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# The Effects of Job Insecurity on Employee Safety Outcomes: Cross-Sectional and Longitudinal Explorations

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Job insecurity research has focused primarily on attitudinal (e.g., job satisfaction), behavioral (e.g., employee turnover), and health outcomes. Moreover, research in the area of workplace safety has largely focused on ergonomic factors and personnel selection and training as primary antecedents of safety. Two cross-sectional structural equational modeling analyses and 1 longitudinal regression analysis of 237 food-processing plant employees unite these 2 disparate areas of research by exploring the relatively uncharted relationship between job insecurity and safety outcomes. Results indicate that employees who report high perceptions of job insecurity exhibit decreased safety motivation and compliance, which in turn are related to higher levels of workplace injuries and accidents.

The specter of losing one's job as a result of corporate restructuring, mergers and acquisitions, or organizational downsizing looms in the foreground for many of today's employees. Fortune 500 companies alone have reduced their total workforce from an aggregate 14.1 million employees to 11.6 million between 1983 and 1993, with approximately 500,000 U.S. employees facing job loss each year as a result of these transitions (Simons, 1998). These are impressive numbers; however, they do not even begin to capture the number of employees who might be concerned about losing their own jobs or the effect job insecurity can have on a range of important individual and organizational outcomes (Cameron, Freeman, & Mishra, 1991)

Studies have shown that job insecurity among employees leads to job dissatisfaction (Ashford, Lee, & Bobko, 1989; Davy, Kinicki, & Sheck, 1991), an increase in negative physical health outcomes (Dooley, Rook, & Catalano, 1987; Kuhnert, Sims, & Lahey, 1989; Roskies & Louis-Guerin, 1990), and higher reports of psychological distress (Dekker & Schaufeli, 1995; Probst, 2000). In addition, employees with perceptions of low job security are more likely to engage in work withdrawal behaviors (Probst, 1998/1999) and report lower organizational commitment (Ashford et al., 1989; Davy et al., 1991), which often leads to employee turnover (Ashford et al., 1989; Davy et al., 1991).

Although the effects of this rising job insecurity on employee attitudes, behaviors, and physical and mental health outcomes have been well documented, research on the implications of job insecurity for employee safety is virtually nonexistent. However, in a review of literature, Landisberger, Cahill, and Schnall (1999) reported that studies examining the impact of lean production on employee safety found detrimental effects on employee health and injury rates in a variety of industries, including automobile manufacturing, telecommunications, and health care. Although these studies did not address job insecurity in particular, it is accepted that one of the hallmarks of lean production is the implementation of organizational downsizing (American Management Association, 1997; Landisberger et al., 1999).

There is also a voluminous literature on antecedents of worker safety, addressing the impact of such factors as ergonomic conditions (Melamed, Luz, Najenson, Jucha, & Green, 1989); employee personal characteristics such as gender, education, and personality (e.g., Ferguson, McNally, & Both, 1984; Hansen, 1989; Leigh, 1986; Leveson, Hirschfeld, & Hirschfeld, 1980); and organizational characteristics such as safety climate (e.g., Brown & Holmes, 1986; Dedobbeleer & Beland, 1991; Zohar, 1980). Yet, to date, there has been no research considering employee job insecurity as a predictor of worker safety.

The purpose of this study was to unite these dis-

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parate areas of research by assessing the effects of job insecurity on variables known to be related to workplace accidents and injuries. In particular, this study assessed attitudinal outcomes such as job satisfaction, employee knowledge regarding appropriate safety behaviors, and employee motivation to comply with organizational safety policies, in conjunction with self-reported safety violations, on-the-job accidents, and workplace injuries.

## Development of a Model Addressing Job Insecurity and Safety

The following sections describe the development of a model (see Figure 1) illustrating the possible relationships among job insecurity, safety motivation, knowledge, compliance, and job-related injuries and accidents. From this model, several testable hypotheses were developed.

### *Job Insecurity and Job Satisfaction*

Dunbar (1993) found that negative affect, anxiety, and depression were all negatively related to the use of personal protective equipment. Therefore, one explanation for the proposed link between job insecurity and safety outcomes is that job insecurity causes negative job attitudes in the form of anxiety regarding job security (i.e., job security dissatisfaction) and reduced satisfaction with other facets of the job (e.g., pay and promotion opportunities). These, in turn, may result in a reduction in adherence to safety policies. In fact, decreased perceptions of job security have consistently been found to be related to decreased job satisfaction in many studies (e.g., Ashford et al., 1989; Davy et al., 1991; Probst, 2000). Job satisfaction has many facets (e.g., satisfaction with work, pay, promotion opportunities, supervision, and coworkers; Smith, Kendall, & Hulin, 1969). In addition, more recent work has found that a sixth facet of job satisfaction (Probst, 1998/1999), namely, job security satisfaction, is also important to consider in today's work environment. On the basis of this work, the first part of the model postulates the following:

> *Hypothesis 1*: There will be a negative relationship between job insecurity and job satisfaction.

Recent research suggests that many of the effects of job insecurity on individual and organizational outcomes are mediated by employee levels of job satisfaction. For example, in a path analysis modeling the effects of being a layoff survivor, Davy et al. (1991) found that although job security positively affected job satisfaction, it did not directly influence employees' behavioral intent to withdraw or organizational commitment. Rather, the relationship between these variables and job security existed only through the intervening variable of job satisfaction. In other words, when job attitudes were held constant, there was no relationship between job insecurity and turnover intentions or organizational commitment. On the basis of this and other similar findings (e.g., Probst, 1998/1999), job insecurity is not expected to directly influence safety motivation or knowledge levels. Rather, it is predicted that job insecurity must lead to job dissatisfaction for negative outcomes to occur. Therefore,

> *Hypothesis 2*: Job satisfaction will mediate the relationship between job insecurity and safety motivation and safety knowledge.

### *Job Satisfaction and Safety Knowledge and Motivation*

Research suggests that safety knowledge and safety motivation are important factors in predicting safety compliance (Hofmann, Jacobs, & Landy, 1995; Neal, Griffin, & Hart, 2000). Safety motivation has been defined as an employee's "motivation to perform a job in a safe manner" (Hofmann et al., 1995, p. 133) and the motivation to perform safety behaviors (Neal et al., 2000). It is important to note, however, that motivation is sometimes defined extrinsically and other times intrinsically. Using a contingency approach, Hofmann et al. predicted that employees would be less motivated to comply with safety policies to the extent that they are not rewarded for performing in a safe manner. In this study, we similarly define safety motivation as an employee's degree of incentive to adhere to their organization's safety regulations, as they understand them to be. In other words, we were interested in extrinsic safety motivation.

Safety motivation was operationalized using an expectancy-valence motivational approach. According to valence–instrumentality–expectancy theory (Vroom, 1964), individuals will expend effort on activities that lead to desired rewards. Therefore, if an individual is rewarded for adhering to safety policies, one would expect that person's motivational force to be high for those behaviors. If the reward structure is such that individuals are "rewarded" for noncompliance, then one would expect their motivational force to comply with safety policies to be low (Hofmann et al., 1995).

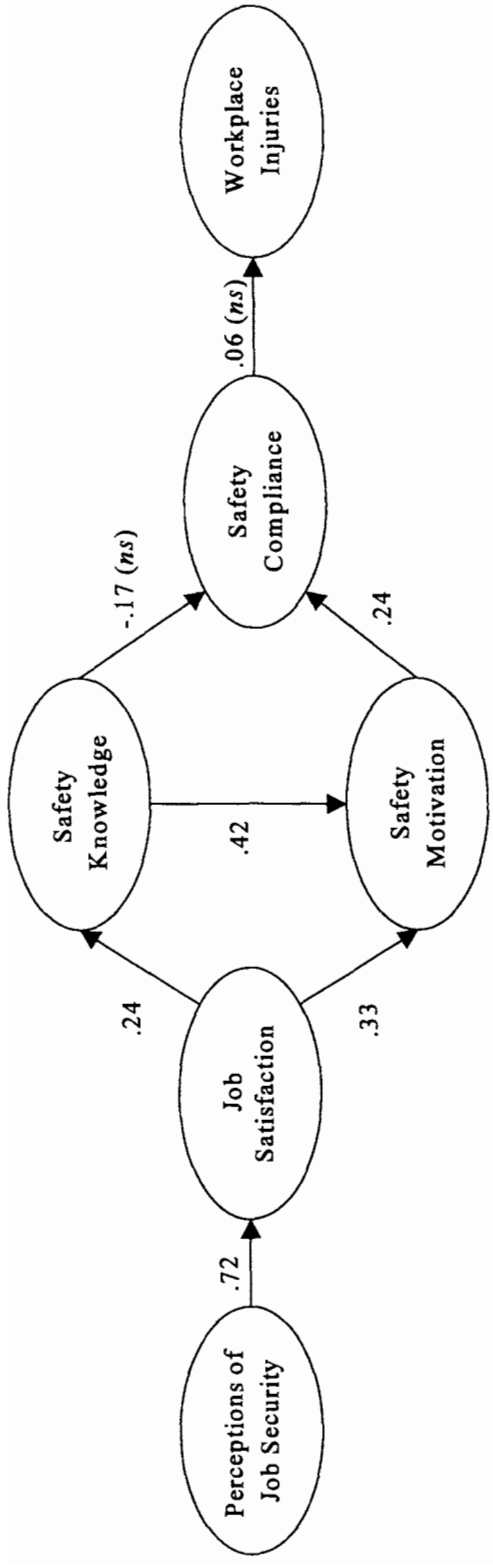


*Figure 1.* Structural model of the effects of job insecurity on employee safety at Time 1.

It is important to note that safety motivation is not necessarily inclusive of safety knowledge or compliance. Safety knowledge is characterized by an employee's understanding of safe operating procedures and adequate safety training and instruction (Hofmann et al., 1995). An employee who is knowledgeable of safety rules may not always be motivated to comply. Likewise, an employee who does not understand all of the safety rules may be motivated, but this motivation may or may not translate into actual compliance because of the lack of proper knowledge or skill. Therefore, it is important to measure these two constructs separately.

Both safety motivation and safety knowledge are expected to be adversely affected when an individual perceives that his or her job security is threatened and is dissatisfied by that perception. In particular, job dissatisfaction is predicted to be related to lower levels of safety knowledge and safety motivation. This prediction is generated from a cognitive resources framework (Kanfer & Ackerman, 1989) and from Eysenck and Calvo's (1992) model of anxiety and performance.

According to Kanfer and Ackerman (1989), there is a set amount of available cognitive resources that each individual has when engaged in the completion of any given task. These finite cognitive resources can be allocated to on-task, off-task, or self-regulatory activities. In a work setting, on-task activities include those behaviors related to production, quality assurance, and safety compliance. Off-task activities include behaviors such as chatting with coworkers, thinking about family, or planning for the weekend. Self-regulatory activities include the monitoring of one's environment. In particular for this study, the monitoring of job security would be aptly classified as a self-regulatory activity. This involves estimating the chances that one might be affected by an impending organizational transition, how one's job might change as a result, keeping up-to-date with organizational rumors, and the like.

When individuals have high job security, these self-regulatory activities can be disengaged, leaving more resources available for the on-task activities of production, quality, and safety. However, when job security is perceived to be low, some of those cognitive resources may be funneled into self-regulatory activities aimed at monitoring progress toward the goal of job retainment. Thus, during times of organizational transition, valuable cognitive resources may be consumed in the monitoring of job security and in the maintenance of production schedules that would otherwise be used to maintain (or increase) safety knowledge, extrinsic safety motivation, and compliance. However, during times of organizational stability and job security, these cognitive resources can be solely devoted to the demands of safety and production.

Other theories also suggest that the stress and dissatisfaction resulting from job insecurity will lead to lowered safety knowledge and motivation. Stress has been shown to lead individuals to focus narrowly on a few specific aspects of their environment (Barthol & Ku, 1959; Mandler, 1982). According to Hofmann and Stetzer (1996), one consequence of this may be that employees tend to focus their attention on performance rather than safety during times of stress, such as the felt threat of losing their jobs. Similarly, Eysenck and Calvo (1992) suggested that anxiety (such as is expected to result from job insecurity) can either (a) drain working memory resources leading to a decrease in performance or (b) increase cognitive arousal, thereby serving as a motivational source that results in performance improvement. Where one will see performance decrements versus performance improvements depends on the employee's perception of organizational prioritization of safety, quality, and production. Wickens (1992) suggested that safety, in particular, represents an additional task that can compete with performance-related tasks when attention or performance capacities are exceeded. In addition, Sanders and Baron (1975) in their distraction-conflict theory suggested that arousal and anxiety can result in employees relegating workplace hazards to the background. On the basis of these theories, the following hypothesis was predicted:

> *Hypothesis 3*: Dissatisfied employees will exhibit lower levels of safety knowledge and motivation than will more satisfied employees.

It has been suggested that workers face a conflict between safety and production (Faverge, 1980; Janssens, Brett, & Smith, 1995; Kjellen, 1984; Leplat & Rasmussen, 1984). The more an organization places an emphasis on production, the more employees perceive that safety is subordinated to the demands of production (Janssens et al., 1995). The degree to which employees choose production over safety will be in part determined by their perceptions regarding organizational reward contingencies.

Hofmann and Stetzer (1996) predicted that employees who are experiencing job stress will focus on performance rather than safety because performance is more likely to result in salient rewards for the employee. In addition, unsafe behavior may actually

be perceived to be rewarding if it allows the employee to perform work tasks more quickly (Slappendal, Laird, Kawachi, Marshall, & Cryer, 1993). These are conditions that are likely to be present during times of job insecurity. Therefore, it is predicted that job stress and dissatisfaction have an impact on safety compliance primarily through a reduced emphasis on safety knowledge and motivation. In other words,

*Hypothesis 4*: Safety knowledge and motivation mediate the relationship between job dissatisfaction and safety compliance.

### *Safety Compliance*

A crucial component of the job security and safety model concerns actual compliance or, alternatively, violation of organizational safety policies. Safety compliance has been defined as the extent to which employees adhere to safety procedures and carry out work in a safe manner (Neal et al., 2000). According to J. P. Campbell (1992), performance on any task is a function of three components: skill, knowledge, and motivation. Therefore, compliance with safety policies is expected to be predicted both by safety motivation and knowledge. On the basis of the theory of reasoned action (Fishbein, 1979; Fishbein & Azjen, 1975) and other theories of motivation (e.g., expectancy theory; Vroom, 1964), it is assumed that employees who have low motivation to comply with safety rules and regulations will also have a greater incidence rate of violating those safety rules. Thus,

*Hypothesis 5*: Employees who are less motivated to comply with safety rules and regulations will violate more organizational safety rules than employees who are more motivated to comply.

All things being equal (e.g., motivation), individuals who have received safety-related training and understand organizational safety incentive systems (and, therefore, presumably have greater knowledge regarding appropriate safety behavior) are expected to adhere to proper safety protocol more frequently than individuals who have less normative knowledge. Employees may or may not be motivated to comply with safety policies, but if they do not possess the requisite knowledge to do so, they are not expected to be able to consistently comply with safety rules. Consistent with this, Neal et al. (2000) found that safety knowledge significantly predicted actual compliance with safety policies in their study of 525 hospital employees. Thus,

*Hypothesis 6*: Employees who have less safety knowledge are predicted to have more safety violations than employees with more safety knowledge.

### *Workplace Injuries and Accidents*

Finally, it is expected that lowered safety knowledge and reduced motivation to comply with safety policies will result in a higher incidence of workplace injuries and accidents as a result of increased noncompliance with organizational safety policies. Accidents are defined to include actual reported accidents, unreported accidents, and "near misses" (incidents that could have caused an injury but did not; Smecko & Hayes, 1999). Therefore, the following was predicted:

*Hypothesis 7*: Noncompliance with organizational safety policies is expected to be related to higher levels of workplace accidents, injuries, and near misses.

Theorists studying the relationship among attitudes, behaviors, and outcomes (e.g., Fishbein, 1979; Fishbein & Azjen, 1975) suggest that one must make a careful distinction between outcomes (e.g., accidents and injuries) and behaviors (e.g., safety compliance). Attitudes (such as safety motivation) can only predict behavior (i.e., compliance), whereas outcomes such as injuries are best predicted by both behavior and extraneous factors not under the control of the individual. Therefore, attitudes should not be expected to have a direct influence on outcomes such as injuries and accidents, but rather the effects of attitudes on outcomes are mediated through their effect on behavior (i.e., compliance). As such, the following was predicted:

*Hypothesis 8*: Safety compliance will mediate the relationships between safety knowledge, safety motivation, and injuries and accidents.

## Method

### *Participants*

Participants were sampled from two geographically distinct plants of a large food-processing company located in the Pacific Northwest of the United States. Both plants were similar with respect to technologies used, production, job categories, and organizational structure. Both plants had undergone major organizational changes affecting the job security of the organization's employees. In the first plant, an entire shift of workers was laid off, and during focus-group interviews employees reported a general feeling that the plant was being slowly phased out of existence in favor of a larger plant located elsewhere. This impression was confirmed through later interviews with the human resources manager, who indicated the plant was indeed being

slowly phased out. In the second location, the swing shift was being eliminated in favor of a night shift. Employees who could not accommodate the new shift schedule (i.e., many single-parent employees with no day-care alternatives) were expected to lose their jobs. On the basis of interviews with employees, the general plant manager, and the human resources manager, production was expected to remain at former levels during these organizational transitions. Thus, even though there would be fewer employees, overall plant production levels were expected to remain constant.

Employees were asked to participate in the study at two different time periods: (a) immediately after the shift changes and elimination were announced and (b) 6 months following the organizational restructuring. The first time period was selected to gather data while job insecurity was presumably at its highest levels. The second time period was selected to allow employees to adjust to the organizational restructuring, while also potentially showing the long-term effects of such insecurity on safety outcomes.

*Time I sampling.* A total of 300 employees from the two sites were randomly selected to participate in the study at Time I: 200 from Site 1 (which is twice as large as Site 2) and 100 from Site 2. Of those invited, a total of 168 employees chose to participate in the study at Time I ($N_1$ = 92; $N_2$ = 76), resulting in an overall participation rate of 56%. Although exact numbers regarding turnover were not available, yearly estimates were extremely high at 200%, meaning that employees are quitting after an average of 6 months. Thus, a participation rate of 56%, allowing for turnover between time of initial sampling and survey administration, was deemed satisfactory.

The modal age category of respondents at Time I was 35–39 years. Male participants accounted for 58% of the respondents; 42% of the respondents were female. The modal level of education completed was high school or general equivalency diploma (GED). The majority of the sample (71%) indicated they were Caucasian or White; 16% checked Hispanic/Latino; and 8% self-identified as Native Americans. The remaining 5% were African American, Asian American, or chose not to affiliate themselves with an ethnic category. Managers made up 16% of the sample. The median number of subordinates per manager was 22.

*Time II sampling.* At Time II, a total of 279 employees from the two sites were randomly selected to participate in the study: 200 from Site 1 and 79 from Site 2.[1] Of those invited, a total of 141 employees chose to participate ($N_1$ = 94; $N_2$ = 47), resulting in an overall participation rate of 51%.

The modal age category of respondents at Time II was 35–39 years. Male participants accounted for 52% of the respondents; 48% of the respondents were female. The modal level of education completed was high school diploma or GED. The majority of the sample (82%) again indicated they were Caucasian or White; 9% checked Hispanic/Latino; and 4% self-identified as Native Americans. The remaining 6% were African American, Asian American, or chose not to affiliate themselves with an ethnic category. Managers accounted for 21% of the sample. The median number of subordinates was 17.5.

*Time I and II participants.* A total of 72 employees from the two sites participated in both data collections. Therefore, longitudinal analyses were conducted for that subset of employees. The modal age category of respondents who participated in both data collections was 40–44 years. Male participants accounted for 57% of the respondents; 43% of the respondents were female. The modal level of education completed was again high school diploma or GED. Eighty-two percent of the sample indicated they were Caucasian or White; 10% checked Hispanic/Latino; and 6% self-identified as Native Americans. The remaining 3% were African American, Asian American, or chose not to affiliate themselves with a racial category. Twenty-two percent of the sample indicated they were a manager or supervisor. The median number of subordinates was 17.5.

## *Sample Differences*

The three samples were not significantly different with respect to the demographic variables reported above, except for the variable age. Participants who participated in both sessions were somewhat older (median age = 40–44 years) than those who participated solely in Time I or Time II (median age = 30–34 years), $F(2, 228) = 7.44$, $p < .001$.

Analyses of variance were conducted to test for differences across the two plant sites at the two data collection time points. Results suggest that there were very few significant differences between the two plant sites at either time point. Specifically, employees at Plant 1 had a higher mean organizational tenure than those at Plant 2. In addition, employees at Plant 1 had significantly lower perceived job security at both data collections. Finally, employees at Plant 2 had more accidents at Time 2 and more injuries at Time 1 than employees in Plant 1. See Table 1 for a complete description of demographics and descriptive statistics broken down by plant and time point.

## *Measures*

To assess the model of interest, we administered surveys assessing each of the constructs in person at each data site. The following scales were included in the survey, which was billed as a "Workplace Environment Survey." Unless otherwise noted, all scales were administered at both data collection sessions.

*Perceptions of job security.* The Job Security Index (Probst, 1998/1999) was used to measure employees' cognitive appraisal of the future of their job with respect to the perceived level of stability and continuance of that job. Respondents indicated on a 3-point scale (1 = *yes*, 2 = *?*, 3 = *no*) the extent to which 18 adjectives or phrases described the future of their job (e.g., "my job is almost guaranteed," "permanent position if I want it," "insecure," "future is vague," and "well-established").

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[1] Because of historically high turnover in the food-processing industry (Komaki, Collins, & Penn, 1982), only 79 of the originally sampled 100 employees remained with the Site 2 organization at Time II. Because of organizational constraints, we were not able to replace those employees in our sampling. At Site 1, however, we were able to replace through random sampling those individuals who had quit since Time I. Therefore, the total number of employees sampled from the first site remained 200.

Table 1
*Sample Demographics and Descriptive Statistics*

| Variable | Sample | | | |
|---|---|---|---|---|
| | Plant I | | Plant II | |
| | Time I | Time II | Time I | Time II |
| Total respondents | 76 | 47 | 92 | 94 |
| Modal age category (years) | 30–34 | 35–39 | 30–34 | 40–44 |
| Male respondents | 38 | 19 | 53 | 52 |
| Female respondents | 30 | 25 | 37 | 41 |
| Unreported | 8 | 3 | 2 | 1 |
| Managers (self-report) | 9 (12%) | 7 (15%) | 17 (16%) | 22 (23%) |
| Mean tenure in years (*SD*) | $6.9\ (7.9)_a$ | $7.4\ (7.6)_a$ | $2.4\ (3.6)_b$ | $3.1\ (4.6)_b$ |
| Modal level of education | HS/GED | HS/GED | HS/GED | HS/GED |
| Job security perceptions (*SD*) | $1.79\ (1.13)_a$ | $1.57\ (0.98)_a$ | $2.07\ (0.88)_b$ | $2.17\ (0.90)_b$ |
| Job attitudes (*SD*) | 1.81 (0.53) | 1.82 (0.57) | 1.68 (0.51) | 1.70 (0.58) |
| Safety knowledge (*SD*) | 5.42 (1.15) | 5.54 (1.11) | 5.54 (1.20) | 5.63 (1.05) |
| Safety motivation (*SD*) | 4.83 (1.20) | 4.87 (0.93) | 4.69 (1.17) | 4.39 (1.29) |
| Safety compliance (*SD*) | 4.78 (0.54) | 4.67 (0.47) | 4.63 (0.73) | 4.59 (0.67) |
| Workplace injuries (*SD*) | $0.23\ (0.42)_a$ | 0.26 (0.44) | $0.38\ (0.49)_b$ | 0.33 (0.47) |
| Workplace accidents (*SD*) | — | $0.42\ (0.64)_a$ | — | $0.70\ (0.75)_b$ |

*Note.* Means with the same subscript are not significantly ($p < .05$) different from each other during the same time point. Dashes denote data are not available for this variable. HS/GED refers to high school diploma or general equivalency diploma.

*Job satisfaction.* Six scales were used to measure employee job satisfaction. Responses from these scales were collapsed into a single measure of overall job satisfaction. The first five scales were taken from the Job Descriptive Index (Smith et al., 1969), with each scale containing 9 items. These included satisfaction with supervision, coworkers, pay, promotions, and work itself. The sixth scale was the 20-item Job Security Satisfaction scale (Probst, 1998/1999), which measures satisfaction with one's level of job security. Whereas the Job Security Index was designed to assess *perceptions* of job security, the Job Security Satisfaction scale was designed to capture an individual's *attitudes* regarding that level of job security. Thus, it captures the individual's evaluative judgment of his or her job security. As recommended by Hanisch (1992), agreement with positively worded job attitude items was scored 3; disagreement with positively worded items was scored 0; and ? responses were scored 1. Negatively worded items were reverse scored, such that higher numbers indicate more positive job attitudes. Sample items from each of the six attitude scales, respectively, are "knows how to supervise," "work well together," "barely live on income," "dead-end job," "challenging," and "excellent amount of security."

*Safety knowledge.* Two items measured the degree to which employees were knowledgeable about their organization's safety policies. Respondents indicated on a scale from 1 to 7 the extent to which they agreed or disagreed with the following statements, "I know who to ask if I am not sure about the safe way to complete a task" and "I feel free to request additional safety training if I think it is needed." At Time II, a third item ("I know the safe way to complete my work tasks") was included. Items were scored such that higher numbers reflect more safety knowledge.

*Safety motivation.* Four items were written to assess the degree to which employees were extrinsically motivated to comply with safety rules and policies. Respondents indicated on a scale from 1 to 7 the extent to which they agreed or disagreed with the following statements: "There is no incentive for me to follow all the safety policies in my plant. I am not rewarded for being 'safe'"; "My supervisor strictly enforces safety rules and regulations"; "My supervisor praises me when he or she sees that I am following proper safety procedures"; and "When I ignore safety rules, my supervisor punishes me." Items were scored such that higher numbers reflect more safety motivation.

Because the safety knowledge and motivation scales were written for the purpose of this study, confirmatory factor analyses were conducted on the Time I and Time II datasets to provide evidence that these items tapped two distinct constructs. Confirmatory factor analysis results indicate that a two-factor solution provides a good fit to the data. (Factor loadings and fit indices may be obtained by contacting the first author.)

*Safety compliance.* At Time I, a single item was written to assess safety compliance. Respondents indicated the frequency with which they "ignore safety rules and regulations at work" ranging on a scale from 1 (*never*) to 5 (*constantly*). Responses to this item were reverse-scored such that higher numbers reflect more compliance. At Time II, an additional item was included to measure compliance, which asked participants to rate the frequency with which they "take shortcuts in safety guidelines in order to get the job done faster" using the same response scale noted above.

*Workplace injuries.* Because of the repetitive nature of the work and the use of sharp implements, injuries in this sample were defined as wrist, hand, or arm injuries, because these were the most common injuries associated with working in these food-processing plants. Thus, at Time I and Time II, a single item (dichotomously scored) assessed

whether employees currently had a wrist, hand, or arm injury.

*Workplace accidents.* Three items assessed workplace accidents. Using a measure developed by Smecko and Hayes (1999), we asked employees to report how many safety accidents they reported to their supervisor, how many unreported accidents they had experienced, and how many near accidents (something that could have caused an injury but did not) they were involved in over the past 12 months. Workplace accidents were measured in the Time II survey only. Responses to the three items were summed to give a total number of workplace accidents for each employee. Given that accident data are frequently positively skewed, the accident data were transformed using the square root transformation for nonnormality (Neter, Wasserman, & Kutner, 1990). This made the accidents data distribution more normal compared with the untransformed data.

Although the workplace accidents and injuries variables are self-report in nature, previous studies have indicated that self-report measures of accidents and unsafe behaviors are related to independent observations of these variables (Lusk, Ronis, & Baer, 1995). In addition, social desirability responding would, if anything, act to suppress the variance on these measures as people would probably tend to underreport these variables (Hofmann & Stetzer, 1996). Therefore, reliance on these self-report measures would, at worst, attenuate the relationship between these variables and their posited predictors.

## *Data Analysis*

The main purpose of this study was to test the model of job insecurity and safety described above. The model was initially tested using the Time I data, then cross-validated by assessing the same model using the Time II data. Finally, to gather additional support for the hypothesized directionality of the model paths, we conducted longitudinal regression analyses using the data from respondents who participated in both data collection sessions.

*SEM analyses.* To conduct the first two tests of the model, we performed the two-step structural equation modeling (SEM) approach recommended by Anderson and Gerbing (1988) using LISREL 8 (Jöreskog & Sörbom, 1993). First, the measurement model was assessed to discriminate empirically the theoretical constructs of the model and to validate the operational measures thereof. As recommended by Fitzgerald, Drasgow, Hulin, Gelfand, and Magley (1997), three parallel indicators were formed for each of the latent constructs on the basis of confirmatory factor loadings, item–total correlations, and item content. Second, the structural equation model, specifying the causal relationships among the latent variables, was tested. Finally, alternative models that allowed for direct effects and the hypothesized mediated effects throughout the model were developed. In other words, these alternative models freed the direct paths between independent and dependent variables, as well as the mediating paths. In this fashion, the structural and alternative nested models could be compared to assess whether the alternative models explained significantly more variance relative to the lost degrees of freedom. Figures 1, 2, 3, and 4 show the paths that were freed in the estimation of the proposed and alternative structural models. All remaining paths were fixed at zero.

*Assessment of model fit.* To assess the adequacy of the measurement and structural models, researchers (Bentler & Bonett, 1980; Jöreskog & Sörbom, 1993; Mulaik et al., 1989) recommend examining several goodness-of-fit indices: the $\chi^2/df$ ratio, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), nonnormed fit index (NNFI), root mean square error of approximation (RMSEA), root mean square residual (RMSR), and comparative fit index (CFI).

*Longitudinal analyses.* Because of the small sample size of participants who responded to questionnaires at both time points, LISREL analyses could not be conducted to assess the validity of the model in a longitudinal context. Therefore, to gather support for the hypothesized directionality of the proposed model, we conducted several multiple regression analyses by predicting Time II dependent variables with the Time I independent variables while controlling for baseline levels of the dependent variable collected at Time I (D. Campbell & Stanley, 1966).

# Time I Cross-Sectional Results

Table 2 presents descriptive statistics and scale reliabilities; Table 3 presents zero-order product–moment correlations among the study variables.

## *Measurement Model Results*

Table 4 contains the goodness-of-fit statistics obtained from analyses of the parallel indicators. The $\chi^2/df$ ratio was 1.35, the GFI was .93, the AGFI was .88, the RMSR was .05, and the NNFI was .96. As is evident from the indices, the measurement model provided a satisfactory fit to the data. The factor loadings obtained from fitting the measurement model to the parallel indicators are provided in Table 5. All factor loadings from the measurement model are large and statistically significant beyond the .01 level. Together, these results suggest a good fit of the measurement model to the data.

The next phase in the analysis was the structural modeling procedure. Elements of the $\beta$ and $\Gamma$ matrices were either fixed at zero or freed (i.e., estimated) according to the proposed model of job insecurity and safety presented in Figure 1. Maximum likelihood estimation was used to estimate parameters.

## *Structural Model Results*

The goodness-of-fit indices for the proposed structural model are presented in Table 4 and also suggest a good fit of the model to the data. Table 4 shows that the $\chi^2/df$ ratio was 1.52, which is sat-

*(text continues on page 150)*

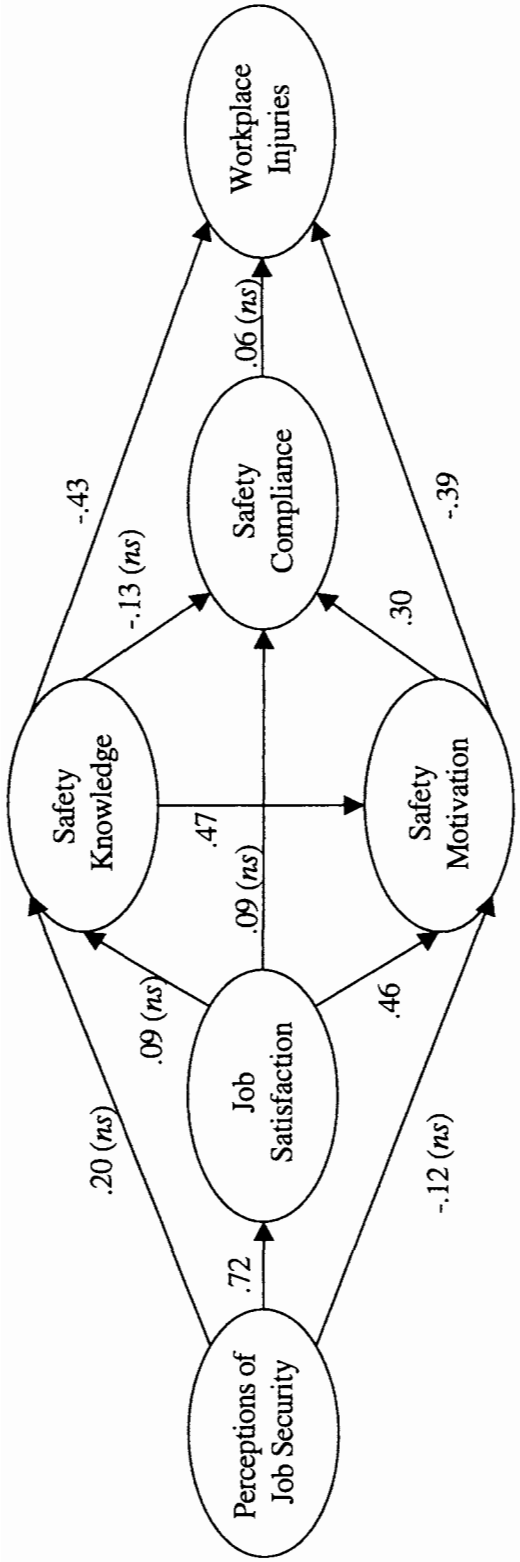


*Figure 2.* Alternative model allowing direct and mediation effects at Time 1.

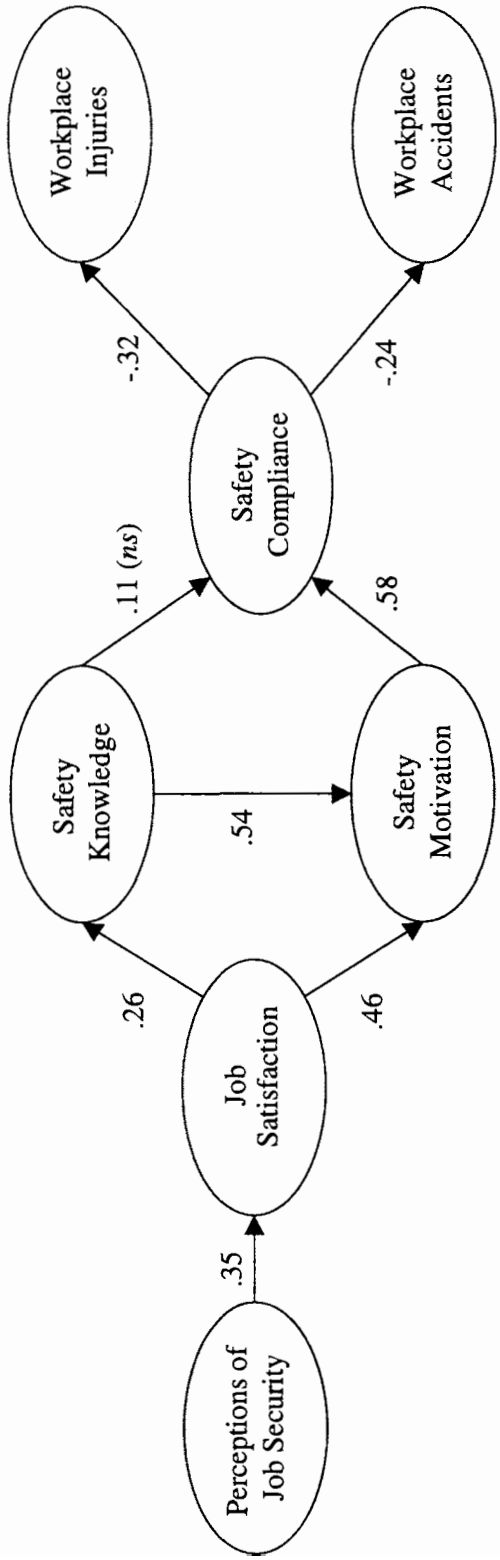


*Figure 3.* Structural model of the effects of job insecurity on employee safety at Time II.

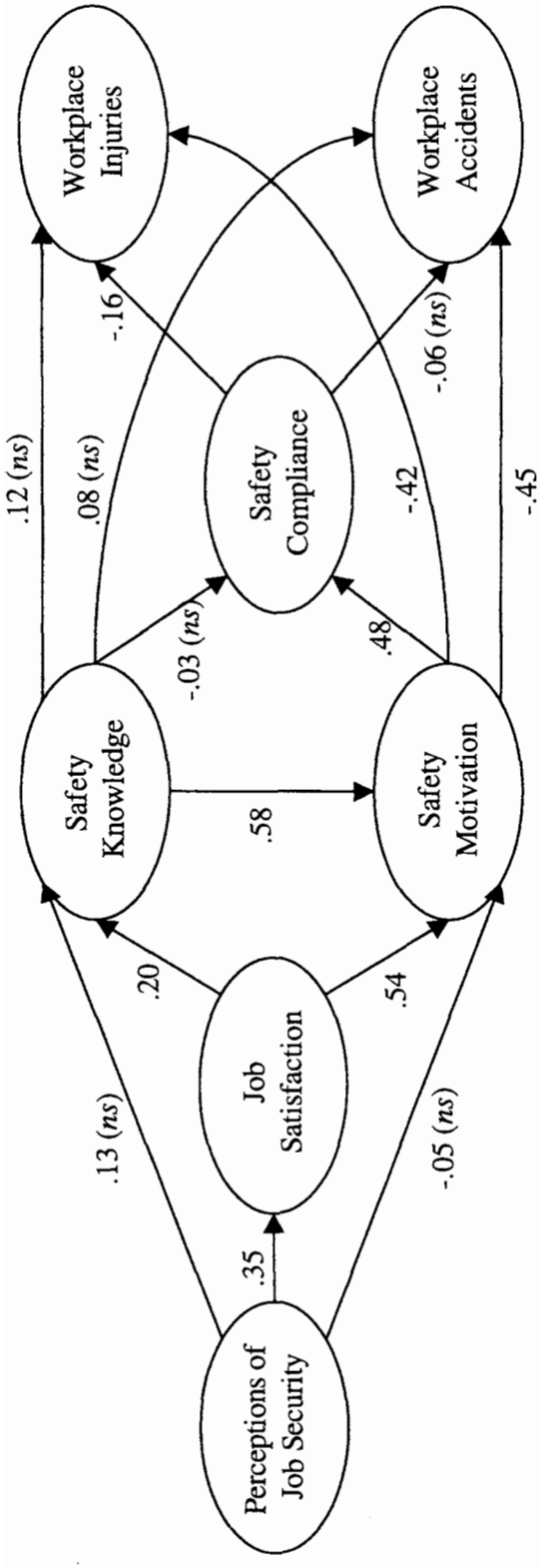


*Figure 4.* Alternative model allowing direct and mediation effects at Time II.

Table 2
*Descriptive Statistics and Scale Reliabilities*

| Variable | *N* | *M* | *SD* | α |
|---|---|---|---|---|
| Time I | | | | |
| 1. Job security perceptions | 162 | 1.94 | 1.00 | .91 |
| 2. Job attitudes | 168 | 1.74 | 0.52 | .91 |
| 3. Safety knowledge | 152 | 5.49 | 1.18 | .67 |
| 4. Safety motivation | 153 | 4.75 | 1.18 | .56 |
| 5. Safety compliance | 158 | 4.70 | 0.66 | — |
| 6. Workplace injuries | 159 | 0.31 | 0.47 | — |
| Time II | | | | |
| 7. Job security perceptions | 137 | 1.97 | 0.96 | .90 |
| 8. Job attitudes | 141 | 1.74 | 0.58 | .92 |
| 9. Safety knowledge | 138 | 5.60 | 1.07 | .61 |
| 10. Safety motivation | 138 | 4.55 | 1.20 | .60 |
| 11. Safety compliance | 138 | 4.62 | 0.61 | .66 |
| 12. Workplace injuries | 138 | 0.30 | 0.46 | — |
| 13. Workplace accidents | 134 | 0.89 | 1.68 | .67 |

*Note.* Dashes denote one-item measure.

isfactory. The GFI was .91; the NNFI was .93; and the RMSEA and RMSR were .06 and .07, respectively. Finally, the CFI was .95. Next, an examination of the path coefficients was undertaken, which are presented in Figure 1.

Five of the seven paths were in the expected direction and significant beyond the traditional significance level of $p < .05$, providing support for many of the hypotheses outlined earlier. In Figure 1, it is evident from the path coefficient of .72 that job security perceptions were strongly related to job satisfaction, providing support for Hypothesis 1. Of greater interest are the relationships between job satisfaction and safety knowledge and safety motivation. Job satisfaction was positively related to safety knowledge (.24), suggesting that individuals who are satisfied with multiple aspects of their job, including job security, report greater knowledge of safety policies. Similarly, higher levels of job satisfaction were related to higher levels of safety motivation (.33), supporting Hypothesis 3. As would be expected, there was a significant relationship between safety knowledge and safety motivation (.42), such that individuals reporting higher levels of safety knowledge also report correspondingly higher levels of motivation to comply with safety rules. An examination of the latter part of the model reveals that, contrary to Hypothesis 6, safety knowledge was not significantly related to reported safety compliance. However, safety compliance was significantly predicted by safety motivation (.24), as was anticipated in Hypothesis 5. Finally, in this test of the model,

Table 3
*Interscale Correlations of Study Variables*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Job security perceptions | .52** | .39** | .19* | .17* | .13 | −.07 | −.20* |
| 2. Job satisfaction | .55** | .70** | .27** | .48** | .17* | −.39** | −.32** |
| 3. Safety knowledge | .17* | .32** | .12 | .45** | .22* | −.24** | −.25** |
| 4. Safety motivation | .22** | .40** | .36** | .66** | .40** | −.29** | −.28** |
| 5. Safety compliance | .07 | .04 | −.02 | .21** | .43** | −.31** | −.20* |
| 6. Workplace injuries | −.07 | −.20* | .15 | −.08 | .06 | .37** | .10 |
| 7. Workplace accidents | — | — | — | — | — | — | — |

*Note.* Time I correlations are presented below the diagonal. Time II correlations are presented above the diagonal. Cross-time correlations for each study variable are reported along the diagonal. Dashes denote item was not measured at Time I.
* $p < .05$. ** $p < .01$.

Table 4
*Goodness-of-Fit Indices for Measurement and Structural Models*

| Model | $\chi^2$ | *df* | $\chi^2/df$ | GFI | AGFI | NNFI | RMSEA | RMSR | CFI |
|---|---|---|---|---|---|---|---|---|---|
| Time I | | | | | | | | | |
| Measurement | 70.22 | 52 | 1.35 | .93 | .88 | .96 | .05 | .05 | .97 |
| Structural | 91.34 | 60 | 1.52 | .91 | .86 | .93 | .06 | .07 | .95 |
| Alternative model | 84.17 | 55 | 1.53 | .92 | .86 | .93 | .06 | .06 | .95 |
| Time II | | | | | | | | | |
| Measurement | 105.08 | 72 | 1.46 | .90 | .84 | .93 | .06 | .06 | .95 |
| Structural | 148.83 | 85 | 1.75 | .87 | .82 | .88 | .08 | .09 | .90 |
| Alternative model | 126.25 | 79 | 1.60 | .89 | .83 | .91 | .07 | .07 | .93 |

*Note.* GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; NNFI = nonnormed fit index; RMSEA = root mean square error of approximation; RMSR = root mean square residual; CFI = comparative fit index. The structural models tested are the a priori models presented in the article. The alternative models allow for direct effects throughout the model, in addition to the hypothesized mediating effects.

safety compliance was not significantly related to workplace injuries, contrary to the expectations of Hypothesis 7.

### *Alternative Model Results: Testing for Direct Effects*

The goodness-of-fit indices for the alternative structural model allowing for direct as well as mediating effects are presented in Table 4. The $\chi^2/df$ ratio was 1.53. The GFI was .92; the NNFI was .93; and the RMSEA and RMSR were both .06. Finally, the CFI was .95. Although the fit indices reflect a satisfactory fit of the model to the data, the sequential chi-square was nonsignificant, indicating that the alternative model does not explain a significantly incremental portion of the variance relative to the degrees of freedom lost, $\chi^2_{seq}(5) = 7.17$, *ns*. An examination of the path coefficients confirms these results. The direct paths from job security perceptions to safety knowledge and to safety motivation and from job satisfaction to safety compliance are nonsignificant, providing support for Hypotheses 2 and 4. The direct paths from safety knowledge and safety motivation to workplace injuries, however, are significant, suggesting that a partially (rather than fully) mediating model might be more appropriate for these variables. Thus, Hypothesis 8, which predicted that safety compliance mediates the relationships between safety knowledge, motivation, and injuries, may not be fully supported.

Table 5
*Measurement Model Confirmatory Factor Loadings*

| Construct | Indicator 1 | Indicator 2 | Indicator 3 |
|---|---|---|---|
| Time I | | | |
| Job security perceptions | .83 | .93 | .64 |
| Job attitudes | .83 | .82 | .86 |
| Safety knowledge | .74 | .69 | — |
| Safety motivation | .38 | .52 | .79 |
| Time II | | | |
| Job security perceptions | .84 | .91 | .69 |
| Job attitudes | .91 | .79 | .90 |
| Safety knowledge | .44 | .73 | .64 |
| Safety motivation | .63 | .38 | .49 |

*Note.* Only factor loadings of latent variables are reported here. All reported factor loadings were significant at $p < .05$. The factor loadings of the single indicator manifest variables (e.g., safety compliance, injuries, and accidents) were fixed at 1.00. The dash denotes only two indicators for safety knowledge at Time I.

## Time II Cross-Sectional Results

Table 2 presents descriptive statistics and reliabilities at Time II. Zero-order product–moment correlations among the study variables at Time II can be found in Table 3.

### *Measurement Model Results*

Table 4 contains the goodness-of-fit statistics obtained from analyses of the parallel indicators. The $\chi^2/df$ ratio was 1.46; the GFI was .90 and AGFI was .84. The NNFI was .93, and the RMSEA and RMSR were both .06. Finally, the CFI was .95. The factor loadings obtained from fitting the measurement model to the parallel indicators are provided in Table 5. All factor loadings from the measurement model

are large and statistically significant beyond the .01 level. Together, these results suggest a satisfactory fit of the measurement model to the data.

The next phase in the analysis was the structural modeling procedure. Elements of the $\beta$ and $\Gamma$ matrices were either fixed at zero or freed (i.e., estimated) according to the proposed model of job insecurity and safety presented in Figure 3. (Note that Figure 3 differs slightly from Figure 1 in that workplace accidents were measured at Time II.) Maximum likelihood estimation was again used to estimate parameters.

### *Structural Model Results*

The goodness-of-fit indices for the proposed structural model are presented in Table 4 and suggest a reasonable fit of the model to the data. Table 4 shows that the $\chi^2/df$ ratio was 1.75, which is satisfactory. The GFI was .87; the NNFI was .88; and the RMSEA and RMSR were .08 and .09, respectively. Finally, the CFI was .90. Next, the path coefficients were examined and are presented in Figure 3.

Seven of the eight paths were in the expected direction and significant beyond the traditional significance level of $p < .05$, providing additional support for many of the hypotheses outlined earlier. Job security perceptions were again related to job satisfaction (.35), providing support for Hypothesis 1. Job satisfaction was also positively related to safety knowledge (.26), suggesting that individuals who are secure in their job and satisfied with that level of security report greater knowledge of safety policies. Similarly, greater job satisfaction was related to higher levels of safety motivation (.46), supporting Hypothesis 3. There was again a significant relationship between safety knowledge and safety motivation (.54), such that individuals reporting higher levels of safety knowledge also report correspondingly higher levels of motivation to comply with safety rules. As was found at Time I, safety knowledge was not significantly related to reported safety compliance. Rather, safety compliance was significantly predicted by safety motivation (.58), as was anticipated in Hypothesis 5. Finally, both workplace injuries and workplace accidents were significantly predicted by safety compliance (–.32 and –.24, respectively), suggesting that greater safety compliance is related to fewer workplace injuries and accidents, in accordance with Hypothesis 7.

### *Alternative Model Results: Testing for Direct Effects*

The goodness-of-fit indices for the alternative structural model at Time II allowing for direct as well as mediating effects are presented in Table 4. The $\chi^2/df$ ratio was 1.60. The GFI was .89; the NNFI was .91; and the RMSEA and RMSR were both .07. Finally, the CFI was .93. These fit indices appear to reflect a better fit of the model to the data than the proposed structural model. As confirmation, the sequential chi-square was significant, indicating that the alternative model explains a significantly incremental portion of the variance relative to the degrees of freedom lost, $\chi^2_{seq}(6) = 22.58$, $p < .01$.

An examination of the path coefficients suggests that these results are largely being driven by the direct effects allowed between safety motivation and workplace injuries (–.42) and accidents (–.45). All other direct effect paths were nonsignificant. Consistent with the Time I alternative model results, this suggests that a partially (rather than fully) mediating model might be more appropriate for these variables.

### *Comparison of Time I and Time II Structural Models*

Before moving on to the longitudinal analyses, we summarize the consistencies and inconsistencies in the structural models at Time I and Time II to provide some cross-validation of the proposed model in the two samples. At both time points, the data indicate that perceptions of job security are significantly related to job satisfaction. In turn, more positive job satisfaction is related to higher levels of safety knowledge and motivation. Further, at both time points, although safety knowledge is related to safety motivation, it is not related to safety compliance. Safety compliance is better explained by safety motivation in both of the models. Finally, safety compliance at Time I was not related to workplace injuries, whereas safety compliance as measured in Time II was related to both workplace injuries and accidents at Time II.

At first glance, it appears that the tests of the alternative models were inconsistent. The Time I model explained a nonsignificant amount of additional variance over the proposed structural model, whereas the Time II model did explain a significant amount of additional variance. However, both models consistently indicated that extrinsic safety motivation has strong direct (as well as indirect) effects on workplace injuries and accidents.

## Longitudinal Regression Results

Although the cross-sectional tests of the models reported above suggest that job insecurity has significant and strong relationships with important safety outcomes, there is a significant limitation to those analyses. Because those results are based on cross-sectional data, the direction of effects can be hypothesized but not directly tested. It is clear that there are significant relationships between job insecurity and important safety outcomes. However, it is unclear if job insecurity is the cause of lower safety motivation and compliance. An alternative, and equally plausible, explanation is that employees with poor safety motivation and compliance are more likely to be insecure in their job as a result of their poor safety attitudes and lack of compliance. Thus, each path of the hypothesized model was further tested using longitudinal data collected on a subset of the Time I and Time II participants. By showing that job security perceptions at Time I were related to Time II safety outcomes, while controlling for baseline levels of the outcome variables at Time I, we can make a better case for the hypothesized model of job security safety (D. Campbell & Stanley, 1966).

The longitudinal multiple regression results are presented in Table 6. For each analysis, the Time I control variable was first entered into the equation to predict the Time II outcomes. In the second equation, both the predictor and Time I control variables were entered into the regression equation. The last two columns of Table 6 indicate the change in $R^2$ and the significance of the $F_{change}$ statistic.

### *Predicting Time II Job Satisfaction*

The first multiple regression analysis assessed the ability of Time I job security perceptions to predict job satisfaction at Time II, while controlling for baseline Time I levels of participant job satisfaction. As can be seen in Table 6, although job satisfaction at Time I was significantly related to job satisfaction at Time II ($\beta = .70$), job security perceptions at Time I also significantly predicted satisfaction at Time II ($\beta = .39$), accounting for an additional 10% of the variance ($F_{change} = 41.24$, $p < .01$). This provides longitudinal support for Hypothesis 1, in addition to the two cross-sectional tests earlier reported.

### *Predicting Time II Safety Knowledge*

As anticipated by Hypothesis 3, job satisfaction at Time I was a significant predictor of safety knowl-

Table 6
*Longitudinal Multiple Regression Analysis Results*

| | | | Control → Criterion | | | | Predictor + Control → Criterion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time I predictor | Time I control | Time II criterion | $\beta$ | $R^2$ | $F$ | $df$ | $\beta_{control}$ | $\beta_{pred}$ | $R^2$ | $F$ | $df$ | $\Delta R^2$ | $F_{change}$ |
| Job security | Job satisfaction | Job satisfaction | .70** | .50 | 157.12** | 1, 60 | .49** | .39** | .59 | 118.93** | 2, 59 | .10 | 41.24** |
| Job satisfaction | Safety knowledge | Safety knowledge | .12 | .02 | 0.94 | 1, 62 | −.01 | .37** | .14 | 4.75* | 2, 61 | .12 | 8.44** |
| Job satisfaction | Safety motivation | Safety motivation | .60** | .60 | 34.89** | 1, 63 | .70** | .24* | .64 | 21.15** | 2, 62 | .05 | 5.13* |
| Safety motivation | Safety compliance | Safety compliance | .43** | .18 | 13.90** | 1, 62 | .34** | .28* | .25 | 10.25** | 2, 61 | .07 | 5.57* |
| Safety knowledge | Safety compliance | Safety compliance | .43** | .18 | 13.40** | 1, 62 | .43** | .09 | .19 | 6.94** | 2, 61 | .01 | 0.53 |
| Safety compliance | Workplace injuries | Workplace injuries | .36** | .13 | 9.55** | 1, 63 | .36** | −.07 | .14 | 4.94* | 2, 62 | .01 | 0.36 |
| Safety compliance | —[a] | Workplace accidents | | | | | | −.27* | .07* | 4.70* | 1, 62 | | |

[a] Workplace accidents data were not available at Time I. Therefore, they could not be controlled for in this analysis.
* $p < .05$. ** $p < .01$.

edge at Time II ($\beta = .37$) after controlling for Time I safety knowledge levels. Entering job satisfaction into the regression equation at Step 2 resulted in an $R^2$ change of .12, which was significant ($F_{change} = 8.44$, $p < .01$).

### *Predicting Time II Safety Motivation*

Providing additional support for Hypothesis 3, the longitudinal multiple regression analysis suggests that job satisfaction at Time I significantly predicts safety motivation at Time II ($\beta = .24$), even after accounting for safety motivation levels at Time I ($\beta = .60$). Thus, although Time II safety motivation is best predicted by earlier levels of motivation, Time I job satisfaction did account for an additional 5% variance in the dependent variable ($F_{change} = 5.13$, $p < .05$).

### *Predicting Time II Safety Compliance*

Safety compliance at Time II was significantly predicted by both Time I safety compliance ($\beta = .43$) in the first equation and Time I safety motivation ($\beta = .28$) in the second equation. Thus, even after Time I safety compliance was accounted for, safety motivation remained a significant predictor of this outcome variable, accounting for an additional 7% variance ($F_{change} = 5.57$, $p < .05$). As was found in both of the cross-sectional analyses, safety knowledge was not a significant predictor of safety compliance ($\beta = .09$) and did not account for any incremental variance explained ($F_{change} = 0.53$, *ns*).

### *Predicting Time II Workplace Injuries*

Time II workplace injuries appear to be best predicted by Time I workplace injuries ($\beta = .36$). Thus, individuals who suffered from wrist, hand, or arm injuries at Time I were also likely to have these types of injuries at Time II. Safety compliance at Time I did not account for any additional variability in workplace injuries ($\Delta R = .01$, $F_{change} = 0.36$, *ns*), although the regression coefficient was in the expected direction ($\beta = -.07$).

### *Predicting Time II Workplace Accidents*

Because workplace accidents were not measured at Time I, baseline levels of such accidents could not be controlled for in this analysis. However, in tentative support of the job security model, Time I safety compliance levels were related to Time II reports of workplace accidents ($\beta = -.27$), such that individuals reporting more compliance at Time I were found to have fewer reported and unreported accidents and near misses at Time II than individuals who exhibited less compliance with safety regulations at Time I ($F_{change} = 4.70$, $p < .05$).

### *Comparison of Cross-Sectional and Longitudinal Results*

Overall, the results of the longitudinal regression analyses were quite consistent with the results of the two cross-sectional SEM analyses. First, in both cross-sectional SEM analyses and in the longitudinal multiple regression analysis, job insecurity was consistently shown to be a strong predictor of job satisfaction. This supports previous research conducted in this area. Next, safety motivation was consistently predicted by job satisfaction. This was true in both of the cross-sectional analyses and in the longitudinal results. Therefore, it appears that job insecurity can have an important effect on safety motivation through its impact on such job attitudes as job security satisfaction, coworker and supervisor satisfaction, and satisfaction with pay, promotions, and the work itself. In addition, consistent support across the three tests was found for the proposition that job satisfaction is related to safety knowledge.

The latter portion of the model assessed behavioral and physical outcomes of job insecurity and decreased safety motivation and knowledge. Participants consistently reported less compliance with safety policies when their extrinsic motivation to comply with safety rules was reduced. Safety knowledge, on the other hand, did not appear to be an important predictor of safety compliance in any of the three analyses. With respect to physical health outcomes, greater numbers of workplace accidents were consistently found when safety compliance was reduced. Finally, partial support was found for the hypothesis that safety compliance is related to experienced injuries on the job. Of the three analyses, only the Time II cross-sectional analyses showed this predicted relationship.

### *Additional Analyses*

Because managers may be exposed to fewer hazards, and thus may report fewer injuries and accidents, one final analysis was performed to assess whether managerial status had a significant effect on the safety variables of interest—specifically, safety

knowledge, safety motivation, safety compliance, workplace injuries, and workplace accidents. We performed hierarchical multiple regression analyses by entering managerial status as a control variable in the first step and entering the relevant predictors in the second step. These analyses were performed successively on the Time I dataset, the Time II dataset, and the longitudinal subset of data.

Results indicate that managerial status had little impact on the safety variables of interest. In the Time I dataset, one of the six analyses was significant suggesting that managerial status was negatively related to reported safety compliance, $F(2, 144) = 16.66$, $p < .001$, such that managers reported being less compliant than nonmanagers ($\beta = -.39$). However, even after entering this control variable, safety motivation remained a significant predictor of safety compliance ($\beta = .27$, $p < .001$). In the Time II dataset, there was again one significant result out of the six analyses. Managers reported fewer workplace injuries than nonmanagers, $F(2, 134) = 11.56$, $p < .001$. However, safety compliance remained a significant predictor of injuries ($\beta = -.31$, $p < .001$), such that greater compliance was related to fewer injuries. Finally, in the longitudinal dataset, none of the six regression analyses were significant.

## Discussion

The purpose of this study was to explore the relationship between employee perceptions of job insecurity and safety outcomes such as extrinsic motivation to comply with safety policies on the job, self-reported incidences of safety violations, and workplace injuries and accidents. Previous research on the outcomes of job insecurity had focused primarily on attitudinal outcomes, such as organizational commitment and job satisfaction, health outcomes including both physical and mental health conditions, and employee withdrawal intentions (i.e., turnover). However, little attention has been paid to safety as a potentially important outcome.

The results of this study confirmed previous research that suggests job security perceptions are strongly related to job satisfaction. In turn, this study showed that job satisfaction is an important predictor of safety motivation and knowledge. More importantly, this study produced important initial evidence that job security is also related to meaningful safety outcome measures, such as safety knowledge, safety motivation, and reported compliance with safety policies. In turn, injuries and accidents were shown to be predicted by safety motivation, and, to a lesser degree, by safety knowledge and compliance. Perhaps most significantly, the majority of these results were confirmed in both cross-sectional samples and a more rigorous longitudinal design.

### *Implications for Practice and Research*

The results of this study have potentially important practical and theoretical implications. With respect to practical implications, these results suggest that organizations not only need to consider the effects that employee job insecurity has on the job satisfaction, health, and turnover intentions of employees, but also need to consider the possibility that job insecurity can have potentially dangerous implications for employee safety attitudes and behaviors. Employees who feel that their jobs are insecure may choose to ignore critical safety policies. The reason for this link and how organizations might circumvent it warrants further exploration. Possibly, employees operating under conditions of job insecurity choose to ignore critical safety policies and "cut corners" to maintain or increase their production numbers in an effort to retain their job. Of course, lifetime job security is not the solution; however, organizations do need to be cognizant of this potentially dangerous relationship between job insecurity and safety violations. In particular, organizations need to be aware of the potentially competing demands of safety and production during times of organizational transition and job insecurity.

Of particular interest to organizations may be the consistent finding that safety knowledge in the absence of motivation had little impact on safety outcomes. With the exception of the alternative model tested at Time I, there were no significant paths to injury except through safety motivation. This has implications for the current focus on behavioral safety programs in industry today, as it questions the role of safety knowledge. Equally troubling is the lack of consistent relationship between compliance and injury. Possibly, this indicates that the organization's safety rules may be inadequate to prevent injury despite employee compliance to those rules.[2]

Theoretically, this study ties together two previously independent streams of research. As noted earlier, there has been a great deal of research on the outcomes of job insecurity, but researchers have up to this point ignored safety motivation and compliance

[2] We thank an anonymous reviewer for drawing our attention to these implications.

as possible outcomes. Similarly, there is a growing body of literature on work and organizational antecedents of employee safety outcomes (e.g., Hofmann et al., 1995; Hofmann & Morgeson, 1999; Hofmann & Stetzer, 1996, 1998; Simard & Marchand, 1997; Thompson, Hilton, & Witt, 1998; Zohar, 1980). However, to date, there has been no research considering job insecurity as a predictor of worker safety. This study was a first attempt to bring together these areas of research.

### *Explaining the Job Insecurity–Safety Link*

There are possibly multiple explanations for the consistent link between job insecurity and safety. However, the most plausible explanation appears to be related to a finite amount of resources on the part of the employee. Consider the employee who has to juggle the competing job demands of production, quality, and safety. When jobs are threatened and organizations are run by the bottom line, employees may feel pressured to cut safety corners to keep their production numbers up. Thus, when employees perceive that the demands of safety and production are incompatible, safety motivation may be replaced by the demands of production motivation when the employee feels his or her job is insecure, particularly if the employee is not actively rewarded for safe behavior. In the present study, the organization was downsizing by eliminating one shift and changing another shift schedule, yet overall organizational production demands remained constant. In other words, employees were expected to produce equivalent amounts under conditions of fewer human resources.

Although production demands were not specifically included in the model or directly measured, there were three items in the questionnaire that assessed the extent to which employees perceived their organization to place an emphasis on production. Analyses assessing production emphasis as a mediator of the relationship between job insecurity and safety outcomes are presented in Table 7 using the three-step approach by Baron and Kenny (1986) and suggest that production demands may partially mediate the relationship between (a) job insecurity and job satisfaction and (b) job insecurity and safety motivation. In other words, employees who feel insecure perceive a greater emphasis on production, which then translates into lower job satisfaction and reduced motivation to attend to safety.

Table 7
*Mediated Multiple Regression Analysis Results*

| | | | Predictor → Mediator | | | | Predictor → Criterion | | | | Predictor + Mediator → Criterion | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Predictor | Mediator | Criterion | $\beta$ | $R^2$ | $F$ | $df$ | $\beta$ | $R^2$ | $F$ | $df$ | $\beta_{med}$ | $\beta_{pred}$ | $R^2$ | $F$ | $df$ | Model |
| Time I variables | | | | | | | | | | | | | | | | |
| Job security | Production | Job satisfaction | −.34** | .12 | 19.42** | 1, 149 | .55** | .30 | 69.62** | 1, 160 | −.19* | .48** | .33 | 36.34** | 2, 148 | P |
| Job security | Production | Safety knowledge | −.34** | .12 | 19.42** | 1, 149 | .17* | .03 | 4.25* | 1, 146 | −.09 | .14† | .04 | 2.72 | 2, 143 | N |
| Job security | Production | Safety motivation | −.34** | .12 | 19.42** | 1, 149 | .22** | .05 | 7.55** | 1, 147 | −.09 | .20* | .07 | 4.27* | 2, 144 | N |
| Time II variables | | | | | | | | | | | | | | | | |
| Job security | Production | Job satisfaction | −.15† | .02 | 3.27† | 1, 135 | .39** | .15 | 23.83** | 1, 135 | −.38** | .33** | .29 | 27.21** | 2, 134 | P |
| Job security | Production | Safety knowledge | −.15† | .02 | 3.27† | 1, 135 | .19* | .04 | 5.12* | 1, 132 | −.08 | .18* | .04 | 3.02* | 2, 131 | N |
| Job security | Production | Safety motivation | −.15† | .02 | 3.27† | 1, 135 | .17* | .03 | 3.97* | 1, 132 | −.19* | .14 | .06 | 4.45* | 2, 131 | F |

*Note.* P = partially mediated model; F = fully mediated model; N = no mediating effects.
† $p < .10$. * $p < .05$. ** $p < .01$.

### *Limitations and Future Directions*

Although the proposed model of job insecurity and safety was supported in the cross-sectional and longitudinal analyses, there are several limitations that should be noted. First, these results can only provide tentative support for the hypothesized directionality of the model. Establishing a link between the Time I predictor and the Time II criterion does not necessarily establish causality because the link could occur through the Time II predictor. Stronger statements regarding causality can only be made through the collection of quasi-experimental or experimental data. Although experimental data on the effects of job insecurity on safety outcomes would be fairly difficult and possibly unethical to collect in the field, such data could conceivably be collected in the laboratory. This multimethod approach would provide even stronger support for this model. The external validity of this model could also be enhanced through the collection of data in populations other than the food-processing industry in which safety is a primary concern.

In addition, although it seems clear that there is a link between job insecurity and safety outcomes, the exact nature of the effects of safety knowledge and motivation on injuries and accidents warrants further study. In particular, it is unclear whether safety motivation and knowledge have direct effects on workplace injuries and accidents or if these effects are mediated through safety compliance. The tests of alternative models seem to suggest that safety motivation and knowledge have direct effects on workplace injuries (in the Time I dataset) and that safety motivation has both direct and indirect effects (through compliance) on injuries and accidents in the Time II dataset.

One parsimonious explanation for these equivocal results may be that the measure of compliance was faulty. Recall that compliance was measured by one item at Time I and two items at Time II. Single-item measures have unknown reliability, and it is difficult to make judgments about their psychometric properties. In general, future research should use a more established and better validated measure of this construct.

Future research should also strive to move beyond the realm of single-source self-report data by gathering independent- or multiple-source data on several of the variables of interest. Self-report data raise concerns about the possible operation of single-source bias as an alternative explanation to the substantive findings. Although this is a limitation of the present study, a perusal of the zero-order correlation coefficients does not point to consistently high coefficients as would be expected if such a bias was having a strong impact on the data. In addition, similar findings across the two cross-sectional and one longitudinal datasets offset some of this concern. Nevertheless, using archival data on accidents, injuries, and safety violations in conjunction with self-report measures may be preferable, as research suggests that the accurate recall of workplace accidents may only extend back 4 weeks (Landen & Hendricks, 1995).

### *Conclusion*

Up until this point, research on the consequences of job insecurity and research on the antecedents of employee workplace safety have largely proceeded independently of each other. Job insecurity research has primarily focused on attitudinal, behavioral, and mental health outcomes, largely ignoring the potential impact on safety. Similarly, research in the area of workplace safety has largely focused on ergonomic factors and personnel selection and training as primary antecedents of safety, thus ignoring the potential role of job insecurity. This research was a first attempt to unite these disparate fields by developing and testing a model linking job insecurity to safety motivation, compliance, and workplace injuries and accidents.

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