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Safety activities in small businesses

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ABSTRACT

Background: Workplace injuries occur at higher rates in smaller firms than in larger firms, and the number of workplace safety activities appear to be inversely associated with those rates. Predictors of safety activities are rarely studied.
Methods: This study uses data from a national random survey of firms ($n = 722$) with less than 250 employees conducted in 2002.
Results: We found that, regardless of firm size or industry, safety activities were more common in 2002 than they were in a similar 1983 study. Having had an OSHA inspection in the last five years and firm size were stronger predictors of safety activities than industry hazardousness and manager's perceptions of hazardousness. All four variables were significant predictors (β range .19 to .28; $R^2 = .27$).
Conclusions: Further progress in the prevention of injuries in small firms will require attention to factors likely subsumed within the firm size variable, especially the relative lack of slack resources that might be devoted to safety activities.

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1. Introduction

Small businesses are burdened with higher occupational injury and fatality rates than larger businesses. (Buckley et al., 2008; Fabiano et al., 2004; Fenn and Ashby, 2004; Hinze and Gambatese, 2003; Jeong, 1998; Mendeloff et al., 2006; Morse et al., 2004; Page, 2009) Efforts to prevent those injuries and fatalities are important because of the human loss, but also because they may threaten the survival of small businesses which are viewed as engines of job creation and economic growth. A study of business survival rates of new, presumably smaller businesses in Canada found that those that survived for at least five years had less than half the rate of occupational injuries in their first year of operation as those that survived for only one to two years (Holizki et al., 2006).

One of the ways employers prevent occupational injuries and fatalities is by engaging in safety activities. Activities such as regular safety meetings with employees, job descriptions that include safety duties, regular management communications about safety issues, and employee involvement are associated with fewer injuries and fatalities (Shannon et al., 1997; Mearns et al., 2003). While most smaller firms engage in some safety activities (Barbeau et al., 2004; Champoux and Brun, 2003), they engage in fewer safety activities than larger firms (de Kok, 2005; Dennis, 2002; Lentz et al., 2001; Lentz and Wenzl, 2006). Reasons for that disparity include less slack resources, greater time demands on managers, poorer manager attitudes about safety, and fewer employees to engage in activities such as safety committees (Hasle and Limborg, 2006; Parker et al., 2007).

Evidence about the relative importance of those reasons is sparse. In the only study of its kind that we found, Sims (2008) took an important step beyond descriptive studies by evaluating a number of predictors of safety activities using regression analysis. Using data from a 1983 survey of a random sample of members of the National Federation of Independent Businesses (NFIB) that was stratified by size and industry, he found that the following factors were associated with more safety activities in a firm:

- A loss prevention inspection by a workers' compensation organization (external variable).
- An OSHA inspection (external).
- Greater business size (organization).
- Greater hazardousness of the business sector (organization).
- Employee safety being an element of collective bargaining activity (organization).
- Presence of a production foreman (organization).
- Presence of designated safety personnel (organization).
- Perceived lack of difficulty in persuading employees to act safely (manager perception).
- Perception that safety and health was a serious concern (manager perception).

However, when the organizational predictive factors were added to the overall regression model, business size, industry sector, and OSHA or workers' compensation inspection experience no

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longer explained significant amounts of variance in the outcome. Sims concluded that much of the predictive value of these variables was explained by manager perceptions and the other organizational variables. These results are at odds with more recent findings that a primary reason for finding fewer safety activities in smaller businesses is lack of resources to devote to non production-related activities – a condition most-related to business size (Page, 2009; Champoux and Brun, 2003; Hasle and Limborg, 2006; Jones, 1999). The Sims study also had to drop consideration of less-hazardous industries due to the low number of safety activities reported in those industries, restricting the gereralizability of his results.

The study described in this paper is a partial replication of the Sims study using more recent data from a second survey of smaller U.S. businesses that was conducted by the same organization almost twenty years after the first survey. The 2002 survey report from NFIB included only analysis of bivariate relationships of all survey questions by firm size (Dennis, 2002). The additional analyses of the 2002 data reported here allowed us to address three research questions: First, was there a change in the number of reported safety activities in smaller businesses between 1983 and 2002? Second, what is the relative importance of business size, industry hazardousness, OSHA inspection, and manager perception variables in predicting safety activities of smaller businesses? The relative importance of these predictors might change over time. Is Sims' finding that OSHA inspections are a weak predictor of safety activities true 19 years later? Finally, this study goes beyond the earlier study by using data from small businesses from all industry sectors (not just the most hazardous ones). Thus we were able to evaluate the extent to which predictors of safety activities were similar for all industries in the U.S. economy. A thorough background on predictor and outcome variables may be found in (Sims, 2008), but a brief explanation is provided here before sections on methods, results, discussion and conclusions.

1.1. Firm size and industrial sector

Smaller businesses have been found to have fewer safety activities than larger businesses. (Dennis, 2002) In addition, industries that are more hazardous have been found to engage in a greater number of safety activities than those in other industries. For example, participation in a safety committee program offered by a workers' compensation agency was positively related to business size and the hazardousness of the participant's industry (as measured by injury rate) (Liu et al., 2010). Firms with more than 100 employees were 100 times more likely to participate than firms with less than 20 employees. Firms in construction or manufacturing were more likely to participate than firms in service sectors.

1.2. OSHA inspections

OSHA inspections have been shown to be related to reduced subsequent workplace injury experience by analysis at both the industry-level (Bartel and Thomas, 1985; Viscusi, 1979, 1983) and enterprise-level (Baggs et al., 2003; Gray and Mendeloff, 2005; Gray and Scholz, 1993; Mendeloff and Gray, 2005; Scholz and Gray, 1990; Weil, 1996). However, the relationship between inspections and safety activities has received less attention. Sometimes the inspection-activities relationship is presumed in investigations of the inspection-injury relationship. Using types of injuries experienced by employers after an OSHA inspection as a dependent variable, Mendeloff and Gray (2005) found support for their proposal that inspections motivated both a focused employer response pattern ("detection/correction" – specific cited hazards reduced and injuries specific to the hazard subsequently reduced) and a general response pattern ("behavioral shock" – overall greater emphasis on safety and a broader range of hazards and injuries reduced). They found evidence that the shock effect was stronger than the detection/correction effect. Thus, we expect that inspections will be related to a range of safety activities across all industries.

1.3. Manager perceptions of relative risk

Research focusing on top level managers suggests that their attitudes or perceptions play a significant role in their organization's occupational safety performance (Rundmo and Hale, 2003; Sawacha et al., 1999). Additionally, small business managers' and employees' perceptions of the work environment including safety training, employee-management cooperation, resources for safety, safety programs, and the presence of a safety committee strongly predicted safety performance (Parker et al., 2007). Safety activities in smaller enterprises are likely related to perceptions and motivations of their managers. Hasle and Limborg's review (2006) found evidence that small business owners often have low motivation to consult outside resources which may leave them at a disadvantage when they face technical issues such as safety and health, leaving them less likely to take preventive action. They also may be less motivated than managers in larger firms because they see workplace injuries less frequently.

2. Data and methods

2.1. Sample

This is a secondary analysis of data that were collected for a 2002 survey called *Workplace Safety*. It was conducted at the direction of the National Federation of Independent Businesses Research Foundation by the executive interviewing group of the Gallup Organization. The methods used to collect the data and descriptive findings are in the NFIB report on the survey (Dennis, 2002). A national random sample of businesses was drawn from the files of the Dun & Bradstreet Corporation. The sample was stratified to oversample for larger businesses since most U.S. businesses employ one to four people. The final sample that was surveyed (by telephone) included 351 businesses with 1 to 9 employees (46%), 200 with 10 to 19 (27%), and 201 with 20 to 249 employees (27%). Without stratification, in 2002 those percentages of the population would have been 79%, 11%, and 10% (Dennis, 2002). Respondents were the business owner or operator. Response rate and non-responder bias data were neither reported by nor available from the primary research groups.

2.2. Analysis variables

2.2.1. Firm size and industrial sector

The number of employees (firm size) was extracted from Dunn & Bradstreet. Respondents were asked to specify their "primary business activity" and given nine categories from which to choose: Construction, manufacturing, wholesale, retail, services, transportation, communication, financial services, and agriculture/forestry/fishing. Data from the U.S. Department of Labor's Bureau of Labor Statistics (BLS) were used to rank these categories on their overall injury and illness rates in 2002 (BLS, 2003). Those ranks were collapsed to two for analysis: "high injury/illness rates" (>3.0 injuries per 100 FTE per year – manufacturing, transportation, construction, agriculture/forestry/fishing, and wholesale trade) or "low injury/illness rates" (<3.0 – retail trade, services, communications, and financial services). Incidence rate data were nonfatal occupational injuries and illnesses involving days away