, individuals will still be influenced to the same extent by the social environment regarding how they feel about their jobs. These findings also suggest that, when controlling for the effects of the social environment, the degree to which individuals have growth needs (that is, fulfillment and self-actualization from the job) does not moderate the influence of their job characteristics on their job satisfaction. These results are contrary to prior theory and to empirical findings, and future research should attempt to confirm these results.

Katz (1978) has suggested that past experience may interact with the characteristics of the job to influence individual perceptions of the job and job satisfaction. Although this interaction was not hypothesized as part of this study, we tested this interaction. In results not reported here, we did not find a significant interaction.

This study has several limitations that must be taken into consideration. One potential weakness of this study is that the objective measures of job characteristics used in this study have not been validated in previ-

Copyright © 2000. All rights reserved.

ous research. These characteristics were chosen in response to methodological criticisms associated with the job characteristics included in the Hackman-Oldham (1976) model. Our correlational analyses presented in the Method section suggest that the job characteristics used in this study capture all of the conceptual features of the job characteristics articulated by Hackman and Oldham, while addressing some of the methodological criticisms that have been leveled against their model. Nevertheless, in analyses not reported here, we reran our models using the self-report items collected using the Job Diagnostic Survey (Hackman & Oldham, 1976) and found no substantive changes in our results. It is possible that the perceptual measures include enough of the variance captured by the objective measures to yield similar results. Our findings suggest that some of the criticisms leveled against the Hackman-Oldham model may be somewhat overstated.

Second, it is possible that, given our relatively small sample size, collinearity between the interaction variables and the main effect variables inflated the standard errors for the entire model and masked potentially significant relationships. A general lack of variance in GNS may have also masked potentially significant results, although attempts to increase the variance in this measure (not reported here) did not improve the result. Attempts to reduce collinearity in the past experience interaction also proved fruitless. Future research should continue to examine the interactions that may exist between dispositional, experiential, and environmental factors.

Third, although PLS offers a number of advantages, it also has some limitations. Even though we attempted to ensure that our measures were reliable prior to PLS modeling (because PLS does not simultaneously estimate the measurement model and the theoretical model, as do techniques such as LISREL), we were unable to incorporate the unreliability in the measurement model into the estimation of the theoretical model. Some components of the models may, therefore, be over- or underestimated (e.g., Dijkstra, 1983). Also, even though PLS works better than several more widely used structural equation modeling techniques for small samples, its estimation procedures work better with larger samples.

Fourth, only one of our network measures—friendship—was found to have a significant relationship with the social environment latent variable. It is possible that the volume of time spent communicating is not a good proxy for salience and credibility. If a person does not consider or value another individual's opinion on nontask-related issues, this individual may have little impact on the person's overall job satisfaction, even if the two spend considerable time communicating as part of their jobs. It is also possible that, since the respondents were asked about the amount of time they spent communicating with an individual about job-related

Copyright © 2000. All rights reserved.

tasks, rather than about the amount of time they spent communicating in general, an accurate portrayal of the total amount of time spent communicating with an individual, especially outside of the work setting, was not captured. Finally, it is also possible that the effects of time spent communicating are nonlinear. For example, the difference between 5 minutes and 10 minutes may not be the same as the difference between 125 minutes and 130 minutes. In analyses not reported here, we logged the time spent communicating measure to try to take this potential nonlinear affect into account. The results suggested a slightly poorer fit with the latent variable than with the unlogged measure.

Fifth, our operationalization of the social environment only took the influence of coworkers into account. It is possible that the attitudes of friends and family members outside of the PWD could also significantly impact an individual's job satisfaction. Unfortunately, incorporating such individuals into the networks was not possible. In addition, although inclusion of these network individuals may have increased the accuracy in portraying individuals' social environments, our findings suggest that the attitudes of coworkers alone have a significant impact on individuals' levels of job satisfaction. The seriousness of this weakness may, therefore, be somewhat limited.

A sixth weakness, also associated with the operationalization of the social environment, is that our method did not take into account the specific content of what was communicated during the interactions. Rather, we assumed that more or less satisfied individuals would communicate this information to the people with whom they interacted. Our findings suggest that such information was communicated; however, it is also possible that individuals self-selected to associate more with individuals who shared the same, preexisting attitudes. Future longitudinal research should attempt to disentangle these competing explanations, as well as tackle the enormously complex task of collecting data on the content of social information provided in a field setting.

A seventh potential weakness of this study is that it was cross-sectional and did not take into account changes over time in the social context or in individual attitudes. This weakness reflects a weakness of the theories being tested, because they also generally fail to consider the effects of time and change. Data limitations prevented us from performing a longitudinal analysis.

A final potential limitation is that we focused only on the effects of job characteristics and social information upon job satisfaction; we did not consider their effects upon individuals' perceptions of the characteristics of their jobs or their job performance. The time and effort associated with trying to get respondents to rate their jobs using the nine-factor plan (not to mention the political consequences of such an action) limited our abil-

Copyright © 2000. All rights reserved.

ity to collect perceptual data that would be directly comparable to the objective job characteristics measures used. Performance data was also unavailable. It is possible that some of the interactions that did not have an effect on job satisfaction might still influence one or both of these additional outcomes. Future research should continue to examine these possibilities.

This study used the cohesion model of social contagion to operationalize the social environment. A future research direction may be to consider operationalizing the social environment using the structural equivalence model of social contagion (Burt, 1987; Hartman & Johnson, 1989). The positional, or structural equivalence, model suggests that people are considered structurally equivalent to the extent they have identical patterns of social relations with the same individuals, although not necessarily with each other. The more individuals can substitute for one another in their social networks, the more likely they may be to share similar attitudes and beliefs (Burt, 1987). Burkhardt (1994) found stronger support for the moderating effects of self-monitoring on the influence of the social environment with the structural equivalence model than she did with the cohesion model.

This study has significant implications for theory and research. Our results support the basic tenets of social information processing theory and job characteristics theory and show how network theories of social contagion can be used to clarify the processes by which social information influences individual attitudes, such as job satisfaction. A methodological contribution of this study is that it introduces the use of partial least squares as another method for dealing with the problems of small sample size and the lack of independence among observations inherent in all network research of this kind (Ibarra & Andrews, 1993; Wasserman & Faust, 1994). This study also contributes to the growing body of literature (e.g. Dean & Brass, 1985; Ibarra & Andrews, 1993; Rice & Aydin, 1991; Schmitz & Fulk, 1991) that uses social network methodologies to operationalize the social environment and test SIP in real organizational settings.

NOTES

1. See Rice (1994) for a review of the literature in this area.

2. Because of our small sample size, we were concerned that collinearity between the main effect and interaction terms might mask potentially significant results. Transformations to reduce the effects of collinearity did not yield significantly different results than those presented here.

3. Thanks to an anonymous reviewer for suggesting this interpretation.

Copyright © 2000. All rights reserved.

REFERENCES

Adler, S., Skov, R., & Salvemini, S. (1985). Job characteristics and job satisfaction: When cause becomes consequence. *Organizational Behavior and Human Decision Processes, 35*, 266-278.

Argyris, C. (1957). *Personality and organization*. New York: Harper & Row.

Blau, G., & Katerberg, R. (1982). Toward enhancing research with the social information processing approach to job design. *Academy of Management Review, 7*, 543-550.

Burkhardt, M. (1994). Social interaction effects following a technological change: A longitudinal investigation. *Academy of Management Journal, 37*, 869-898.

Burt, R. (1987). Social contagion and innovation: Cohesion versus structural equivalence. *American Journal of Sociology, 92*, 1287-1335.

Chin, W. W. (1994). *PLS-Graph V. 2.91.02.08 Manual*. Unpublished manuscript.

Cohen, J. (1968). Weighted kappa: Nominal scale agreement with provision for scaled disagreement or partial credit. *Psychological Bulletin, 70*, 213-220.

Contractor, N. S., & Eisenberg, E. (1990). Communication networks and new media in organizations. In J. Fulk & C. Steinfield (Eds.), *Organizations and communication technology* (pp. 143-172). Newbury Park, CA: Sage.

Contractor, N. S., Seibold, D. R., & Heller, M. A. (1996). Interactional influence in the structuring of media use in groups: Influence of members' perceptions of group decision support system use. *Human Communication Research, 22*, 451-481.

Dean, J., & Brass, D. (1985). Social interaction and the perception of job characteristics in an organization. *Human Relations, 38*, 571-582.

Dijkstra, T. (1983). Some comments on maxium likelihood and partial least squares methods. *Journal of Econometrics, 22*, 67-90.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*, 114-140.

Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research, 19*, 440-452.

Fornell, C., & Cha, J. (1994). Partial least squares. In R. Bagozzi (Ed.) *Advanced methods of marketing research* (pp. 52-78). Cambridge, UK: Blackwell.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39-50.

Fornell, C., Lorange, P., & Roos, J. (1990). The cooperative venture formation process: A latent variable structural modeling approach. *Management Science, 36*, 1246-1255.

Fried, Y., & Ferris, G. (1987). The validity of the job characteristics model: A review and meta-analysis. *Personnel Psychology, 40*, 287-322.

Fulk, J., Steinfield, C., Schmitz, J., & Power, G. (1987). A social information processing model of media use in organizations. *Communication Research, 14*, 529-552.

Griffin, R. (1983). Objective and social sources of information in task redesign: A field experiment. *Administrative Science Quarterly, 28*, 184-200.

Griffin, R., Bateman, T., Wayne, S., & Head, T. (1987). Objective and social factors as determinants of task perceptions and responses: An integrated perspective and empirical investigation. *Academy of Management Journal, 30*, 501-523.

Hackman, J. R., & Oldham, G. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology, 60*, 159-170.

Hackman, J. R., & Oldham, G. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance, 16*, 250-279.

Hackman, J. R., & Oldham, G. (1980). *Work redesign*. Reading, MA: Addison Wesley.

Hartman, R., & Johnson, J. D. (1989). Social contagion and multiplexity: Communication networks as predictors of commitment and role ambiguity. *Human Communication Research, 15*, 523-548.

Copyright © 2000. All rights reserved.

Head, T. C., Molleston, J. L., Sorenson, P. F., & Gargano, J. (1986). The impact of implementing a quality circles intervention on employee task perceptions. *Group and Organization Studies, 11*, 360-373.

Herzberg, F. (1968). One more time: How do you motivate employees? *Harvard Business Review, 46*, 53-62.

Ibarra, H., & Andrews, S. (1993). Power, social influence, and sense making: Effects of network centrality and proximity on employee perceptions. *Administrative Science Quarterly, 38*, 277-303.

Jex, S., & Spector, P. (1989). The generalizability of social information processing to organizational settings: A summary of two field experiments. *Perceptual and Motor Skills, 69*, 883-893.

Johnson, R. A., & Wichern, D. W. (1992). *Applied Multivariate Analysis* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Judge, T., & Hulin, C. (1993). Job satisfaction as a reflection of disposition: A multiple source causal analysis. *Organizational Behavior and Human Decision Processes, 56*, 388-421.

Katz, R. (1978). Job longevity as a situational factor in job satisfaction. *Administrative Science Quarterly, 23*, 204-223.

Kilduff, M. (1992). The friendship network as a decision-making resource: Dispositional moderators of social influences on organizational choice. *Journal of Personality and Social Psychology, 62*, 168-180.

Kilduff, M., & Regan, D. (1988). What people say and what they do: The differential effects of informational cues and task design. *Organizational Behavior and Human Decision Processes, 41*, 83-97.

Kulik, C., Oldham, G., & Langner, P. (1988). Measurement of job characteristics: Comparison of the original and the revised job diagnostic survey. *Journal of Applied Psychology, 75*, 462-466.

Lennox, R., & Wolfe, R. (1984). Revision of the self-monitoring scale. *Journal of Personality and Social Psychology, 46*, 1349-1364.

Loher, B. T., Noe, R. A., Moeller, N. L., & Fitzgerald, M. P. (1985). A meta-analysis of the relation of job characteristics to job satisfaction. *Journal of Applied Psychology, 70*, 280-289.

Lohmöller, J. (1984). *LVPLS 1.6 program manual: Latent variable path analysis with partial least squares estimation*. Munich, Germany: Hochschule der Bendeswehr.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*, 370-396.

Milkovich, G. T., & Newman, J. M. (1993). *Compensation* (4th ed.). Homewood, IL: Irwin.

Monge, P., & Contractor, N. S. (in press). Emergence of communication networks. In F. Jablin & L. L. Putnam (Eds.), *New handbook of organizational communication*. Newbury Park, CA: Sage.

Moscovici, S. (1976). *Social influence and social change*. London: Academic Press.

Nunnally, J. C. (1978). *Psychometric Theory*. New York: McGraw-Hill.

O'Connor, G. J., & Barrett, G. V. (1980). Informational cues and individual differences as determinants of subjective perceptions of task enrichment. *Academy of Management Journal, 23*, 697-716.

O'Reilly, C., & Caldwell, D. (1979). Informational influence as a determinant of perceived task characteristics and job satisfaction. *Journal of Applied Psychology, 64*, 157-165.

Rice, R. E. (1993). Using network concepts to clarify sources and mechanisms of social influence. In G. Barnett & W. Richards, Jr. (Eds.), *Advances in communication network analysis*. (pp. 43-52). Norwood, CT: Ablex.

Rice, R. E. (1994). Network analysis and computer-mediated communication systems. In S. Wasserman & J. Galaskiewicz (Eds.), *Advances in social network analysis: research in the social and behavioral sciences* (pp.167-203). Newbury Park, CA: Sage.

Copyright © 2000. All rights reserved.

Rice, R., & Aydin, C. (1991). Attitudes toward new organizational technology: Network proximity as a mechanism for social information processing. *Administrative Science Quarterly, 9*, 219-244.

Rice, R., Grant, A., Schmitz, J., & Torobin, J. (1990). Individual and network influences on the adoption and perceived outcomes of electronic messaging. *Social Networks, 12*, 27-55.

Roberts, K., & Glick, W. (1981). The job characteristics approach to task design: A critical review. *Journal of Applied Psychology, 66*, 193-217.

Salancik, G., & Pfeffer, J. (1977). An examination of need-satisfaction models of job attitudes. *Administrative Science Quarterly, 22*, 427-456.

Salancik, G., & Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly, 23*, 224-253.

Schmitz, J., & Fulk, J. (1991). Organizational colleagues, media richness, and electronic mail: A test of the social influence model of technology use. *Communication Research, 18*, 487-523.

Sims, H., Sziliagyi, A., & Keller, R. (1976). The measurement of job characteristics. *Academy of Management Journal, 19*, 195-212.

Smith, P. C., Kendall, L., & Hulin, C. L. (1969). *The measurement of satisfaction in work and retirement*. Chicago: Rand McNally.

Spector, P. (1992). A consideration of the validity and meaning of self-report measures of job conditions. In C. L. Cooper & I. T. Roberson (Eds.), *International review of industrial and organizational psychology (Vol. 7*, pp. 230-260). New York: Wiley.

Staw, B., & Ross, J. (1985). Stability in the midst of change. *Journal of Applied Psychology, 70*, 469-480.

Taber, T., & Taylor, E. (1990). A review and evaluation of the psychometric properties of the job diagnostic survey. *Personnel Psychology, 43*, 467-500.

Thomas, J., & Griffin, R. (1983). The social information processing model of task design: A review of the literature. *Academy of Management Review, 8*, 672-682.

Vance, R., & Biddle, T. (1985). Task experience and social cues: Interactive effects on attitudinal reactions. *Organizational Behavior and Human Decision Processes, 35*, 252-265.

Vroom, V. (1964). *Work and motivation*. New York: Wiley.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. New York: Cambridge University Press.

Weick, K. (1979). Organizations in the laboratory. In R. Mowday & R. Steers. (Eds.), *Research in organizations: Issues and controversies* (pp. 164-197). Santa Monica, CA: Goodyear.

White, S. E., & Mitchell, T. M. (1979). Job enrichment versus social cues: A comparison and competitive test. *Journal of Applied Psychology, 64*, 1-9.

Wold, H. (1966). Nonlinear estimation by iterative least squares procedures. In F. N. David (Ed.), *Festschrift for J. Neyman: Research papers in statistics* (pp. 411-444). London: Wiley.

Wold, H. (1985). Partial least squares. In S. Kotz & N. L. Johnson (Eds.), *Encyclopedia of statistical sciences (Vol. 6*, pp. 587-599). New York: Wiley.

Zalesny, M. D., & Ford, J. K. (1990). Extending the social information processing perspective: New links to attitudes, behaviors, and perceptions. *Organizational Behavior and Human Decision Processes, 47*, 205-246.

Copyright © 2000. All rights reserved.