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## Evaluating the Association of Workplace Psychosocial Stressors with Occupational Injury, Illness, and Assault

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### Abstract

**Objective**—This research project characterizes occupational injuries, illnesses, and assaults (OIIAs) as a negative outcome associated with worker exposure to generalized workplace abuse/harassment, sexual harassment, and job threat and pressure.

**Methods**—Data were collected in a nationwide random-digit-dial telephone survey conducted during 2003–2004. There were 2,151 study interviews conducted in English and Spanish. Analyses included cross tabulation with Pearson’s Chi-Square, and logistic regression analyses.

**Results**—Three hundred fifty-one (351) study participants reported having an OIIA during the 12 months preceding the study. Occurrences of generalized workplace harassment (O.R.= 1.53; CI = 1.33 – 1.75, p = 0.05), sexual harassment (O.R.= 1.18; CI = 1.04 – 1.34, p = 0.05), and job pressure and threat (O.R.=1.26; CI = 1.10–1.45, p = 0.05), were significantly associated with reporting an OIIA.

**Conclusions**—The psychosocial environment is significantly associated with an increased risk of OIIA. Further research is needed to understand causal pathways and to explore potential interventions.

### Keywords

Psychosocial Stress; Occupational Injuries; Occupational Illnesses; Generalized Workplace Harassment; Sexual Harassment; Job Pressure and Threat

## INTRODUCTION

Occupational injuries and illnesses in the U.S. continue to occur at the rate of over 4 million a year in the private sector.<sup>1</sup> Occupational injuries, illnesses, and assaults (OIIAs) range in severity from minor lacerations or contusions to serious outcomes such as amputations and death. In high-performing organizations, these outcomes trigger health and safety investigations that seek to identify deficiencies in standard operating procedures, lack of engineering controls, or disregard for safety procedures. However, these investigations take place in the context of the political, sociological, and psychological environments of the workplace. Reducing and/or eliminating chemical, biological, and physical hazards through engineering and administrative controls are necessary but may not be sufficient. To address this problem, components of work life that contribute to an employee's likelihood of experiencing an occupational injury or illness, such as the social and psychological work environment may need to be explored.<sup>1</sup>

Psychosocial stressors at work are influenced by organizational climate and management style. Productivity and profitability are achieved through policies and procedures developed to ensure that the worksite follows production procedures, health and safety procedures, and human resource policies where applicable. Ideally, these programs should function in tandem with each other in a manner that protects the employee and allows him/her an environment conducive to completing a workday without excessive occupationally-related physical, psychological, and sociological stressors that result in negative health consequences. Occupational stress is a generalized term that is influenced by many factors and is considered to be multi-leveled by Bliese and Jex (1999).<sup>2</sup> Levels of influence that interact to form an individual's perception of workplace stress are largely driven by workplace policies and procedures, including interactions with coworkers and superiors<sup>3,4,5,6</sup> as well as general life experiences with violence, abuse, and/or discrimination. Traditionally, research on job stressors has included concepts such as job decision latitude, job demands,<sup>7</sup> job control,<sup>8,9,10,11</sup> and job pressure.<sup>12</sup> Health outcomes associated with job stressors include depression, anxiety,<sup>13</sup> diminished mental functioning (inattentiveness, fatigue), headaches,<sup>14</sup> absenteeism,<sup>15</sup> and occupational injuries.<sup>16</sup> However, much of the research on job stressors has employed a checklist approach, which is problematic to the extent that certain stressors may or may not be relevant to different occupations, and may or may not be appraised as stressful by different individuals. For research across occupations, affective tone of workers' experience of the job, such as experiences of job pressure and threat (JPT), may be a more useful indicator of the stressfulness of one's job, as opposed to whether or not specific stressors were encountered.<sup>11</sup> Therefore JPT has been included in this study to measure perceived workplace stress because minimal information is available that describes potential relationships with affective experience of the workplace and risk of OIIA.

Regarding specific stressors that do apply across most jobs, recently attention has been paid to interpersonal stressors in the workplace, notably generalized workplace harassment (GWH) and sexual harassment (SH). GWH involves hostile interpersonal interactions such as being yelled at, sworn at, or subjected to humiliating or demeaning behavior without explicit reference to gender or other legally protected social status characteristics.<sup>17</sup> Sexual harassment (SH) experiences have long been identified as a problem in the workplace. SH has been defined in two categories by the Equal Employment Opportunities Commission (1980) as either *quid pro quo* or hostile environment harassment. *Quid pro quo* harassment is defined as "unwelcome sexual advances, requests for sexual favors and other verbal or physical conduct of a sexual nature" whereas hostile environment harassment involves the creation of an "intimidating, hostile, or offensive working environment."<sup>18</sup> Fitzgerald and colleagues (1988) have shown that SH was a widespread phenomenon in both women

workers and university students. Sexual harassment was linked to the recipient feeling a sense of threat and insecurity in their jobs potentially influencing their ability to function productively and safely carry out work-tasks.<sup>19</sup> Research suggests that harassment in the workplace represents a particularly pathogenic form of stress, as SH and GWH have been shown to predict negative mental health outcomes above and beyond the effects of more typically-studied job stressors.<sup>3,17,20,21</sup>

This study builds on existing research by examining associations between workplace psychosocial stressors (GWH, SH, and JPT) and OIIA in a US national sample of working adults. Associations were examined using data collected on a US sample of working adults during a nationwide random-digit telephone survey in 2003.

This study explores whether workers who report high exposure levels of GWH, SH, and JPT are at greater risk of experiencing an OIIA controlling for sex, racial group, age, and occupational group. Additionally, we will examine whether the relationship between workplace harassment (GWH and SH) and JPT is associated with OIIA in the same manner.

## METHODS

### Purpose of Data Collection

This study was conducted by the Survey Research Laboratory at the University of Illinois at Chicago over a 28 week period. The research tool used to collect this research data was multidimensional in that it was mainly designed to study the relationships between workplace harassment, use of health and mental health services, and alcohol use in the US working population as well as incidence of accidents, occupational and non-occupational in nature. Inclusion criteria for the study participants were: a) adult age (18+ years), b) living at the residence of the telephone number, c) having worked at least 20 hours per week at any point in the last twelve months, and d) fluent in English or Spanish. The study was approved by the University of Illinois at Chicago's Institutional Review Board prior to data collection.

Eligible study participants were selected from within households using the Trodahl-Carter-Bryant method of respondent selection.<sup>22,23</sup> Interviews were conducted, in either English or Spanish, by telephone using computer-assisted telephone interview (CATI) technology. Respondents were offered a \$10 incentive check upon completing the interview. A complete explanation of the methods used to collect the data for this research project can be found elsewhere.<sup>24</sup>

Data in this study have a weighting variable which was calculated in two different stages. In the first stage, "selection weights" adjusted the data to reflect the probability of selecting the surveyed household to participate in the study. Selection weights were calculated as a function of the total number of telephone lines available to receive and make telephone calls in that residence along with the total number of eligible adults living in the residence. Second stage or "post-stratification weights," were calculated to ensure that the research population was comparable to the 2003 Current Population Survey (CPS) data. CPS data were used to compare the present dataset in reference to demographic measures such as age, highest education attainment levels, race/ethnicity, and gender relative to census data.<sup>24</sup> Ultimately, the data weighting procedure adjusts the research data so that research results represent the US working population during the defined time period.

## STUDY POPULATION

The final sample size included 2,151 study participants (out of 4,116 eligible, or 52%) who lived in the 48 contiguous states and the District of Columbia. Of the 2,151 study

participants, 1,067 (49.6%) were females and 1,083 (50.3%) were males (1 unknown). Occupations reported by study participants spanned virtually every identifiable occupational category recognized by the BLS. The data were coded into one of the 23 U.S. Department of Labor Occupational Classification categories prior to further reducing the categories into the eight general occupational categories.

## MEASURES

Demographic information was self-reported (i.e., age, race/ethnicity, occupation). Age was a continuous variable. Race was coded into five different groups (White (reference group), African-American, Hispanic, Asian, and Other). Occupational groups were coded into eight different sub-groups (management/business (reference group), professional, service, sales/office, construction/extraction, farming/fishing/forestry, production/transportation, and military). Gender (male, female) was recorded by telephone interviewers based on cues observed during interviews (e.g., tone and timbre of voice) and was asked of respondents only if absolutely necessary. Males served as the reference group.

Measures used in this study are described below. The alpha reliability coefficients are presented for each multi-item measure.

### Occupational Injuries, Illnesses and Assaults (OIIAs)

Occurrence of a job-related injury, illness, or assault was self-reported by the study participants in response to being asked, “In the past 12 months, did you suffer a work-related illness, injury, or assault; that is one which occurred as a result of being at your job or performing your job duties?” A follow-up question to categorize injury or illness type as classified on the Occupational and Safety Health Administration (OSHA) 300 form when study participants answered “yes” to the above question. The study participants were asked to answer “yes” or “no” to a follow-up question asked, “*What type of injury, illness, or assault was this?*” The list included; injury, assault, skin disorder, respiratory condition, poisoning, carpal-tunnel syndrome/other musculoskeletal disorder, other illness, other, or don’t know. Responses to “other illnesses” included cardiovascular problems, headaches/migraines, gastrointestinal problems, and neurological problems.

### Generalized Workplace Harassment (GWH)

GWH has five dimensions that have been identified by Richman and colleagues (1999).<sup>25</sup> In this dataset, GWH was assessed with a 10-item instrument adapted from the Richman et al. (1999) 29-item instrument that assessed 4 of 5 dimensions of abuse they had previously identified. The four categories were verbal aggression (2 items), disrespectful behavior (3 items), isolation/exclusion (4 items), and threats/bribes (1 item). Verbal aggression consists of hostile verbal exchanges such as yelling and swearing. Disrespectful behavior encompasses demeaning experiences such as public humiliation or being talked down to. Isolation/exclusion consists of one’s work contributions being ignored or being excluded from work activities such as meetings. Threats/bribes involve subtle or obvious requests to perform actions deemed wrong, or being threatened with retaliation for failing to do such actions. Study participants were asked to rate each experience as occurring: never=1, one time=2, more than one time=3 in reference to their experiences during the 12 months preceding the interview. The GWH composite scale ranges from 10–30. The standardized coefficient  $\alpha$  for the scale reliability of GWH was 0.84.

### Sexual Harassment (SH)

SH in the workplace was assessed using 9-items adapted from the Sexual Experiences Questionnaire (SEQ), an instrument developed by Fitzgerald, Shullman et al. (1988).<sup>19</sup>

Questions addressed three different categories of SH: gender harassment (3 items), unwanted sexual attention (3 items), and coercion (3 items). Gender harassment consists of being “put down” because of gender. Unwanted sexual attention involves being drawn into a discussion about personal or sexual matters, being touched, or being the recipient of unwanted sexual attention. Sexual coercion involves being treated badly or being made to feel that negative consequences would occur if sexual encounters were refused. Like the response scale for the GWH items, participants rated each experience as occurring never=1, one time=2, more than one time=3 in reference to their experiences during the 12 months preceding the interview. The SH composite range was 9–27. The standardized coefficient  $\alpha$  for this measure was 0.80.

### Job Pressure and Threat (JPT)

JPT was measured with seven items adapted from the Stanton (2001) Stress in General Scale.<sup>26</sup> Three items were taken from the Pressure Subscale evaluating job pressure, and four items were drawn from the Threat Subscale evaluating job threat. Job pressure consists of the feeling that one’s job is pressured, hectic, or relaxed. Job threat consists of feeling that one’s job is under control, nerve-wracking, hassled, or smooth-running. The two scales were combined in these data analyses to provide a more robust indicator (range of 0–21). Study participants answered “yes,” “no” or “can’t decide” to each descriptor in reference to their experiences during the 12 months preceding the interview. All questions began with asking the study participant, “*Would you say your job is/was...*” followed by a descriptor. In the job pressure scale the coding for the descriptors “*pressure and hectic*” were coded such that yes=3, no=0, and can’t decide=1.5. The coding for “*relaxed*” was yes=0, no=3, and can’t decide=1.5. In the job threat scale “*under-control and smooth running*” were coded yes=0, no=3, and can’t decide=1.5 while “*hassled and nerve-wracking*” were coded yes=3, no=0, and can’t decide=1.5. The standardized coefficient  $\alpha$  for this scale was 0.74.

## DATA ANALYSIS

All data analyses were performed with weighted data. Sociodemographic characteristics of the study sample are provided in Table 1. Cross tabulations were used to analyze prevalence rates of OIIA across gender, racial groups, and occupational groups while logistic regression analyses were used to analyze risk associations reported as odds ratios between GWH, SH, JPT and OIIA. The continuous research variables (GWH, SH, and JPT) were standardized so that the coefficients would reflect the average effect of an increase of 1 standard deviation (SD) as opposed to an increase of “one unit” in the logistic regression models. Standardizing GWH, SH, and JPT by 1 SD was performed due to variations in data scales, to allow for easier interpretation of the relative importance of these variables.

## RESULTS

Table 1 illustrates the prevalence of OIIA by sex, age groups, racial groups, and occupational groups. There were 351 OIIAs in the final count (see Table 1), with 240 cases of occupational injuries, 19 occupational assaults, and the remaining 92 being various occupational illnesses. When OIIAs were examined by gender, 194 occurred among males (55.3 %, 194/351), and 157 among females (44.7 %, 157/351). The  $\chi^2$  was significant for the bivariate associations of age, race, and occupational group with OIIA. Because these variables remained significant in the multivariate analyses, we report in more detail on the nature of these relationships below, in describing the results of the logistic regression analyses.

When we examined the distribution of race among those reporting an OIIA, the majority of OIIAs were reported by Whites (non-Hispanic) at 66% (223/338), African Americans 13.3%

(45/338), Hispanic 12.4% (42/338), Asian 1.2% (4/338), and Other 7.1% (24/338). While this indicates that minorities are far less represented in the overall group reporting OIIAs, when we examined the prevalence of OIIAs within racial group (Table 1), non-White Hispanics in particular were more likely to experience OIIAs compared to their White counterparts.

Table II shows the results of the logistic regressions. When considering the relationships between the demographic control covariates and OIIA, results showed that age (continuous) was inversely associated with risk of OIIA implying that younger workers are at a greater risk of OIIAs. Sex was not associated with increased risk of experiencing OIIA. Hispanics were at greatest risk of experiencing OIIA. There were four occupational sub-groups significantly at risk for experiencing OIIA when using management/ business as the reference group. In particular, those employed in professional, service, production/ transportation, sales/office, and construction/extraction jobs were more likely than management/business workers to experience OIIAs.

Data were run in four different models to determine the associations between the three stress variables. Models 1, 2, and 3 show the association between experiencing an OIIA and GWH, SH, and JPT are significant when one variable at a time is added into the model. The full model was run to examine how the relationships between each of the stress variables and OIIA may change when taking into account the effects of the other stressors in the model. The full model indicates that each of these three stress variables significantly contributes to predicted risk for experiencing OIIA, beyond the effects of the other stressors and covariates in the model. In the full model, age was inversely associated with OIIA. Hispanics were at greatest risk of experiencing OIIA compared to non-Hispanic Whites. The same four occupational groups associated with being at risk of experiencing OIIA in the bivariate analyses remained significant in the multivariate analysis.

## DISCUSSION

This is the first study to examine a relationship between various sources of stress in the workplace environment and OIIAs in a national sample. Based on the results of this study, GWH, SH and JPT are strongly associated with an increased risk of OIIA, controlling for age, sex, race/ethnicity and occupation. Effects of each individual stressor on risk of OIIA were similar. Similar findings have been reported by Rospenda et al., (2005)<sup>20</sup> who reported predictive associations between workplace harassment (GWH and SH) and OIIA in a university population that consisted of current and former employees in four job classifications (service/maintenance, faculty, secretaries, and graduate students). When comparing the current study results to Rospenda et al. (2005), it must be noted that the current study results are based on a nationally representative workforce sample and incorporates JPT into the model. Like Rospenda et al. (2005), workers reporting higher scores of GWH were at greatest risk of experiencing an OIIA.

This research suggests that hostile psychosocial environments that include aggressive and disruptive acts cause emotional and mental stress. Job pressure and threat tends to be based on the worker's perception (i.e., would you say your job is/was under-control, nerve-racking, smooth running) and could be subject to day-to-day influences at work and away from work.<sup>14</sup> Concerted efforts to identify and reduce precursors to workplace violence may show promise for future guidelines and regulations; existing Employee Assistance Programs may also play a role in interventions. Additionally, workers who perceive their jobs to be hectic, high-pressure, nerve-racking, and hassled were at increased risk of OIIA. Therefore, this research shows that experiencing job threat and pressure, which may be

indicative of management styles, work pace, or overall work environment, should be considered when performing investigations about OIIAs.

From a health and safety professional's point of view, the workplace as a whole has to be evaluated such that we understand and know the demographics of the workforce as well as the occupational and environmental hazards. The composition of today's workforce has more women, disabled persons, Hispanics and other ethnicities functioning in it which means that we have to equip ourselves with the necessary tools for protecting workers by developing control mechanisms for workplace exposures including workplace psychosocial stressors.<sup>1</sup> Therefore, corporate health and safety professionals should consider incorporating psychosocial stressors into health and safety programs, while also advocating for systematic collaboration with other departments which may be necessary prior to an incident such as human resources, and acquiring support from upper management in respect to a 'no tolerance' approach towards hostile interpersonal interactions at work.

The main limitation of this study is that this is a cross-sectional design which does not allow causality or temporality to be established. Therefore the results reported here show associations occurring during the same time frame. In spite of the timeframe, it is plausible that causality could occur either way, meaning that the harassment and job pressure and threat could precede the OIIA or vice-a-versa. In the scenario that the occupational stressors preceded the OIIA, one could hypothesize that the stress was responsible for the worker being mentally distracted thereby causing the OIIA to happen, or that organizations that have poor interpersonal working climates have poor safety climates overall. In respect to the reverse scenario, the injured worker could perceive greater levels of harassment and job pressure and threat as a result of his/her OIIA, depending on the severity of the OIIA and whether it involved limitations or days away from work. For either direction, the possibility that depression might play a mediating role should be explored. The possible role of depression is of particular relevance for women in light of a cross-sectional study that showed women who reported having an occupational injury were significantly more likely to report preexisting depression compared to women who had not reported an occupational injury.<sup>27</sup> Additionally, it is possible that the relationships between psychosocial stressors and OIIA may be due to an unmeasured confounding variable. For example, a poor occupational safety culture may lead to both more OIIAs and an overall climate of lack of respect (leading to increased likelihood of harassment) for workers. Future research in this area should consider measuring this and other such potential confounders.

Another limitation of this was that the study population was restricted to households with land-line telephone service which means that those households without telephones (which may be related to socio-economic status) were excluded. Households that may only have access to cellular telephones were not included in the telephone number lists, which may also have resulted in potential selection bias. The data collection effort was limited to workers in the 48 contiguous US states leaving out workers living in Hawaii, Alaska and the US territories.

The use of self-reported information lends itself to biases such as possible over-reporting of psychosocial stressor exposures, and of outcomes that were not verified against employment or medical records. An important factor with this data is that it was originally collected to examine issues surrounding sexual harassment, use of health and mental health services, and alcohol use in an adult population. This issue is of concern in that the research population who responded to the survey may have agreed to participate in the research project because he/she was experiencing occupational harassment which may have increased their level of risk for occupational health issues or susceptibility to occupational injuries. On the contrary, study participants who experienced an OIIA may have perceived that he/she was the object

of GWH, and SH, or may have experienced overall perceptions of JPT due to the OIIA. Recall bias is a possibility since each study participant was asked to answer various questions based on their experiences during the 12 months prior to the survey interview. Future sampling efforts should consider delivering the survey in languages beyond English and Spanish.

Research is underway to examine relationships between psychosocial stressors and OIIA in a longitudinal study to examine causality, particularly among the occupational categories found to be at greatest risk of OIIA in the present study. Potential future research paths may look at size of companies to determine whether company resources (health and safety professionals, employee assistance programs, occupational medical departments or well-defined human resource departments) have any effect on the results reported in this study.

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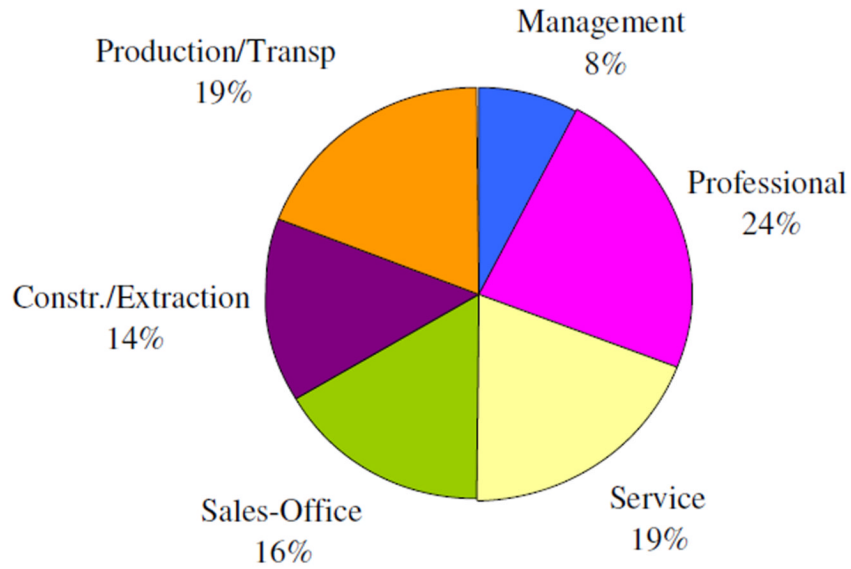
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## Self-reported OIIAs by occupational category



**FIGURE 1.**  
Self-reported OIIAs by general occupational codes per the 2000 Census.

TABLE I

WEIGHTED SAMPLE DEMOGRAPHICS BY OIIA STATUS. N=2,151

	OIIA		Pearson	df
	No (n=1784)	Yes (n=351)	$\chi^2$	
<b>Sex</b> (n=2,135)			0.788	1
Female	83.6% (802)	16.4 % (157)		
Male	83.5% (982)	16.5 % (194)		
<b>Age</b> (n=2,067)				
(Range: 19–88)	% (n)	% (n)	24.78*	4
(mean = 41.5, SD = 12.9)				
30	78.1 (371)	21.9 (104)		
31–40	84.0 (400)	16.0 (76)		
41–50	82.7(473)	17.3 (99)		
51–60	87.0 (341)	13.0 (51)		
61+	93.4 (142)	6.6 (10)		
<b>Race</b> (n=2,060)			19.44*	4
White	85.1 (1290)	14.9 (225)		
African-American	80.7 (188)	19.3 (45)		
Hispanic	73.4 (116)	26.6 (42)		
Asian	90.5 (38)	9.5 (4)		
Other	78.6 (88)	21.4 (24)		
<b>Occupational Group</b> (n=2,105)			37.50*	5
Management/Business	91.0 (272)	9.0 (27)		
Professional	83.8 (415)	16.2 (80)		
Service	77.7 (233)	22.3 (67)		
Sales/Office	88.1 (414)	11.9 (56)		
Construction	80.3 (204)	19.7 (50)		
Product/Transportation	77.0 (221)	23.0 (66)		

Note - Counts may differ from N=2151 because of missing data. The percentages represent row percentages.

\* significant at p 0.001.

TABLE II

Multiple logistic regression models showing the relationships between study variables, controlling variables, and OIIA (dependent variable).

	Model 1		Model 2		Model 3		Full Model	
	O.R.	95% CI	O.R.	95% CI	O.R.	95% CI	O.R.	95% CI
<b>Age</b> (continuous)	0.98*	0.97-0.99	0.98	0.97-0.99	0.98*	0.97-0.99	0.98*	0.97-0.99
<b>Sex</b> (reference = Male)	1.29	0.97-1.70	1.07	0.81-1.41	1.20	0.91-1.57	1.18	0.89-1.58
<b>Race</b> (reference = White)								
African-American	1.04	0.71-1.53	1.07	0.73-1.55	1.30	0.90-1.89	1.05	0.71-1.55
Hispanic	1.76*	1.16-2.66	1.79*	1.19-2.69	1.95*	1.29-2.92	1.85*	1.22-2.82
Asian	0.66	0.20-2.12	0.68	0.21-2.17	0.73	0.25-2.17	0.65	0.19-2.24
Other	1.16	0.96-1.94	1.07	0.63-1.83	1.54	0.94-2.51	0.99	0.57-1.71
<b>Occupational Group</b> (reference = Management/Business)								
Professional	1.74*	1.07-2.84	1.95*	1.20-3.17	2.06*	1.27-3.33	1.87*	1.14-3.07
Service	2.49*	1.49-4.15	2.52*	1.52-4.19	3.12*	1.87-5.19	2.74*	1.62-4.62
Sales/Office	1.17	0.70-1.95	1.18	0.71-1.97	1.33	0.80-2.21	1.18	0.70-2.00
Construction/Extraction	2.28*	1.32-3.93	2.60*	1.52-4.43	2.71*	1.58-4.65	2.55*	1.47-4.44
Production/Transportation	2.43*	1.45-4.08	2.60*	1.55-4.33	3.01*	1.80-5.01	2.50*	1.47-4.23
<b>GWH</b> § (continuous)	<b>1.82*</b>	1.63-2.02					<b>1.53*</b>	1.33-1.75
<b>SH</b> § (continuous)			<b>1.54*</b>	1.39-1.72			<b>1.18*</b>	1.04-1.34
<b>JPT</b> § (continuous)					<b>1.59*</b>	1.40-1.81	<b>1.26*</b>	1.10-1.45
<b>Model R<sup>2</sup></b>	0.145		0.103		0.099		0.155	

NOTE:

\* Significant at p 0.005.

§ Standardized scales for GWH, SH, and JPT variables were used in the above models.

Nagelkerke R<sup>2</sup> values are presented.