Chapter 12

FOOD PROCESSING WORKERS CAN BE THE FIRST LINE OF DEFENSE AGAINST INTENTIONAL CONTAMINATION

Verlin B. Hinsz
North Dakota State University, ND, USA

Gary S. Nickell
Minnesota State University Moorhead, MN, USA

ABSTRACT

Government officials state that America’s food supply is vulnerable to a terrorist attack. We assert that actions of the workers who have direct contact with food are a critical component in defense against intentional contamination of the food supply. We find that psychological factors play a significant role in keeping food safe and avoiding unintentional contamination. In particular, workers’ food safety behaviors depend on their intentions to keep food uncontaminated and their beliefs of what they can do to prevent contamination. We examine whether similar intentions and beliefs can help understanding of how food processing workers might play a role on the front line of food defense against intentional contamination. We report a study that examines the extent to which workers are willing to go beyond their required duties to detect signs of intentional contamination.

Workers at a turkey processing plant were given the opportunity to complete a questionnaire that included a set of questions focusing on employee beliefs and intentions regarding intervening to prevent deliberate contamination of food products. A large majority of workers responded that they were willing to do all that is needed to keep the products from being intentionally contaminated. A majority of workers also agreed that there were good safeguards in place at the plant to detect if someone intentionally contaminated any of their products. On the negative side, these food processing workers said it was likely someone could intentionally contaminate the food products without
being caught. Similarly, a quarter of the workers said it would be difficult to detect if someone purposely contaminated the products at the plant.

Our primary conclusion is that most employees appeared motivated to detect intentional contamination, however some believe it would be difficult. Food production organizations that encourage an environment that enhances workers’ willingness to go beyond expectations for food safety and security may be better prepared to combat and prevent intentional contamination.

**INTRODUCTION**

“For the life of me, I cannot understand why the terrorists have not attacked our food supply because it is so easy to do” (U.S. Secretary of Health and Human Services, Tommy Thompson, December 3, 2004).

As this quote from former Secretary Thompson illustrates, the American food supply is vulnerable to a terrorist attack (MSNBC News, 2004). The food supply and aspects of the food chain are just one area where a terrorist attack could be directed. Such an attack is often referred to as agroterrorism – the deliberate introduction of an agent into the food supply to undermine its stability and/or generate fear (Chalk, 2004; Monke, 2007). The economic losses from an agroterrorism act would be extensive and likely widespread. Analysts make it clear that the American food supply is quite susceptible to acts of deliberate contamination (Chalk, 2004). Consequently, they recommend much more attention be directed toward protecting the safety of American foods (GAO, 1999). The Bioterrorism Preparedness and Response Act of 2002 was enacted primarily in response to acknowledged vulnerabilities following the September 11, 2001 attacks (Monke, 2007). The purpose of this act was “to improve the ability of the United States to prevent, prepare for, and respond to bioterrorism and other public health emergencies.” This act and several executive initiatives have been undertaken to advance the nation’s ability to detect and respond to a terrorist attack on agricultural production or the food supply.

To achieve this safety in food, enhanced security and surveillance at food processing plants is required (Chalk, 2004; Monke, 2007). Greater food security can be accomplished by incorporating various technologies such as sensors and surveillance cameras (Stout, 2004). Yet, even greater use of technology will not eliminate various means of deliberate food contamination (Brandon, 2002). FBI Director Robert Mueller suggested that the workers and individuals who have contact with food in the supply chain are on the line of defense against deliberate contamination (CNN, 2006). Food production workers can be the eyes and ears for food security and surveillance of the food supply. We argue that the workers at food processing plants can be important guardians against intentional contamination of the food supply.

Social science research supports our assertion that food processing workers can be an important component of efforts to combat intentional contamination of the food supply. This research finds that involving people in responses to threats of contamination produces a number of benefits (Stout, 2004). Food processing workers are well situated to play a role in thwarting deliberate attempts at contamination. The workers are directly on the production line and may be able to detect contamination. Moreover, workers are often direct links in the
food chain that perceive changes in the food processing or its packaging that indicate contamination attempts. Therefore, food processing workers are well positioned to be part of the food defense solution.

Food processing workers also have the background as part of their training and job duties to detect instances of food contamination. Food processing workers have the responsibility of preventing contamination as part of their job duties. For most workers on the production line, food safety is a critical part of their duties. They receive training about food safety as part of their jobs and routinely receive updated training (Hinsz and Nickell, 2004a). These workers have developed skills and strategies to prevent unintentional contamination of foods. Consequently, with little change in activities, food processing workers could be trained to apply their knowledge, skills, and abilities to potential instances of intentional contamination. They could supplement their efforts aimed at eliminating unintentional contamination to counteract deliberate attempts to contaminate the food supply.

Food processing workers are well-placed and have the background necessary to play an important role in detecting and responding to intentional attempts at contaminating the food supply. The question then arises as to whether these workers would be motivated to counteract deliberate contamination. This is a key question we address in this chapter. In addition we will examine workers' beliefs about how capable they believe they are to respond to an intentional contamination threat.

We have a research program that examines factors important for motivating food safety behaviors in food processing workers. One portion of this research builds upon the theory of planned behavior (Ajzen, 1991) and applies the theory to actions involved in avoiding contamination of food products (Nickell and Hinsz, 2004; Nickell, Hinsz, and Park, 2005). We demonstrate the importance of employee attitudes, subjective norms, perceived behavior control, and behavioral intentions in explaining self-reported food safety behavior. Another aim of this research program is the development and test of a general model of motivated food safety behaviors. Our efforts have been successful (Hinsz and Nickell, 2004b; Hinsz, Nickell, and Park, 2007), providing us with a strong framework for conceptualizing the factors that contribute to workers' motivations to keep food safe and uncontaminated.

Our research demonstrates the applicability of the theory of planned behavior and the model of motivated food safety behaviors to the behaviors workers need to execute to avoid unintentional instances of contamination. We find that workers believe that they can contribute to food safety and are willing to do so. The question then arises as to whether food processing workers also believe they can prevent instances of deliberate contamination and want to do so. We address these questions by conducting a survey of food processing workers that directly asks for their beliefs about their capability to intervene in potential acts of deliberate contamination as well as the degree they intend to act to prevent intentional contamination. As a consequence, this study examines the extent to which workers are willing and they believe able to go beyond their required duties and watch for signs of intentional contamination.
**RESEARCH STUDY**

We conducted a survey of workers at a fully integrated turkey processing plant located in the upper Midwest. All workers from all sections of the plant who did not have management or administrative duties (*n* = 260) were given the opportunity to take home a questionnaire which included the critical items discussed in this chapter. The responses of 162 workers (62.3% response rate) are included in the following analyses. The respondents who returned the survey were representative of plant workers (37% female; *M* age = 40.98, *SD* = 13.86; 72% White workers). These workers had been at the plant an average of 8.34 years. We paid the workers $15 if they completed and returned the survey to us a week after it was distributed to them. The critical questions included in the survey focused on employee beliefs and intentions about responses to potential instances of intentional contamination. These questions were distributed throughout a 125 item survey.

The two questions that assessed the workers’ intentions to respond favorably to deliberate contamination were stated as: (1) “I plan to do all that is needed to keep the turkey products from being intentionally contaminated.” and (2) “I am willing to do all that is needed to keep the turkey products from being intentionally contaminated.” These two questions were answered on seven category strongly disagree to strongly agree response scales. The theory of planned behavior claims that intentions of this sort are the best predictors of behaviors that are not routine (Ajzen, 1991). These two measures of intentions to guard against intentional contamination were correlated (*r* = .50), indicating a degree of similarity in responses to the two items in this sample.

Two additional items assessed the workers’ beliefs about the potential vulnerability of the plant to a deliberate contamination attempt: (3) “There are good safeguards in place at this plant to detect if someone intentionally contaminated any of the turkey products.” and (4) “How likely is it that someone could intentionally contaminate the turkey products from the plant without being caught?” The first of these two questions was answered on the seven category strongly disagree to strongly agree response scale. The second question was responded to on a seven category semantic differential scale ranging from extremely likely to extremely unlikely which was subsequently reverse scored. These two items reflect the workers’ expectancies of the likelihood of intentional contamination. These two outcome expectancy items were not as highly correlated as the other measures (*r* = .30), which probably reflects the different features of intentional contamination assessed by the two questions.

The survey also included two items that reflected beliefs about the ease or difficulty of workers in detecting attempts to intentionally contaminating the food products: (5) “How easy would it be to notice if someone intentionally contaminated the turkey products at the plant?” and (6) “How difficult would it be to detect if someone purposely contaminated the turkey products at this plant?” Responses to these two questions were assessed on seven category semantic differential scales from extremely easy to extremely difficult which were reverse scored prior to analyses. These beliefs reflect the workers’ self-efficacy in being able to detect conditions indicating intentional contamination (Bandura, 1997). These two self-efficacy measures were also positively correlated (*r* = .61), showing that respondents responded similarly to the two items.
RESULTS OF ANALYSES

Responses to the two intention measures were quite positive (see Table 1). A large majority of workers (88%) strongly agreed or agreed that they plan or were willing to do all that is needed to keep their products from being intentionally contaminated. It is interesting to note that gender, age, and length of tenure were not significantly related to willingness to guard against intentional contamination. Hence, this strong willingness to respond positively toward potential instances of intentional contamination was distributed broadly across the different workers at the plant.

With regard to outcome expectancies, a majority of the workers who responded to the survey (57%) agreed or strongly agreed that there were good safeguards in place at the plant to detect if someone intentionally contaminated any of their products. On the negative side, over a third of the employees sampled (37%) said it was extremely or quite likely someone could intentionally contaminated the food products without being caught. Therefore, although the workers were strongly motivated to prevent intentional contamination, they were not as positive that an attempt at intentional contamination could be detected or thwarted at the plant.

Consistent with the findings for outcome expectancies, the self-efficacy measures indicated that workers (26%) said it was extremely or quite difficult to notice or detect if someone purposely contaminated the products at the plant. Again, although the workers were motivated to detect attempts at deliberate contamination, many workers believed they would not find it easy to actually do so because of the detection of such attempts would be difficult.

The intention measure indicates motivation to detect attempts at intentional contamination and self-efficacy reflects perceived ability to do so. Although the workers had strong intentions to thwart intentional contamination, these intentions were not correlated significantly with the measures of self-efficacy. That is, willingness and perceived ability were not correlated. Intercorrelations, mean values, and standard deviations of the responses to the six questions are presented in Table 1.

Table 1. Intercorrelations, Means and Standard Deviations for Questions about Intentional Contamination

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
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<tr>
<td>1 (intention)</td>
<td></td>
<td></td>
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<td>5.07</td>
<td>1.75</td>
<td>6.29</td>
<td>1.09</td>
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<tr>
<td>2 (intention)</td>
<td>50**</td>
<td>18*</td>
<td>.04</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>3 (outcome expectancy)</td>
<td>12</td>
<td>13</td>
<td>.30**</td>
<td>3.69</td>
<td>2.06</td>
<td></td>
<td></td>
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<tr>
<td>4. (outcome expectancy)</td>
<td>-.05</td>
<td>.09</td>
<td>.19**</td>
<td>.18*</td>
<td>4.52</td>
<td>1.94</td>
<td></td>
</tr>
<tr>
<td>5 (self efficacy)</td>
<td>01</td>
<td>.09</td>
<td>.23**</td>
<td>.20**</td>
<td>.61**</td>
<td>3.94</td>
<td>1.81</td>
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<tr>
<td>6 (self efficacy)</td>
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*Note. n = 162. * p significant at .05 ** p significant at .01. Questions 4, 5, and 6 were reverse scored.*
CONCLUSION

Deliberate attempts to contaminate the American food supply appear to have been rare (GAO, 1999). Yet, many analysts believe the threat is real (MSNBC News, 2004) and that the consequences would be substantial (Chalk, 2004). Although technological innovations are likely to play a large role in efforts to reduce threats of intentional contamination (Stout, 2004), we assert that workers in food processing facilities can also contribute in many ways to thwart deliberate attempts at food contamination and agroterrorism. Food processing workers are well placed to intervene, and they have the training, skills, and knowledge that would make them a critical point in securing a supply of safe food. The questions this study addresses are whether the food processing workers are motivated to counteract intentional contamination and whether they believe their attempts to intervene would be successful.

The results of our study indicate that the employees at a turkey processing plant were very willing to act to deter intentional contamination. This willingness appeared to be shared by most all the workers and was not limited to specific kinds of workers or workers with particular backgrounds. However, many workers also believed it would be difficult to detect intentional contamination. Moreover, the workers were not all convinced that safeguards would stop an intentional attack from contaminating the food products from the plant. Consequently, the outcomes of the survey gave a mixed message of food processing workers having strong motivations but questionable abilities to prevent a deliberate contamination of the food produced at this plant.

A compelling response of the food processing workers in our survey was the strong intention to do what they could to keep the products from being intentionally contaminated. This response is somewhat surprising because such efforts are not part of the workers’ duties and responsibilities. The workers appear to be willing to go beyond their assigned job responsibilities to act in ways that would protect themselves, their families and friends, and many other members of their community and nation from an intentional attack on the food supply. This willingness on the workers’ part is indicative of organizational citizenship which is generally defined as “individual contributions in the workplace that go beyond role requirements and contractually rewarded job achievements” (Organ and Ryan, 1995, p. 775). An intention to try to prevent an intentional combination of the food supply reflects organizational citizenship in that the workers would go beyond their necessary job requirements and duties to aid in efforts that would be for the greater good. These workers’ intentions toward preventive behaviors should lead other citizens to feel reassured about the potential security of the food supply.

The food processing workers surveyed in this study were willing to act to benefit others by trying to prevent intentional contamination. Research suggests that food production organizations that provide an environment conducive to organizational citizenship may be better prepared to combat and prevent agroterrorism (Borman, 2004). Moreover, workers who are willing to go beyond the required duties and responsibilities appear to contribute to greater effectiveness of the organizations for which they work (Koys, 2001). We suggest that future research should investigate the role that organizational culture can have on food safety as well as actions that may prevent agroterrorism.

Food processing workers are willing to intervene against incidents of intentional contamination. These workers are on the front line of defense in efforts to combat
agroterrorism. The workers' willingness to thwart deliberate contamination attempts complements their normal job requirements and duties of preventing contamination. The workers' actions to prevent unintentional contamination can help reduce public health problems and disease associated with unsafe food (Mead et al., 1999). In the process, workers can be a critical control point in the prevention of contamination of food products, whether it is unintentional or intentional. Former Secretary Thompson said that he worried every single night about a potential terrorist attack on the nation's food supply (Loven, 2004). Our research suggests that perhaps because of the efforts of workers to protect the food supply against contamination and attempts to contaminate it, Secretary Thompson, the workers, and the nation will be able to sleep easier.

REFERENCES


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**AUTHORS' NOTES**

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Direct inquiries to Verlin B. Hinsz, Department of Psychology, North Dakota State University, Fargo, ND 58105 or e-mail Verlin.Hinsz@NDSU.edu.