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RESEARCH ARTICLE

ONE ROAD TO TURNOVER: AN EXAMINATION OF WORK EXHAUSTION IN TECHNOLOGY PROFESSIONALS[1]

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Abstract

The concept of work exhaustion (or job burnout) from the management and psychology research literature is examined in the context of technology professionals. Data were collected from 270 IT professionals and managers in various industries across the United States. Through structural equation modeling, work exhaustion was shown to partially mediate the effects of workplace factors on turnover intention. In addition, the results of the study revealed that: (1) technology professionals experiencing higher levels of exhaustion reported higher intentions to leave the job and, (2) of the variables expected to influence exhaustion (work overload, role ambiguity and conflict, lack of autonomy and lack of rewards), work overload was the strongest contributor to exhaustion in the technology workers. Moreover, exhausted IT professionals identified insufficient staff and resources as a primary cause of work overload and exhaustion. Implications for practice and future research are discussed.

Keywords: Burnout, exhaustion, IS professionals, IT professionals, staffing, technology professionals, turnover, work overload

ISRL Categories: AF0403, EH02, EH0202, EH0204, EL, EL10

Introduction

As organizational utilization of (and dependence on) information systems and technology continues to grow, the ability of an organization to retain valuable technology staff is likely to become a critical factor in the attainment of strategic goals. Furthermore, although the need for technology professionals is expanding, a corresponding growth in the supply of IT talent has not emerged (Department of Commerce 1997; Garner and Weldon 1998; Information Technology Association of America 1998). The supply-demand gap in the IT labor market compounds staffing problems, as technology professionals not satisfied in current positions are likely to find alternative employment

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opportunities plentiful. Hence, the effective management of IT professionals (i.e., management that contributes to the retention of valued technology workers, as well as contributing to the optimization of their job performance) is an area of increasing concern.

Many factors, some related to the work environment and some related to the individual, influence an employee's commitment to the organization and satisfaction with his or her job. One particularly powerful factor that prior research has repeatedly shown to be significantly correlated to the job attitudes of interest (namely, organizational commitment, job satisfaction, and turnover intention) is work exhaustion, or job burnout. The research literature in IS and the popular press suggest that technology professionals are particularly vulnerable to work exhaustion (e.g., Kalimo and Toppinen 1995; McGee 1996).

As a potentially significant road to turnover among technology personnel, work exhaustion in the IT environment was examined in the present study. Specifically, technology professionals were surveyed to address two research objectives: (1) to confirm that turnover intention is significantly higher in technology professionals experiencing exhaustion than in non-exhausted counterparts and (2) to gain insights into the primary cause of exhaustion for technology professionals.

The article begins by reviewing the concept of work exhaustion, its antecedents and consequences, and its applicability to the IT environment. Next, the research design and methods employed in the present study are described. Then, results of the data analyses conducted to address the research objectives are presented and implications are drawn for research and practice.

The Work Exhaustion Concept

In the research literature, the phenomenon of work exhaustion was originally encompassed by the construct of "tedium." Tedium is defined as a state of physical, emotional, and mental exhaustion caused by long-term involvement in demanding situations (Pines et al. 1981). The suggestion is that tedium is the result of having too many negative and too few positive features in one's environment—that is, too many pressures, conflicts, and demands combined with too few rewards, acknowledgments, and successes (Kanner et al. 1978). Although one may be able to stay in a demanding situation when one feels valued and appreciated, most people will develop tedium (or exhaustion) when their life imposes much more stress than support (Pines et al. 1981).

A stream of research on "job burnout" has focused on the emotional exhaustion component of tedium (e.g., Gaines and Jermier 1983; Jackson et al. 1986; Saxton et al. 1991). Job burnout has been defined as the result of constant or repeated emotional pressure associated with an intense involvement with people over long periods of time (Pines et al. 1981). As such, the term job burnout in the research literature has come to be associated with the emotional exhaustion experienced by people in human service professions, primarily health care, social services, criminal justice, and education (Kilpatrick 1989).[2]

The operational definition most widely used in job burnout research is the three-component model developed by Maslach and Jackson (1981, 1986). They define job burnout as a psychological syndrome of emotional exhaustion, depersonalization (negative, callous, or excessively detached behavior toward others), and diminished personal accomplishment that can occur among individuals who work in human service. Except for the early work of Pines et al. (1981), nearly all work exhaustion research has utilized the Maslach and Jackson conceptualization and, consequently, has focused on emotional exhaustion in human service work.

In a review of job burnout research, efforts to generalize job burnout to corporate and industrial

[2]In laymen's terminology, "job burnout" and "work exhaustion" can be used interchangeably. In the research literature, however, the term job burnout has become more narrowly defined, as it specifically deals with the emotional dimension of exhaustion and (by definition) is caused by intense involvement with people.

settings were encouraged (Cordes and Dougherty 1993). A revised conceptualization of burnout (recently developed by Schaufeli et al. 1995) facilitates such efforts. The revised conceptualization is intended to apply to a wide range of occupations, not just human service professions in which workers spend much time dealing with people. It was inspired by the Maslach and Jackson (1981) model and, similarly, consists of three components: exhaustion, cynicism (defined as a mental distancing from one's work), and decreased professional self-efficacy. The primary component, exhaustion, is defined as the depletion of mental resources (Schaufeli et al. 1995).

The measurement scale for the exhaustion construct was developed by modifying items from Maslach and Jackson's (1981) emotional exhaustion scale to encompass mental and physical as well as emotional exhaustion, and to eliminate references to people as the source of exhaustion (Leiter and Schaufeli 1996). For example, the item "Working with people all day is really a strain for me" from the Maslach and Jackson scale became "Working all day is really a strain for me" in the Schaufeli et al. scale.

The present study focuses on work exhaustion in technology professionals and, hence, uses the Schaufeli et al. conceptualization and measure of exhaustion.[3] To more clearly denote the workplace focus of the Schaufeli et al. exhaustion concept, the present article uses the term "work exhaustion" in referring to this construct.

Antecedents and Consequences of Work Exhaustion

Antecedents and consequences of exhaustion have been identified through empirical efforts of burnout and tedium researchers. Antecedents to exhaustion receiving consistent empirical support include work overload (e.g., Jackson et al. 1986, 1987; Lieter 1991; Pines et al. 1981); role conflict and role ambiguity (e.g., Burke and Greenglass 1995; Fimian and Blanton 1987; Jackson et al. 1986; Pines et al. 1981; Sethi et al. 1999); lack of autonomy (e.g., Jackson et al. 1986; Landsbergis 1988; Pines et al. 1981); and lack of rewards (e.g., Jackson et al. 1986; Pines et al. 1981).

Consequences of exhaustion that have received consistent empirical support include reduced job satisfaction (e.g., Burke and Greenglass 1995; Maslach and Jackson 1984a; Pines et al. 1981; Wolpin et al. 1991); reduced organizational commitment (e.g., Jackson et al. 1987; Leiter 1991; Sethi et al. 1999; Thomas and Williams 1995); and higher turnover and turnover intention (e.g., Firth and Britton 1989; Jackson et al. 1986, 1987; Pines et al. 1981). In addition to the support provided by individual studies, a recent meta-analysis of correlates to the emotional exhaustion dimension of job burnout provided strong support for the antecedents of role conflict and work overload and the consequences of increased turnover intention and reduced organizational commitment (Lee and Ashforth 1996).

For each antecedent and consequence, the studies identified in the previous paragraphs include at least one longitudinal study providing evidence of causal direction. It should be noted that the general measure of work exhaustion (the exhaustion scale developed by Schaufeli et al.) is relatively new and, thus, the antecedent-consequence framework was not empirically established using that measure. Rather, all of the studies cited used the Maslach and Jackson (1981) measure of emotional exhaustion, with the exception of the Pines et al. study that used the measure for tedium (defined as physical, emotional, and mental exhaustion caused by long-term involvement in demanding situations). Because items comprising the Schaufeli et al. work exhaustion scale were based on items in the Maslach and Jackson scale, and because the aforementioned antecedents and consequences (except for organizational commitment) are supported by the work of Pines and her colleagues using a more general measure, the nomological net is expected to generally hold for the newer work exhaustion construct. Indeed, preliminary data provide support for the relationship of work exhaustion (as

[3]The other elements of the Schaufeli et al. conceptualization (cynicism and decreased professional self-efficacy) are viewed as potential consequences of work exhaustion (Moore 2000) and not relevant to the focus of the present study.

measured by Schaufeli et al.) to work overload, role conflict, role ambiguity, job satisfaction, organizational commitment, and turnover intention (Leiter and Robichaud 1995; Leiter and Schaufeli 1996; Schaufeli et al. 1995).

Although individual differences may also influence the occurrence of work exhaustion, research has shown job factors to be the key predictors (Maslach and Schaufeli 1993). This view is shared by Cherniss (1993), who noted that most of the research to date suggests that adverse organizational conditions are more significant in the etiology of job burnout than are personality factors. Further, Hallsten (1993) asserts that without organizational problems, burnout is unlikely to occur for professionals.

Work Exhaustion in the IT Environment

Although exhaustion can occur in various work environments, the popular press and the research literature suggest that technology professionals are particularly vulnerable. A special report on burnout in *InformationWeek* (McGee 1996) proposed that virtual office technology (e.g., home PCs and laptops with modems, faxes, beepers, and cellular phones) and a greater-than-ever demand to keep up with changes in technology contribute to a problem of burnout among technology professionals.

Another IT periodical (Fischer 1998) recently reported results of a survey of 1,180 networking professionals in which 94% of respondents indicated they work in deadline or crisis mode at least some of the time (12% indicated "always," 50% "often," 32% "sometimes," 6% "rarely," and 0% "never"). In addition, 84% of the respondents reported that they bring work home or work nights and weekends at least some of the time (15% indicated "always," 39% "often," 30% "sometimes," 14% "rarely," and 2% "never"). One network administrator provided a vivid illustration of his work environment: "I've tried to get my boss to change deadlines... [but] it doesn't work. I go in to talk and end up getting two or three more jobs, without ever resolving the original issue" (Fischer 1998, p. 59).

Moreover, IT workers are expected to keep technologies working and computer applications functioning around the clock in organizations. Workers can be on call 24 hours a day, seven days a week. The *InformationWeek* article quotes a systems programmer describing his work situation:

> You're expected to keep your beeper on and make yourself available on weekends in case there's a problem....Even when you're going on vacation, the boss will say, 'Leave us your number in case something comes up.' (McGee 1996)

Technology is so widespread and vitally important in organizations that an IT professional providing technical support can feel overwhelmed by demands. A systems administrator, interviewed in the *InformationWeek* article, noted: "I can't even go into the ladies' room without someone asking me about their printer."

In addition to reports in the practitioner press, IS researchers examining the work environment of technology professionals have found evidence of antecedents to exhaustion. Numerous studies have reported evidence of work overload, role ambiguity, and role conflict (e.g., Bostrom 1981; Goldstein and Rockart 1984; Ivancevich et al. 1983; Li and Shani 1991; Sethi et al. 1999; Weiss 1983). It has been suggested that IS professionals in many organizations are continually asked to take on impossible workloads and deadlines (Bartol and Martin 1982). Indeed, work overload and insufficient time to complete work have been reported as common occurrences in the work environments of IS professionals (Ivancevich et al. 1983). Further evidence is found in a field study of 109 IS managers in which work overload was reported to be the major source of perceived work stress, followed by role conflict and role ambiguity (Li and Shani 1991).

A contributing factor to the occurrence of role conflict and role ambiguity appears to be the boundary spanning activities often required of technology professionals. One study found that significant variance in role conflict was explained by the degree to which IS personnel were involved in boundary spanning roles (Baroudi 1985).

Similarly, another study reported a significant relationship between boundary spanning activities and role ambiguity (Guimaraes and Igbaria 1992).

IS researchers also report that technology professionals experience symptoms commonly associated with work exhaustion. Stress-related symptoms reported by IS managers include feeling restless and unable to concentrate, feeling irritable and tense, feeling tired and having low energy (Weiss 1983). In preliminary data on 69 professionals who had worked in IS for at least 20 years and were currently holding expert or manager positions in IS, it was found that approximately one-fourth of the subjects: felt used up at the end of the work day, felt fatigued when they got up in the morning to face another day on the job, and felt they were working too hard on their job (Kalimo and Toppinen 1995).

In summary, the IS research literature, coupled with informal surveys and anecdotal evidence from the practitioner press, provides strong evidence that antecedents to exhaustion are present in the work environments of technology professionals. Furthermore, the practitioner literature and IS research provide evidence of technology professionals experiencing symptoms commonly associated with exhaustion. For these reasons, work exhaustion is believed to be occurring among IT professionals. Given the correlation between exhaustion and turnover evidenced in the management literature, work exhaustion in technology professionals is particularly worthy of investigation because it may be contributing to increased turnover among these workers.

The Research Model and Hypotheses

A conceptual model of work exhaustion and turnover intention, drawn from the management and psychology research base, is presented in Figure 1. To properly investigate the relationships posited in the model, control variables associated with turnover intention, and with perceptual studies in general, must be considered and incorporated. Researchers are generally advised to control for negative affectivity (an individual difference factor) when both independent and dependent variables are the same person's perceptions or attitudes (Watson et al. 1987). Even more specifically, researchers have been advised to control for this factor in studies involving relations between self-reports of stressors and strains (Burke et al. 1993). Negative affectivity is a mood-dispositional factor and individuals high in negative affectivity (as contrasted to those low in this factor) are more likely to experience dissatisfaction with themselves and their lives (Watson and Clark 1984). Hence, negative affectivity is measured and statistically controlled in the present study.

The management literature also identifies two demographic factors that tend to correlate with the outcome variable of turnover intention. Age and organizational tenure have shown consistent association (in a negative direction) with voluntary turnover (Mobley et al. 1979; Porter and Steers 1973; Price 1977). Although personal factors tend not to act alone in the prediction of work exhaustion, age has also shown a significant inverse correlation with exhaustion in a few studies (e.g., Maslach and Jackson 1984b; Schwab and Iwanicki 1982). Accordingly, organizational tenure and age are assessed and statistically controlled.

To achieve the objectives of the present study, hypotheses are drawn from the model (Figure 1) and tested. Based on prior research involving non-IT workers (e.g., Firth and Britton 1989; Jackson et al. 1986, 1987; Pines et al. 1981), IT professionals experiencing work exhaustion are expected to report a higher propensity to leave the job. It has been suggested that the first thing most people consider when they encounter work exhaustion is changing jobs (Leatz and Stolar 1993). They look around their present organization to see if there is something else they could do that would get them away from the demands of their current job. If nothing surfaces, they look for a position with a different organization. Accordingly, the following hypothesis is extended to address the first research objective.

H1: Technology professionals experiencing higher levels of work exhaustion report higher intentions for turnover.

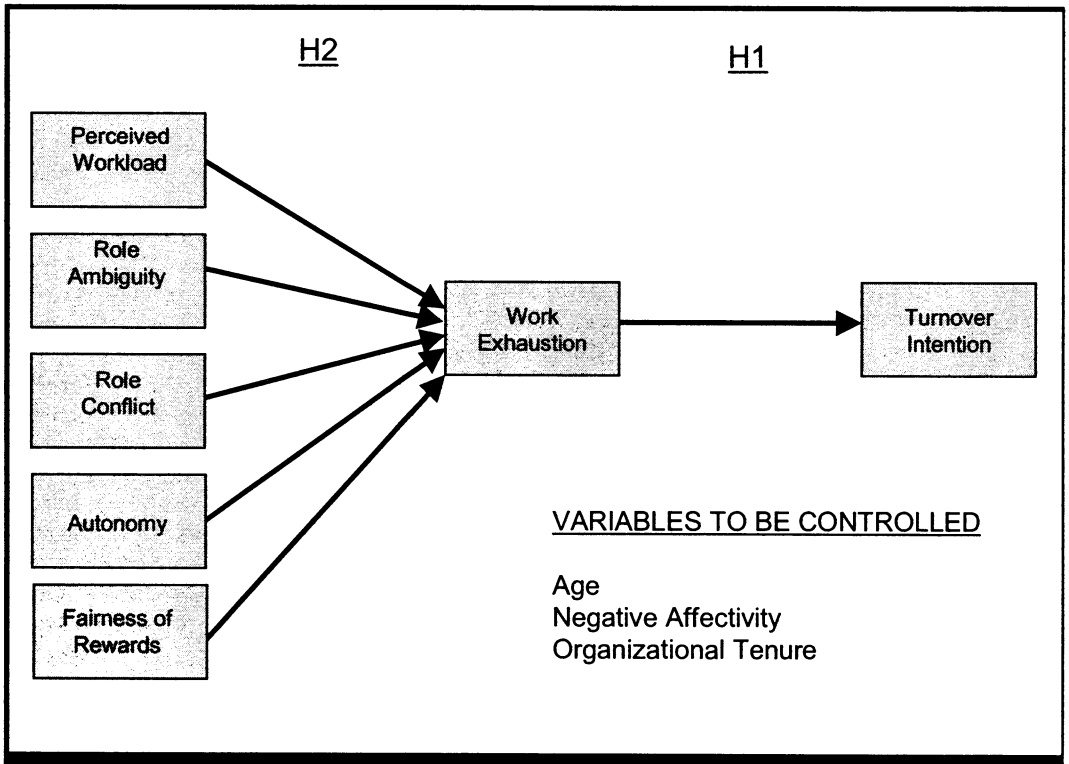

Figure 1. Original (Full-Mediation) Conceptual Model

The second objective of the study involves determining which of the workplace factors commonly identified as antecedents to exhaustion is the strongest contributor to exhaustion in technology professionals. Lack of autonomy and lack of fair rewards can occur in the work environments of IT professionals, but consistent reports of such elements are not present in the literature. In fact, researchers have reported evidence of fairly high autonomy in IS jobs (e.g., Cougar and Zawacki 1980; Ferratt and Short 1988; Goldstein 1989). Role ambiguity and conflict have been reported in the IT environment (e.g., Goldstein and Rockart 1984; Li and Shani 1991) and are likely to contribute to exhaustion. Work overload, however, appears to be somewhat of a recurring theme in the IS literature and is therefore expected to be the strongest contributor to work exhaustion in technology professionals. For example, in the 1980s, studies reported that unreasonable workloads and deadlines were commonly imposed on IS professionals (Bartol and Martin 1982; Ivancevich et al. 1983). In the 1990s, other studies provided evidence of work overload and frequent work in deadline and crisis mode among IT professionals (Fischer 1998; Li and Shen 1993). Accordingly, the following hypothesis is extended to address the second research objective.

H2: Relative to other workplace contributors to work exhaustion identified in the research literature (role ambiguity, role conflict, lack of autonomy, lack of rewards), work overload is the strongest contributor to work exhaustion in technology professionals.

Methods

To address the objectives of the present study and provide data for hypothesis testing, survey instruments were mailed to a sample of technology professionals. Both quantitative and qualita-

tive methods are utilized in the analysis of data collected. Structural equation modeling is employed to examine the general fit of the proposed model and to test hypotheses H1 and H2. To complement the quantitative results from the test of hypothesis H2, a qualitative analysis of responses to an open-ended question regarding the cause of exhaustion is also undertaken.

Details regarding the specific research methods employed are provided in the following sections. First, the sampling method is described and a discussion of the data collection procedures is provided. Next, specific measures used to assess the variables are identified and scale reliability and validity data are reported. This is followed by the presentation of response statistics associated with the mailed survey.

Sampling

A random sample was drawn from the member list of a professional organization, the Association for Information Technology Professionals (AITP, formerly known as DPMA). AITP was founded in 1951 and has more than 8,500 members throughout the United States and Canada (although the sampling for the present study was limited to members residing in the United States). Individuals in all facets of IS belong to AITP, including managers, programmers, and systems designers.

A random sample of 5,000 mailing labels was generated from the AITP membership database. This random sample included residents of 48 states and the District of Columbia (Alaska and Vermont were not represented). From the sheets of mailing labels, approximately every second or third label was used to establish a sample of 1,975 AITP members to receive the mailing. The mailings to AITP members included an additional copy of the survey to be passed on to another IT professional (not necessarily an AITP member). In this manner, participation was not limited to members of AITP.

Data Collection

Data were collected from the sample via a two-phased survey. Two instruments (Instrument 1 and Instrument 2) were administered at different points in time to reduce the likelihood of self-report method effects (Podsakoff and Organ 1986).[4] Instrument 1 assessed antecedents to work exhaustion (perceived workload, role ambiguity, role conflict, and autonomy) and also contained the open-ended question regarding the cause of exhaustion. Instrument 2, mailed to participants within two weeks of the completion of the first survey, measured turnover intention and fairness of rewards. The work exhaustion measure was included on both instruments. The two demographic control variables were collected on Instrument 1 and negative affectivity was assessed on Instrument 2.

The cover letter guaranteed confidentiality and stated "no individual information will be released to anyone." The surveys were mailed from the researcher's university address and were returned by participants using envelopes pre-addressed to the researcher at her university address.

The instruments and associated cover letters made no reference to work exhaustion or job burnout. Rather, the general purpose of the study was stated as "the examination of work conditions of IS professionals (the positives and the negatives) in today's fast-changing, competitive environment." The terms work exhaustion and burnout were avoided to minimize the occurrence of experimental bias.

Measures

The scale items for the variables are provided in Appendix A. Existing, established scales were used in measuring all of the constructs. Exhaustion was assessed by the five-item work exhaustion subscale of the General Burnout Questionnaire (Schaufeli et al. 1995). Turnover intention was assessed using a four-item scale based on Jackson et al. (1987) and Mitchel (1981). Perceived workload was measured by a four-item

[4]In addition to collecting variables at different points in time to minimize common method effects, Harman's one-factor statistical test was applied to the data to examine the likelihood that common method variance accounts for the majority of covariance in the variables. The results of the test are reported later under "Preliminary Statistics."

Table 1. Scale Reliabilities

Scale	Number of Items	Alpha	n
Autonomy	5	.82	324
Fairness of Rewards	2	.81	268
Negative Affectivity	10	.86	261
Perceived Workload	4	.80	328
Role Ambiguity	6	.83	328
Role Conflict	8	.80	320
Turnover Intention	4	.92	269
Work Exhaustion[a]	5	.88	270

[a]Work exhaustion assessed by Instrument 2.

scale that Kirmeyer and Dougherty (1988) adapted from research by Caplan et al. (1975) (1975) and Kahn et al. (1964). Role conflict and role ambiguity were assessed using the scales developed by Rizzo et al. (1970). Autonomy was assessed by a five-item participation scale used by Mohr (1971) and Hrebiniak (1974). The Watson et al. (1988) PANAS scale was used to assess the individual difference variable of negative affectivity. The items used to assess fairness of rewards were drawn from Niehoff and Moorman's (1993) distributive justice scale. Two of the five items comprising the distributive justice scale specifically address fairness of rewards and, hence, were used to assess fairness of rewards in the present study. The two items are: "I think that my level of pay is fair" and "Overall, the rewards I receive here are quite fair."

Internal consistency reliabilities (Cronbach coefficient alpha) for the scales are reported in Table 1. All of the measurement scales exhibited high reliability (alpha .80 or higher).

A factor analysis was conducted to confirm the validity of the scales, and the results are provided in Table 2. Items from the autonomy, fairness of rewards, perceived workload, role ambiguity, role conflict, turnover intention, and work exhaustion scales were entered into the factor analysis and seven factors were forced. As reflected in Table 2, the factors emerged cleanly and each had an eigenvalue greater than 1.0. Of the 34 items, only one cross-loaded to a different scale; a role conflict item had a loading of .43 on the role conflict factor and also possessed a loading of .60 on the perceived workload scale. This item, which is part of the traditional role conflict scale ("I receive an assignment without the manpower to complete it"), does appear to overlap the domain of the perceived workload construct. However, because the domain and validity of the role conflict scale has been strongly established in the management literature, the item was retained in the role conflict measure.

Response Statistics

Instrument 1 was mailed to the random sample of 1,975 AITP members. Sixteen surveys could not be delivered to the intended recipient (they were returned by the U.S. Postal Service or by the company with a note that the addressee no longer worked there). Of the 1,959 surveys that were presumed to be successfully delivered to AITP members, 215 were completed and returned for a response rate of 11%. Of the 215, one was not used because the respondent indicated that he was currently retired from work.

Each mailing to an AITP member also included a copy of the instrument to be passed on to another technology professional. Of the 1,959 "hand-off" surveys, eight were known to not be handed off successfully (i.e., they were returned not completed or there were indications that the AITP member completed both copies of the survey). Of

Table 2. Confirmatory Factor Analysis Results

Method: Principal Components, Varimax Rotation, Forcing Seven Factors
Rotated Factor Matrix (Converged in 11 Iterations):

Item	Factor 1 (RA)	Factor 2 (TOI)	Factor 3 (PWL)	Factor 4 (WE)	Factor 5 (AUT)	Factor 6 (RC)	Factor 7 (REW)
RA5	.774*	-.119	-.050	-.130	.226	-.191	-.111
RA4	.756*	-.143	-.039	-.172	.249	-.061	.004
RA2	.699*	-.051	-.115	-.108	.222	-.214	-.013
RA1	.680*	-.147	-.060	-.032	.266	-.016	.115
RA6	.614*	-.119	-.116	-.078	.139	-.256	-.222
RA3	.528*	.011	-.170	-.282	-.035	.024	-.191
TOI4	-.112	.870*	.029	.142	-.152	.076	.220
TOI2	-.155	.862*	-.001	.134	-.124	.077	.207
TOI1	-.119	.855*	-.014	.106	-.158	.052	.037
TOI3	-.067	.815*	.090	.073	-.120	.066	.008
PWL3	-.075	.091	.839*	.129	.055	-.002	-.081
PWL4	-.178	.125	.786*	.272	-.014	.069	-.130
PWL1	-.012	-.114	.643*	.165	-.136	.186	.341
PWL2	-.083	-.047	.629*	.158	-.084	.261	.246
WE5	-.094	.072	.009	.753*	-.086	.136	.114
WE4	-.268	.206	.292	.733*	-.159	.108	.064
WE3	-.193	.159	.168	.726*	-.168	.142	.097
WE1	-.159	.117	.511	.654*	-.108	.052	-.084
WE2	-.066	.081	.460	.628*	-.120	.153	.025
AUT4	.185	-.082	.033	-.251	.745*	-.056	-.148
AUT3	.233	-.044	-.013	-.561	.736*	-.060	-.191
AUT2	.375	-.135	-.127	-.108	.665*	.058	-.148
AUT5	.135	-.205	-.184	.017	.640*	.069	.074
AUT1	.177	-.188	.045	-.012	.600*	-.228	.041
RC6	-.044	.044	.077	.134	-.013	.709*	-.220
RC3	-.095	.219	.082	.038	-.344	.563*	.012
RC5	-.223	.044	.372	.063	-.022	.551*	.093
RC4	-.050	-.012	.099	.069	.194	.527*	.183
RC7	-.268	.014	.407	.026	-.100	.494*	.391
RC1	-.158	.068	.025	.261	-.365	.480*	.121
RC8	-.265	.148	.083	.317	-.176	.441*	.210
RC2	-.088	.024	.596*	.049	-.098	.429	.366
REW1	.084	-.351	-.080	-.096	.082	-.059	-.693*
REW2	.182	-.413	-.151	-.172	.204	-.104	-.619*

Factor	Eigenvalue	% of Variance	Cumulative %
Facor 1 (RA)	9.986	29.37	29.37
Factor 2 (TOI)	3.419	10.06	39.43
Factor 3 (PWL)	2.395	7.04	46.47
Factor 4 (WE)	1.861	5.47	51.94
Factor 5 (AUT)	1.398	4.11	56.05
Factor 6 (RC)	1.348	3.96	60.02
Factor 7 (REW)	1.143	3.36	63.38

Table 3. Number of Participants per Organization*	
Number of Participants	**Number of Organizations with this Number of Participants**
Companies with 1 participant	213
Companies with 2 participants	39
Companies with 3 participants	2
Companies with 4 participants	2
Companies with 6 participants	2
Companies with 11 participants	1

*Three participants did not indicate their employing organization.

the 1,951 surveys that were presumed to be successfully handed off, 117 were completed and returned for a response rate of 6%. Because recipients who did not complete the survey were also unlikely to hand off the additional survey, an alternative estimate of the response rate for the "hand-off" surveys would be 54.4% (or 117/215).

Instrument 2 was mailed to the 331 subjects who completed Instrument 1. Although most participants completed and returned Instrument 2 in a timely manner, 85 follow-up letters were sent. In the end, 270 of the 331 subjects completed and returned Instrument 2 for a subject retention rate of 81.6%.

Chi-square and ANOVA tests (on data collected in Instrument 1) showed that participants who completed Instrument 2 did not differ significantly ($p < .05$) from participants who dropped out of the study and did not complete the second instrument on characteristics of age, marital status, job classification, organizational rank, or years in IS/IT at their current organization. However, the distribution of gender in the two groups was significantly different (Pearson $X^2 = 4.57$, df = 1, $p < .03$). Of the 61 subjects who dropped out of the study after completing Instrument 1, 19.67% were female and 80.33% were male. Of the 270 subjects who did not drop out, 33.70% were female and 66.30% were male. In other words, the retention rate for female subjects (91/103 = 88.35%) was significantly higher than the retention rate for males (179/228 = 78.51%) in this study.

In the sample of 331 participants, 259 companies were represented. Of those companies, the large majority (213) had a single participant in the study. The organization with the most participants was a large insurance company that was represented by 11 subjects. The number of companies having various numbers of participants is summarized in Table 3.

Results

Preliminary Statistics

Of the 331 participants, 270 at least partially completed both survey instruments. Of those 270 subjects, 18 did not complete scales related to one or more of the variables in the present study. Those subjects were left out of the remaining statistical analyses, resulting in a sample of 252 participants to test the fit of the model and hypotheses H1 and H2.

Means, standard deviations, and correlations for the independent, dependent, and control variables are provided in Table 4. The average participant in the study was almost 45 years in age and had been employed by the current organization for about 11 years. Additional demographic data collected indicated that the average participant had been in IS in the organization for about 10 years and had been in his or her current job for almost nine years. Of the participants responding, 69% were male, 76% were married, 53% had children living at home, 67% were AITP members, and 75% possessed a bachelor's (or higher) degree. Technology professionals in a wide variety of industries were represented in the sample.

Table 4. Descriptive Statistics for Study Variables[a]

			Correlations								
Variable	*Mean*	*s.d.*	AGE	AUT	REW	NA	OT	PWL	RA	RC	TOI	WE
AGE	44.64	9.15	1.0									
AUT	5.06	1.38	.01	1.0								
REW	4.83	1.62	.07	.34**	1.0							
NA	1.65	0.51	-.02	-.27**	-.20**	1.0						
OT	11.49	8.53	.40**	.08	.18**	-.03	1.0					
PWL	4.79	1.29	-.11	-.20**	-.27**	.31**	-.08	1.0				
RA	4.91	1.25	.08	.56**	.33**	-.35**	.13*	-.31**	1.0			
RC	4.36	1.15	-.03	-.38**	-.40**	.30**	-.01	.53**	-.50**	1.0		
TOI	2.42	1.25	-.11	-.38**	-.48**	.22**	-.26**	.13*	-.32**	.29**	1.0	
WE[b]	2.43	1.25	-.20**	-.34**	-.36**	.54**	-.10	.43**	-.42**	.38**	.38**	1.0

[a] $n = 252$

[b] Work exhaustion score collected on Instrument 2

*$p < .05$

**$p < .01$

To provide a level of assurance that common method is not a likely explanation for relationships found in the present study, Harman's one-factor statistical test was performed (Podsakoff and Organ 1986). An exploratory factor analysis was conducted on the scale items used to assess the seven independent and dependent variables examined in the present study. A total of 34 items were entered into the analysis, and eight factors emerged possessing an eigenvalue greater than 1.0. The first factor in the unrotated solution was made up of various items from the exhaustion, autonomy, role ambiguity, role conflict, and reward scales. Some of those items also cross-loaded strongly on subsequent factors. Additional items from the role conflict and reward scales loaded most highly on factors other than this first one, and the scale items for turnover intention and perceived workload tended to load on subsequent factors. Hence, the results of this test indicate that the items used to assess the independent and dependent variables in the present study tended not to load on a single general factor.

Tests of Model Fit and Hypotheses

To assess the fit of the structural model to data obtained from the present sample of technology professionals, structural equation modeling using the maximum likelihood estimation method is employed (specifically, version 3.61 of the Amos software package was used). In the statistical model, the control variables are incorporated in accordance with their correlations to work exhaustion and turnover intention. Negative affectivity is significantly correlated with both exhaustion and turnover intention in the present sample (see Table 4) and, hence, these two paths are included in the model. Age is significantly correlated with work exhaustion and organizational tenure is significantly correlated with turnover intention, so those two paths are also specified in the model.

The measures for age and organizational tenure are single-item self-report measures and are assumed to perfectly assess the underlying constructs. The full measurement models for the endogenous latent constructs (work exhaustion and turnover intention) are included in the statistical model. Following prior practice (Miller et al. 1988; Sabherwal 1999), measures for negative affectivity and the antecedent variables (perceived workload, role ambiguity, role conflict, autonomy, and fairness of rewards) are entered as scale scores. Reliability estimates and associated error variances for the scale scores are specified in the model. In this manner, we maintain what has

been considered to reflect the meaning of each of these latent exogenous constructs (Hair et al. 1995). Researchers have suggested that the use of individual scale items may be more appropriate for exploratory data-reduction analyses than for tests of structural models (Schumaker and Lomax 1996). Furthermore, the inclusion of individual scale items would increase the degrees of freedom and may interfere with assessments of model fit (Schumaker and Lomax 1996).

Therefore, in the statistical model, the coefficients for paths from the five antecedent constructs and negative affectivity to their respective measurement variables are set to the square-root of the estimated reliability (reflected in Table 1). In addition, the error variance for each of those measures is specified in the statistical model as the variance multiplied by (1 – estimated reliability). The coefficients for paths from the two remaining control variables (age and organizational tenure) to their measures are set to 1.0 to reflect perfect measures. Further, to set a unit of measurement for each of the endogenous latent constructs, a path coefficient to a measurement variable is set to 1.0; for work exhaustion the path coefficient to the WE5 scale item is constrained, and for turnover intention the path coefficient to TOI4 is constrained. Finally, the path coefficients for the error terms associated with the endogenous latent variables and their measures are set to 1.0.

The conceptual model (reflected in Figure 1) implies that work exhaustion fully mediates the effects of the workplace factors on turnover intention. For example, no significant direct effect of perceived fairness of rewards on turnover intention is anticipated. Although the model is based on prior research (Durup and Leiter 1995; Koeske and Koeske 1989), it is conceivable that work exhaustion does not fully mediate the effects of the workplace variables on turnover intention. Rather, work exhaustion may partially mediate those effects. Therefore, in addition to assessing the general goodness of fit of the model in Figure 1 (reflecting full mediation), the fit of the model is compared to the fit of a partial-mediation model. The alternative partial-mediation model is shown in Figure 2. The only difference between the alternative model and the original model is that the alternative partial-mediation model includes five additional paths, from the antecedent variables to turnover intention.

Results of Model Fit Tests

Fitting the original full-mediation model to the sample data resulted in a X^2 value of 255.12 (df = 89, $p < .01$), a X^2/df ratio of 2.87, a GFI (goodness-of-fit index) value of .89, and a RMSEA (root-mean-square error of approximation) of .09. The model explains 57% of the variance in work exhaustion and 26% of the variance in turnover intention. The path coefficients and a summary of fit index values are provided in Table 5. Although the X^2/df ratio satisfies the requirement of being less than 3.0 (Carmines and McIver 1981), the X^2, GFI, and RMSEA values suggest the model can be improved. Accordingly, a test of the alternative partial-mediation model is undertaken.

Fitting the alternative partial-mediation model to the sample data resulted in a X^2 of 197.61 (df = 84, $p < .01$), a X^2/df ratio of 2.35, a GFI of .92, and a RMSEA of .07. The model explains 56% of the variance in work exhaustion and 45% of the variance in turnover intention. The path coefficients and a summary of fit index values are provided in the right-most columns of Table 5. The significant jump in variance explained in turnover intention, the decrease in X^2 and the X^2/df ratio, fit index (GFI, IFI, CFI) values above .90 (Bentler and Bonett 1980), and a RMSEA value less than .08 (Hair et al. 1995; Browne and Cudeck 1993) provide support for the alternative partial-mediation model. Although the X^2 value for the alternative model does not provide clear evidence of a good fit, statisticians have noted that the X^2 statistic can be quite sensitive to sample size and encourage analysts to complement this measure with other measures of fit such as the GFI (Hu and Bentler 1995). More specifically, Hair et al. (1995) note that the use of X^2 is appropriate for sample sizes between 100 and 200, with the significance test becoming less reliable with sample sizes outside this range.

Finally, a statistical test of model comparison was conducted. The reduction in X^2 obtained by moving from the original model to the alternative model is 57.51 (df = 5, $p < .001$), providing further evidence that the partial-mediation model is the

Table 5. Path and Fit Statistics for Full-Mediation and Partial-Mediation Models

	FULL-MEDIATION MODEL			PARTIAL-MEDIATION MODEL		
Path	***Standardized Estimate***	***Unstandardized Estimate***	***Critical Ratio***	***Standardized Estimate***	***Unstandardized Estimate***	***Critical Ratio***
PWL→WE	.262	.178	2.858**	.283	.191	3.040**
RA→WE	-.109	-.077	-1.091	-.115	-.081	-1.143
RC→WE	-.060	-.046	-0.540	-.072	-.054	-0.638
AUT→WE	-.086	-.055	-0.999	-.073	-.046	-0.840
REW→WE	-.196	-.106	-2.794**	-.174	-.094	-2.466*
NA→WE	.421	.718	5.886**	.422	.717	5.846**
AGE→WE	-.132	-.013	-2.573*	-.133	-.013	-2.575*
WE→TOI	.438	.718	4.886**	.269	.441	2.950**
NA→TOI	-.048	-.135	-0.585	-.031	-.087	-0.413
OT→TOI	-.244	-.003	-4.290**	-.198	-.003	-3.637**
PWL→TOI	--	--	--	-.234	-.260	-2.350*
RA→TOI	--	--	--	.051	.059	0.483
RC→TOI	--	--	--	.145	.181	1.208
AUT→TOI	--	--	--	-.171	-.178	-1.906
REW→TOI	--	--	--	-.378	-.336	-4.982**
Fit Measure	**FULL-MEDIATION MODEL**			**PARTIAL-MEDIATION MODEL**		
X^2	255.12, df = 89, $p < .01$			197.61, df = 84, $p < .01$		
X^2/df	2.87			2.35		
GFI	.89			.92		
IFI	.93			.95		
CFI	.93			.95		
RMSEA	.09			.07		
R^2 for WE	.57			.56		
R^2 for TOI	.26			.45		

* $p < .05$

** $p < .01$

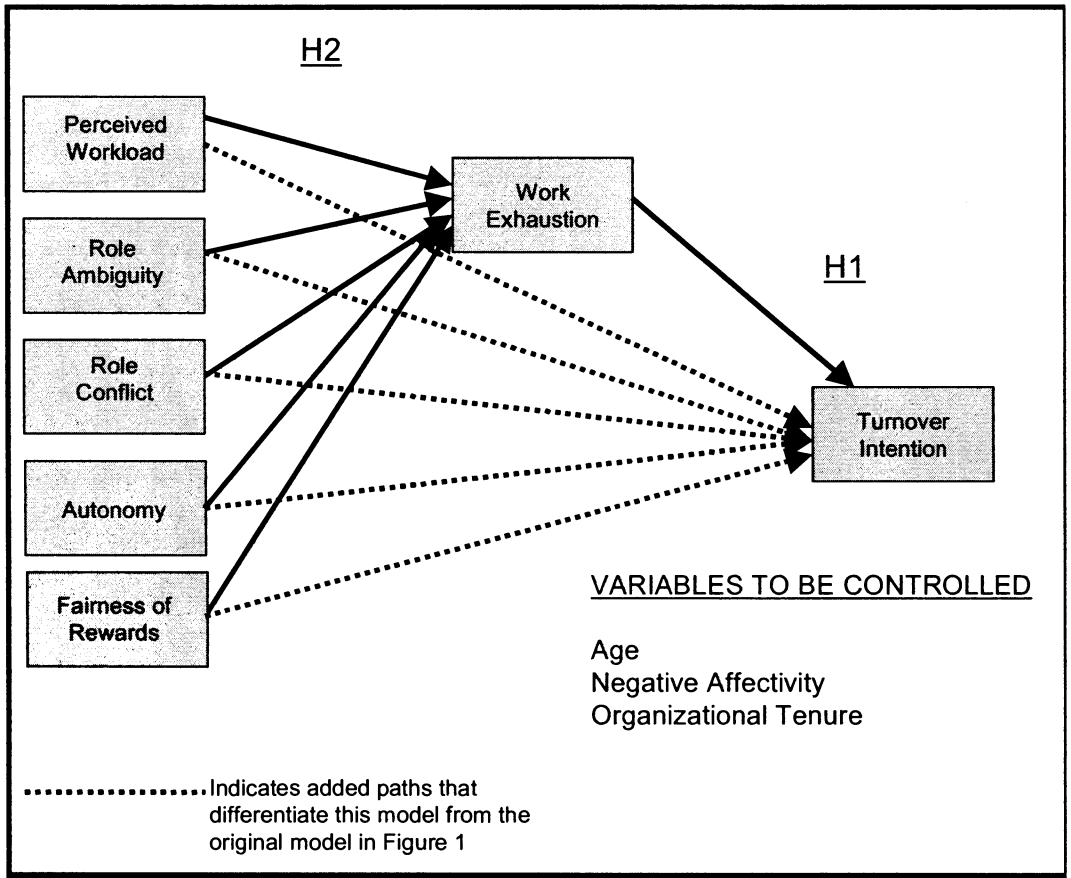

Figure 2. Alternative (Partial-Mediation) Conceptual Model

more appropriate one. Consequently, the partial-mediation model is depicted in Figure 3 with its resulting path coefficients, and this model is utilized in the analyses to test hypotheses H1 and H2.

In summary, the partial-mediation model does a good job of predicting work exhaustion and turnover intention in this sample of IT workers. Taken together, the five antecedents (perceived workload, role ambiguity, role conflict, autonomy, and fairness of rewards) and two control variables (negative affectivity and age) explain 56% of the variance in work exhaustion. Moreover, work exhaustion in conjunction with the five antecedent variables and two control variables (negative affectivity and organizational tenure) explains 45% of the variance in turnover intention. Nonetheless, it should be noted that neither of the models considered in the present study is intended to be a comprehensive model for the prediction of turnover intention. Rather, the partial-mediation model carried forward provides an appropriate framework for investigating relationships among workplace factors, exhaustion, and turnover intention.

Results of Hypothesis Tests

To address the first research objective and test hypothesis H1, the path coefficient for work exhaustion to turnover intention is examined. The standardized coefficient of .27 ($p < .01$) indicates that work exhaustion is a significant predictor of turnover intention and provides support for hypothesis H1.

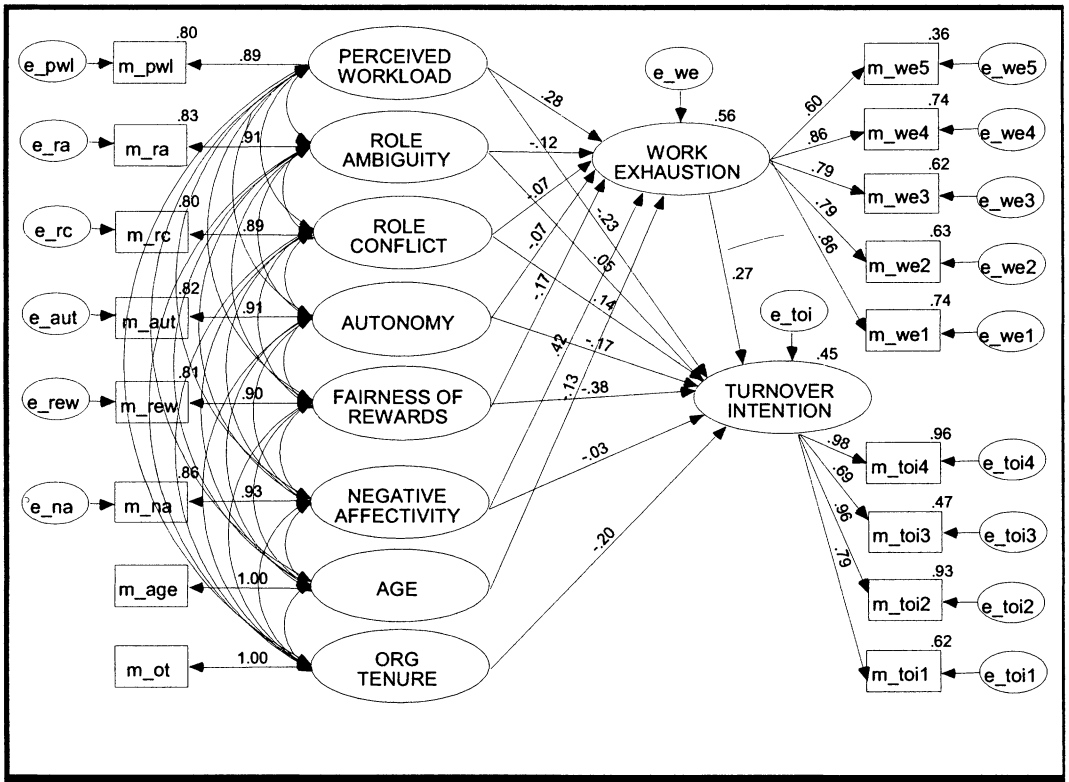

Figure 3. Partial-Mediation Model Test Results

To address the second research objective and test hypothesis H2, the paths between the workplace antecedent variables (perceived workload, role ambiguity, role conflict, autonomy, and rewards) and work exhaustion are examined. Aside from the control variables (negative affectivity and age), perceived workload is clearly the strongest predictor of work exhaustion. The standardized path coefficient of .28 ($p < .01$) indicates the significant contribution of perceived workload to work exhaustion in this sample of technology professionals. The path coefficients for the four remaining workplace factors are considerably smaller, ranging in absolute value from .07 to .17. Hence, hypothesis H2 is supported.

Analysis of Reported Causes of Exhaustion

In a qualitative approach to the second research objective, responses to the open-ended question ("What do you think is causing this feeling of overextension?") were content-analyzed to identify themes in the perceived cause of exhaustion reported by technology professionals. A preliminary step taken to facilitate the examination of perceptions regarding the cause of exhaustion was to identify those subjects who were exhausted. This step was required because responses to questions about the cause of exhaustion are only meaningful for subjects experiencing exhaustion. After identifying exhausted participants, the content analysis was performed on the

subsample of work-exhausted technology professionals.

Identification of Work-Exhausted Subjects

Prior studies have not established a cutoff value for the relatively new exhaustion scale. Therefore, data collected using the exhaustion scale in other samples (Schaufeli et al. 1995) were examined to identify an appropriate cutoff value. The existing data (for a total of 1,392 subjects) provided an estimated mean and standard deviation for the work exhaustion scale. It was decided that scores at least 1.5 standard deviations above the mean scale score would reasonably represent exhaustion. Thus, an exhaustion scale score greater than or equal to 3.4 was considered to be an indication of work exhaustion.

To provide a secondary check, an additional indication of exhaustion was designed into the survey. Instrument 1 contained a preface to the open-ended question concerning cause of exhaustion that permitted the respondent to indicate that he or she was not currently experiencing work exhaustion. Specifically, the introductory narrative was:

> Most of us from time to time in our work have gone through periods of feeling overextended and trying to do more than we can get done. If it happens that you are currently experiencing this, please complete items C1 through C13. If not, go to page 13.

Hence, a subject was classified as work-exhausted if (1) the work exhaustion scale score was greater than or equal to 3.4 *and* (2) the subject elected to respond to the open-ended question regarding cause. This method resulted in the classification of 48 of the 270 subjects (for whom both Instrument 1 and Instrument 2 data were available) as work-exhausted.

The average subject in the work-exhausted subsample was about 42 years in age, had been employed by the current organization for almost 11 years, had been in IS/IT in the organization for about nine years, and had been in his/her current job for almost nine years. Of the work-exhausted subjects, 52% were male, 72.9% were married, 47.9% had children living at home, 68.8% were AITP members, and 75.0% possessed a bachelor's (or higher) degree. A wide variety of industries was represented in the subsample. This description is very similar to that of the average participant in the full sample (previously discussed in the "Preliminary Statistics" section).

Comparison of Exhausted and Non-Exhausted Subjects

Analysis of variance and chi-square significance tests were conducted to detect significant differences between the work-exhausted and non-exhausted subjects in the study. The exhausted and non-exhausted groups did not differ significantly (at $p < .05$) on the demographic variables of age, education, marital status, whether or not they had children living at home, whether or not they were members of AITP, job classification, organizational rank, industry, job tenure, organizational tenure, or years in IS/IT at their current organization. However, the two groups differed significantly on total years in IS/IT across organizations. The non-exhausted group had spent an average of 19.0 years in IS/IT, whereas the work-exhausted group averaged 15.3 years in IS/IT across organizations.

In addition, the distribution of gender in the two groups differed significantly. The proportion of females (23/48 = 47.9%) in the work-exhausted group was significantly higher than the proportion of females (80/283 = 28.3%) in the non-exhausted group. To further explore the relationship of gender and work exhaustion, an analysis of variance was performed on the full sample to test for a significant difference in the work exhaustion score by gender. The ANOVA was significant ($F = 4.17$, df = (1,265), $p < .05$). However, when organizational rank was included in the ANOVA, gender no longer had a significant effect on work exhaustion. Rather, organizational rank was significant ($F = 3.85$, df = (6,250), $p < .001$) and neither the gender main effect ($F = .03$, df = (1,250)) nor the interaction effect of gender and organizational

rank (F = .43, df = (6,250)) was significant.[5] These findings were consistent with prior job burnout research (e.g., Etzion 1988; Izraeli 1988) that indicates when variables related to the job are controlled, a significant association between gender and work exhaustion tends not to emerge.

Content Analysis of Reported Causes

Following a preface of "Most of us from time to time in our work have gone through periods of feeling overextended and trying to do more than we can get done," respondents were asked "What do you think is causing this feeling of overextension?" This open-ended question generated rich data regarding technology professionals' attributions for their exhaustion.

The responses to the open-ended question provided by the 48 exhausted subjects were content-analyzed into general themes. In classifying the responses, an attempt was made to generate categories that reflect what is happening that is leading technology professionals to experience work exhaustion. Some categories were defined prior to an analysis of the responses (based on IS literature previously reviewed in this article). The categories defined a priori were: insufficient staff and resources; unrealistic deadlines and target dates; changes in technology and/or the business environment; expectations and needs of users.

Additional categories emerged from the respondent data. Categories inferred from the text of the responses were: organizational restructuring; unclear objectives; problems with manager; cause was outside the workplace.

The unit of analysis for the content analysis was the entire text of the response. Multiple classification was used, meaning that a response could be classified into more than one category. A faculty member in the management department of a large Midwestern university, an IS professional (not a subject in the study), and the author independently classified each of the responses. Initially, the three raters disagreed on the classification of six of the 48 responses. The discrepancies were resolved through discussion. Most were resolved when it was determined that one or more of the raters had made assumptions about what the respondent meant. When those assumptions were eliminated, the three raters agreed on the classification of all 48 responses (i.e., inter-rater reliability was 100%).

Semantic validity of the content analysis was also assessed. Semantic validity has been defined as the degree to which persons familiar with the language examine texts placed in the same category and agree they have similar meanings or relate to the category in a similar fashion (Weber 1990). To assess semantic validity, knowledgeable others were enlisted to examine the results of the classification generated by the three raters. One faculty member and one doctoral student from the management department of a large Midwestern university reviewed each category and its associated texts. Both reviewers agreed that each text appropriately reflected the category in which it was placed.

The counts by category are provided in Table 6, along with a sample participant response for each category. Twelve responses were left unclassified because the raters agreed that assumptions would have to be made (however slight) regarding the content of the responses to classify them. Examples of responses left unclassified are "Responsible for year-round purchasing and support of academic computing facilities" and "No feeling of completion."

In summary, the results of the content analysis indicate that *insufficient staff and resources* was the cause most commonly cited by the work-exhausted technology professionals in this sample (reflected in 20 of 48, or 42%, of the responses). A number of the technology workers also pointed to demands related to *changes in technology and the business environment*, *unrealistic deadlines and target dates*, *organizational restructuring*, and *expectations and needs of users* as key contributors to their exhaustion.

[5]Follow-up tests revealed that subjects who were themselves the highest-ranking IS officer and subjects who were more than three levels below the highest-ranking IS officer scored significantly higher on work exhaustion than subjects who were in the middle of the organizational ranks (i.e., one, two, or three levels below the highest-ranking IS officer).

Table 6. Results of Content Analysis for Cause of Work Exhaustion		
CATEGORY	***COUNT***	***SAMPLE RESPONSE***
Insufficient staff and resources	20	*Our team does not have adequate human resources to accomplish the projects we are assigned.*
Changes in technology and/or business environment	8	*Constant change in technology.*
Unrealistic deadlines and target dates	5	*The executive director makes commitments without considering realistic timelines for such projects.*
Organizational restructuring	5	*Corporate merger.*
Expectations and needs of users	4	*Interrupted work flow with our user calls and problems.*
Unclear objectives	2	*Constant change in management, no clear process or objectives.*
Problems with manager	2	*Manager pushes work methods that are at least 10 years old... He has at times actively stifled innovation.*
Cause was outside the workplace	1	*Had a child.*

Discussion and Implications

The results of the present study elucidate the crucial role that work exhaustion can play in the turnover of technology professionals. The study provides empirical evidence that exhausted technology professionals report significantly higher intentions to leave the job. Furthermore, work overload appears to be at the crux of exhaustion for technology professionals, as this workplace factor emerges as the primary culprit from both quantitative and qualitative investigations. Perceived workload explained more variance in the exhaustion of technology professionals than the other commonly-cited workplace antecedents, and was also reflected in the strong majority of causes reported by the exhausted technology workers (e.g., insufficient staff and resources, unrealistic deadlines and target dates).

The power of work exhaustion and its associated workplace factors to affect employee turnover is further evidenced in the model test results. In the statistically confirmed model (Figure 3), 45% of the variance in turnover intention was explained by the factors in the model. The strongest contributors to turnover intention in this sample of technology professionals were perceived fairness of rewards, work exhaustion, organizational tenure, and perceived workload. In the current climate of dependence on information systems and technology and high demand for IT labor, organizations are encouraged to take notice of these findings. Firms may need to implement strategies to reduce work exhaustion and enhance perceptions of reward fairness in order to retain IT professionals.

Before identifying directions for future research and drawing implications for practice, limitations of the study are acknowledged.

Limitations of the Study

The present study enlightens researchers and practitioners in regard to work exhaustion in technology professionals but, like any study, it has inherent limitations. The present study utilized cross-sectional data and, as such, cannot confirm

the directions of causality implied in the model. Although the directions of the individual relationships posited in the model have been supported by prior studies, future research using longitudinal data to test the model as a whole is encouraged. Additional issues to be considered in conjunction with the results of the present study include sample size, common method variance, and the operationalization of negative affectivity.

The sample drawn for the present study consisted of 270 IT professionals working in various industries throughout the United States and, as such, should be fairly generalizable. However, the subsample of exhausted subjects utilized in the content analysis of reported causes was small (48 subjects) and the response rate for the primary mailing was only 11%, so there exists a possibility that the sample may not be representative of the general population of technology professionals in the U.S. Hence, research involving additional samples may be needed to ensure appropriate generalization of the results. By using standard scales to measure variables of interest, the data from the present study provides the foundation for a cumulative record of research in work exhaustion and related perceptions of technology professionals. While very few studies have examined exhaustion in the corporate environment, it is hoped that additional studies of technology professionals and other corporate workers will be conducted to more firmly determine the boundaries of generalizability.

Because independent and dependent variables in the present study were measured by self-report methods, common method variance must be considered. However, steps were taken in the design of the study to reduce the likelihood of method bias. Specifically, separation of measurement was employed, negative affectivity was measured and statistically controlled, and Harman's one-factor statistical test was conducted to provide additional assurance that the observed relationships were unlikely to be due to common method variance.

Finally, the significant path coefficient (.42) for negative affectivity to work exhaustion deserves attention. Negative affectivity (a dimension of an individual's mood or disposition) was measured and controlled because prior research indicates it can influence self-reports of stress and strain. As such, negative affectivity can operate as a nuisance variable when examining relationships between perceptions or attitudes of the same individual (Watson et al. 1987). Indeed, negative affectivity was significantly correlated with work exhaustion and other self-reported perceptions and attitudes in this sample.

A potential explanation for the strong relationship between negative affectivity and work exhaustion lies in the operationalization of the negative affectivity construct. The well-established scale used to assess this mood-disposition variable includes items asking the respondent to indicate the degree to which he or she feels distressed, upset, jittery, and irritable. Such feelings are typically associated with the experience of work exhaustion and burnout; therefore, exhausted workers may be expected to report a higher occurrence of these feelings. In other words, the phenomenon of work exhaustion may "instill" a mood of negative affectivity. Or, it may be that persons higher in negative affectivity more readily recognize that work exhaustion is occurring. A few studies have reported evidence that persons higher in negative affectivity are more reactive to situational cues (Larsen and Ketelarr 1991; Marco and Suls 1993; Parkes 1990), and this could contribute to a positive relationship between negative affectivity and work exhaustion. Bottom line, while researchers are still encouraged to control for this variable, we may need to reconsider how best to operationalize and incorporate negative affectivity in future studies of work exhaustion.

It should be noted that, in the present study, the incorporation of negative affectivity likely resulted in a more conservative test of the relation of common antecedents to work exhaustion. In other words, negative affectivity probably usurped some of the variance in work exhaustion that might otherwise have been explained by factors such as perceived workload or fairness of rewards.

Directions for Future Research

Although the present study was not designed to assess the prevalence of work exhaustion in the

IT environment, future studies are encouraged to investigate this issue. To do so, a data collection method will need to be employed that is not biased toward participation by non-exhausted workers. For example, in the present study, it is likely that a number of technology professionals actually experiencing exhaustion did not find time to complete the two survey instruments and participate in the study. Hence, the 18% exhaustion rate (48 of 270) found in the present sample may well be a low estimate of the actual prevalence of work exhaustion in technology professionals.

Comparison studies of work exhaustion among technology and non-technology professionals at similar occupational levels would provide important insights. Such investigations would help to determine whether unique characteristics are associated with exhaustion in technology professionals and whether unique mechanisms might be needed to address exhaustion in the IT environment.

Along this line, an investigation of exhaustion in environments employing contract technology workers would be of interest. One recent study noted that contract IT workers often cause permanent workers to perform training, supervision, and quality control tasks that were not previously a part of the permanent employees' job description (Slaughter and Ang 1996). This can result in a work spillover as permanent technology employees undertake more complex jobs and expanded responsibilities, often with no adjustment to their prior workload and no training or reward for taking on the new responsibilities. Such an environment could be expected to generate antecedents to exhaustion (e.g., work overload, role ambiguity, and lack of rewards).

The finding that 42% of the exhausted technology professionals in the present study indicated their exhaustion was caused by insufficient staff and resources provides an impetus for further research on the work environments of technology professionals. Qualitative data collected from this sample of exhausted technology workers elucidate a view of a workplace in which IS/IT departments and teams are understaffed and do not have the resources required to meet the demands and expectations placed on them. Further research is encouraged to determine the prevalence of these conditions and the consequences for individual workers as well as organizations.

Also, the work exhaustion framework may provide an explanation for the complexity of research results regarding the moderating effect of job involvement on quality of work life (see Igbaria et al. 1994). When an individual is not experiencing work exhaustion, high job involvement may enhance the effect of positive elements of the work environment on the quality of work life. However, for an individual experiencing work exhaustion, high job involvement may magnify the negative elements of the work environment and heighten their inverse effects on quality of work life. Further research along this line is encouraged.

Research investigating actual turnover, rather than turnover intention, is also encouraged. Although empirical research has consistently found turnover intention to be the strongest cognitive precursor of turnover (e.g., Lee and Mowday 1987), the meta-analytic findings of Tett and Meyer (1993) indicate that turnover intention accounts for only 27% of turnover variance. Hence, turnover intention should not serve as a direct surrogate for actual turnover. However, turnover intention continues to be a variable of interest to researchers and practitioners as it can signal the need for interventions to prevent and reduce the occurrence of actual turnover.

Finally, the finding that work exhaustion partially mediated the effects of workplace factors on turnover intention in the present sample has implications for organizational behavior research. Whereas prior studies have provided support for a full-mediation model (e.g., Durup and Leiter 1995; Koeske and Koeske 1989), further research is encouraged to determine the extent to which work exhaustion mediates the influence of various workplace factors on turnover and other outcome variables.

Implications for Practice

Due to the high demand for talented IT workers in today's labor market, retention of valued tech-

nology professionals is a crucial concern for many organizations. Therefore, effective management —management that contributes to the satisfaction and retention of valued technology professionals—is imperative.

Moreover, there is reason to believe that an organization's "best people" may be most vulnerable to work exhaustion, although firm empirical evidence has yet to be reported. Specifically, the literature suggests that only highly motivated individuals who feel a strong commitment to their work can burn out (Farber 1983; Pines 1993). In today's environment of constantly changing technology, increasing customer demands, and dogged pursuit of efficiency, IT managers are likely to have a tendency to assign critical projects to select highly-regarded employees. These high-performers can easily find themselves in exhaustive situations as projects pick up steam and efforts become more realistically defined. Without proper involvement, the supervising manager may be unaware of the pressure the employee is experiencing and may not be present to provide acknowledgment, support, and additional resources where needed.

In such situations, valued technology professionals are likely to become trapped in prolonged situations of high pressure and demands and burn out. The results of the present study provide evidence that, when this happens, the exhausted worker can be expected to experience a higher propensity to leave the job. Simply put, if valued technology employees are subjected to an overly demanding work environment in which the negatives overpower the positives for a prolonged period of time, the company risks losing those workers. And these are often the very employees the organization does *not* want to lose.

Worker perceptions regarding the cause of exhaustion can compound the problem. When an exhausted IT employee perceives the exhaustion to be caused by an unreasonable workload (which appeared to be a common occurrence in this sample of technology professionals), the worker is likely to feel that changes to the work environment need to be made by those in control. If the worker believes that such changes are unlikely, he or she will look for a better environment in which to work (Cherniss 1993). And in today's market of high demand for IT professionals, job alternatives outside the organization can be plentiful.

Hence, when a valued technology employee is experiencing exhaustion, communication is crucial; the manager must realize it is happening and work with the employee to effectively address the cause (Golembiewski et al. 1987). Whereas interventions that train employees in strategies for coping with stress (e.g., training in relaxation, time management, and assertiveness) have been shown to be effective in some situations (Bruning and Frew 1986; Higgins 1986), chronic sources of pressure are likely to be resistant to reduction through individual coping efforts. Furthermore, the present study suggests that workplace factors (such as perceived fairness of rewards) not only contribute to work exhaustion, but may also directly affect turnover intention. Therefore, managers may need to be generally attentive to the workplace factors commonly associated with work exhaustion (i.e., strive to reduce the occurrence of work overload and role ambiguity and conflict, and increase worker autonomy and perceived fairness of rewards).

What specific actions can IT managers take to minimize the occurrence of work exhaustion? First, managers need to be aware of the workloads and sentiments of individual workers, particularly those highly valued by the organization. Direct face-to-face interaction with individual employees, either on a scheduled basis or spontaneously, is likely to be the most effective means for doing this (Moore 1999). Second, managers need to make a conscious effort to provide acknowledgment and show appreciation to technology professionals who are doing a good job. The evolution of the work exhaustion construct implies that such positives help to outweigh the negatives in a work situation. And, as always, it is important to distribute rewards fairly to employees as an unfair allocation of rewards could simply add to the negatives (Moore 1999). Staying on top of individual workloads and contributions should enable the manager to distribute rewards in a manner that valued IT professionals will perceive as fair.

Finally, what should a manager do to help a technology professional who is experiencing exhaustion? The manager can play a key role in helping the employee identify the cause of exhaustion. Experience in managing the workloads of others, insights gained from fellow managers regarding workload expectations, and the manager's knowledge of the worker's strengths and weaknesses and general tendencies can help in pinpointing the cause. Once the manager and employee believe they have identified the cause of exhaustion, the manager can take the lead in developing a plan of action to constructively target the cause. The plan might involve improving processes and practices, clarifying or adjusting expectations and target dates, adding resources, or acquiring needed training for the employee (Moore 1999).

All of these recommendations add to the workload of IT managers. However, Leatz and Stolar (1993) insist that this type of management activity, in conjunction with hiring more workers where needed, is probably the most important means of avoiding employee burnout. Therefore, organizations that are serious about combating work exhaustion and retaining technology workers may need to modify the workloads of their managers to allow time for these activities. Ideally, a manager would perform this individual-level activity with all subordinates; however, in organizational situations where that is not feasible, managers are encouraged to at least maintain a keen awareness of the workloads and sentiments of the most highly valued technology personnel. Bottom line, organizations need to encourage, enable, and empower IT managers to prevent key technology professionals from burning out and leaving the company.

Acknowledgements

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Appendix A

Measurement Scales

Autonomy

Scale Range: 1 = Strongly Disagree; 7 = Strongly Agree

AUT1. If I had a suggestion for improvement to make, it would be difficult for me to get a hearing on it from my manager. (R)

AUT2. When some important matter comes up that concerns me, my manager seeks out my ideas before a decision is made.

AUT3. All in all, I have very little influence in management decisions that affect me in important ways. (R)

AUT4. I get few opportunities, if any, to participate in management decisions that affect significant aspects of my job. (R)

AUT5. Our manager is inclined to accept the opinions of workers in important decisions about job-related matters.

Fairness of Rewards

Scale Range: 1 = Strongly Disagree; 7 = Strongly Agree

REW1. I think my level of pay is fair.
REW2. Overall, the rewards I receive here are quite fair.

Negative Affectivity

Scale Range: 1 = Very slightly or not at all; 2 = A little; 3 = Moderately; 4 = Quite a bit; 5 = Extremely

NA1. Scared
NA2. Afraid
NA3. Upset
NA4. Distressed
NA5. Jittery
NA6. Nervous
NA7. Ashamed
NA8. Guilty
NA9. Irritable
NA10. Hostile

Perceived Workload

Scale Range: 1 = Strongly Disagree; 7 = Strongly Agree

PWL1. I feel that the number of requests, problems, or compaints I deal with is more than expected.
PWL2. I feel that the amount of work I do interferes with how well it is done.

Scale Range: 1 = Daily; 2 = Almost Every Day; 3 = About Once a Week; 4 = 2 or 3 Times a Month; 5 = About Once a Month; 6 = A Few Times a Year; 7 = Once a Year or Less

PWL3. I feel busy or rushed. (R)
PWL4. I feel pressured. (R)

Role Ambiguity

Scale Range: 1 = Strongly Disagree; 7 = Strongly Agree

RA1. I feel certain about how much authority I have.
RA2. Clear, planned goals and objectives exist for my job.
RA3. I know that I have divided my time properly.
RA4. I know what my responsibilities are.
RA5. I know exactly what is expected of me.
RA6. Explanation is clear of what has to be done.

Role Conflict

Scale Range: 1 = Strongly Disagree; 7 = Strongly Agree

RC1. I have to do things that should be done differently.
RC2. I receive an assignment without the manpower to complete it.
RC3. I have to "buck" a rule or policy in order to carry out an assignment.
RC4. I work with two or more groups who operate quite differently.
RC5. I receive incompatible requests from two or more people.
RC6. I do things that are apt to be accepted by one person and not accepted by others.
RC7. I receive an assignment without adequate resources and materials to execute it.
RC8. I work on unnecessary things.

Turnover Intention

Scale Range: 1 = Very Unlikely; 5 = Very Likely

TOI1. How likely is it that you will be working at the same company this time next year? (R)
TOI2. How likely is it that you will take steps during the next year to secure a job at a different company?
TOI3. I will be with this company five years from now. (R)
TOI4. I will probably look for a job at a different company in the next year.

Work Exhaustion

Scale Range: 0 = Never
1 = A few times a year or less, almost never
2 = Once a month or less, rarely
3 = A few times a month, sometimes
4 = Once a week, rather often
5 = A few times a week, nearly all the time
6 = Daily

WE1. I feel emotionally drained from my work.
WE2. I feel used up at the end of the work day.
WE3. I feel fatigued when I get up in the morning and have to face another day on the job.
WE4. I feel burned out from my work.
WE5. Working all day is really a strain for me.

Note: (R) denotes scale items that are reverse-scored.