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The prediction of workers' food safety intentions and behavior with job attitudes and the reasoned action approach¹

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ARTICLE INFO

Article history:

Received 13 November 2014

Accepted 26 March 2015

Available online 12 June 2015

Keywords:

Job attitudes

Intentions

Food safety

Reasoned action

Behavior

Job satisfaction

Job involvement

Organizational commitment

ABSTRACT

The production of safe food is an important objective for many food-processing facilities given the health and organizational costs of food contamination. This investigation examines how reasoned action and job attitudes approaches can predict factors that contribute to the production of safe food. The reasoned action approach suggests these behaviors are predicted by perceived behavioral control and intentions to engage in food safety behaviors, and that these intentions are anticipated by attitudes regarding the behaviors and perceived social norms to engage in food safety behaviors. The job attitudes approach examined how job satisfaction, job involvement, and organizational commitment could predict worker's self-reported efforts to provide safe food. A survey of workers at a poultry producing facility indicates that the job attitudes and the reasoned action variables were all predictive of food safety behaviors, however, further analyses indicate that workers' reports of their food safety intentions and behaviors were best predicted by the reasoned action approach with job attitudes failing to add to the prediction of food safety. Implications for other behaviors involving safety and security are discussed.

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La predicción de la intención y el comportamiento de los trabajadores en seguridad alimentaria desde las actitudes laborales y el modelo de acción razonada

RESUMEN

La producción de alimentos seguros constituye un objetivo importante de los servicios de procesamiento de alimentos en vista de los costes sanitarios y organizativos de la contaminación alimentaria. Este estudio analiza de qué modo los enfoques de la acción razonada y de las actitudes laborales pueden predecir factores que contribuyan a la producción de alimentos seguros. El enfoque de la acción razonada señala que estos comportamientos los predice la percepción del control e intención comportamentales de implicarse en comportamientos seguros y que esta intención la anticipan las actitudes relativas a los comportamientos y percepción de normas sociales de compromiso con los comportamientos alimentarios seguros. El enfoque de actitudes laborales analiza en qué medida la satisfacción, la implicación laboral y el compromiso con la organización pueden predecir el esfuerzo manifestado por el trabajador para producir alimentos seguros. La encuesta aplicada a los empleados de una empresa avícola indica que las variables de actitudes laborales y de acción razonada predecían los comportamientos de seguridad alimentaria, si bien un análisis más a fondo indica que la manifestación de los trabajadores con respecto a su intención y comportamiento sobre seguridad alimentaria se predecían mejor desde el enfoque de acción razonada, mientras que las actitudes laborales no aportaban predicción de seguridad alimentaria. Se comentan las implicaciones para otros comportamientos referidos a la seguridad (sanitaria y jurídica).

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Palabras clave:

Actitudes laborales

Intención

Seguridad alimentaria

Acción razonada

Comportamiento

Satisfacción laboral

Implicación laboral

Compromiso con la organización

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An emerging concern in organizations is the impact of safety and security behaviors by employees (Bitzer, Chen, & Johnston, 2009; Hinsz & Nickell, 2004). The provision of safety and security by organizational members is important for retailers (e.g., shoplifting), military installations (e.g., sentry duty), schools (e.g., external person shooting), food service (e.g., food poisoning), and public events (e.g., marathons). However, safety and security are qualitatively different from other classes of behavior associated with performance (e.g., quantity, quality; Hinsz & Nickell, 2004). The outcome of performing appropriate safety and security behaviors is that no negative outcomes arise. The negative outcomes might not arise without safety and security behaviors, but performing safety and security behaviors makes it less likely that the negative outcomes occur. Therefore, safety and security behaviors may be considered important aspects of performance to be assessed, rather than the observable quantity produced. If safety and security behaviors are the important criteria, then to achieve those behaviors, it may be very useful to focus on understanding the predictors of the safety and security behaviors (Hinsz & Nickell, 2004).

Intentions and reasoned action

The prediction of behaviors such as those involved in safety and security should be amenable to models of behavioral prediction used for other behaviors (e.g., turnover, Hinsz & Nelson, 1990; goal pursuit, Hinsz & Ployhart, 1998). In particular, the reasoned action approach (Fishbein & Ajzen, 2010) may serve as a foundation for conceptualizing safety and security behaviors (cf., Hinsz, Nickell, & Park, 2007; Nickell & Hinsz, 2015). A substantial body of research supports the reasoned action approach (see Fishbein & Ajzen, 2010, for a partial review as well as Armitage & Conner, 2001 and Sheppard, Hartwick, & Warshaw, 1988, for meta-analyses). The research reported here is concerned with the application of the reasoned action approach to the behavior of people at work in organizational settings. The reasoned action approach has been routinely applied to social and health behaviors (Ajzen, Albarracín, & Hornik, 2007; Ajzen & Fishbein, 1980). In organizational settings, the reasoned action approach has been applied to technology adoption (Morris, Venkatesh, & Ackerman, 2005), turnover intentions (Hinsz & Nelson, 1990), employee commitment, (Becker, Randall, & Riegel, 1995), and a variety of workplace health behaviors (e.g., Blue, Wilbur, & Marston-Scott, 2001; Borland, Owen, Hill, & Schofield, 1991).

An important feature of the reasoned action approach is that intentions are considered the immediate precursors of the behaviors people perform. These intentions are people's judgments about the likelihood that they will or will not engage in the behavior as it is defined. As a reasoned action, this approach assumes that people determine and intend to engage in behaviors that they chose. Consequently, what are considered safety and security outcomes are influenced by the behaviors of individuals. These individuals have intentions to engage in the behaviors as a function of their dispositions, beliefs, and experiences. In particular, according to the reasoned action approach, intentions are predicted by attitudes, subjective norms, and perceived behavioral control (see Figure 1).

The attitudes of organizational members play important roles in their behaviors on behalf of the organization (Brief, 1998). However, the impact of attitudes toward different kinds of work behavior is not as strong as some might expect (Fishbein & Ajzen, 2010). There are a number of reasons why work-related attitudes are not highly predictive of work behaviors. Clearly, issues of poor measurement haunt research involving attitudes and behavior (Fishbein & Ajzen, 1975). Additionally, research demonstrates that a correspondence in the specificity of the attitudes and behaviors is required (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 2010). If the

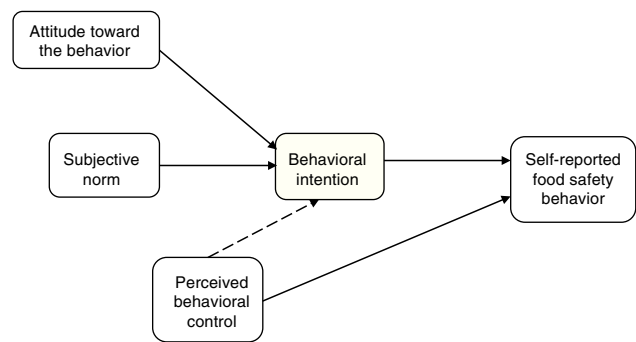


Figure 1. Conceptual model of the relationships of reasoned action approach constructs relative to the prediction of food safety behaviors and intentions.

behavior of interest is at a general level (e.g., quit a job) then the attitude needs to be measured at the general level as well (e.g., attitude toward quitting a job). Alternatively, if the researcher is specifically interested in a more specific behavior (e.g., quitting your job in the next six months), then the attitude needs to be measured at a corresponding level (e.g., attitude toward quitting your job in the next six months). When attitudes and behaviors are measured at corresponding levels, with sufficient specificity and high quality measures, then research indicates that attitudes achieve relatively high predictions of the corresponding behaviors.

The prediction of behavior is enhanced if factors such as perceived social (subjective) norms are used to complement attitudes (Fishbein & Ajzen, 1975). If attitudes reflect the person's positive and negative views of the person engaging in the behavior, then the subjective norm reflects the person's perceived social norms about that person engaging in the behavior. That is, to what degree does the person believe others who are important to the person approve or disapprove of the person engaging in the behavior. Although behaviors are differentially predicted by attitudes and subjective norms, research indicates that properly assessed subjective norms make significant contributions to the prediction of behavior. It is important to recognize the potential that these perceived social norms will have on safety and security behaviors, such as food safety behavior of interest here (Nickell, Hinsz, & Park, 2005). Not only do people do what they want to do (i.e., behave according to their attitudes) but they also do what they believe others want them to do (i.e., behave according to perceived social norms).

An additional factor that enhances the prediction of some behaviors is the person's perception of the degree to which they have control over performing the behavior or not. Behaviors and people are conceptualized to vary in the degree to which performance of the behavior is under the person's control (Ajzen, 1991). Certain individuals might have low perceived control (e.g., low locus of control or low self-efficacy). Meanwhile, certain behaviors are perceived to be more under an individual's volition (e.g., keeping your workstation tidy) while others are less so (e.g., parking in a desirable spot). Because of differences in the nature of behavior, some behaviors are better predicted by perceived behavioral control than others. Because safety and security behaviors are indirectly related to important outcomes, we expect that perceived behavioral control will be predictive of safety and security behavior.

Intentions, perceived behavioral control, attitudes, and subjective norms can be organized in a predictive model represented by the reasoned action approach (see Figure 1). Figure 1 illustrates that safety and security behaviors such as food safety would be predicted by perceived behavioral control and intentions to perform safety and security behaviors. These intentions would be predicted by attitudes toward performing the safety and security behaviors as well as perceived norms to engage in the safety and security

behaviors and possibly by perceived behavioral control. One goal of this research is to test this reasoned action approach for predicting a specific class of safety and security behaviors, i.e., those associated with product safety (Hinsz & Nickell, 2004). In particular, we will focus on food processing and the production of safe food products.

Job attitudes

We have described how the reasoned action approach may be useful for predicting safety and security behaviors. However, it is possible to address the prediction of work-related behaviors from more traditional organizational approaches. In particular, established research traditions have focused on job-related attitudes for the prediction of job-related behaviors (Brief, 1998; Spector, 1997). The most obvious example of the job-related attitudes is job satisfaction (Saari & Judge, 2004). Moreover, because safety and security behaviors involve qualitatively different aspects of job-related behaviors, it might be useful to explore how job involvement (Kanungo, 1982) serves as a useful predictor of safety and security behaviors. Additionally, because the safety and security behaviors of interest are performed in an organizational context, another job-related attitude of potential impact is organizational commitment (Meyer & Allen, 1991; Meyer & Herscovitch, 2001). Job satisfaction, job involvement, and organizational commitment is the trio of job attitudes that have often been considered distinct concepts which in combination are relevant for the prediction of work behavior and intentions (Brooke, Russell, & Price, 1988; Harrison, Newman & Roth, 2006; Mathieu & Farr, 1991). Consequently, another objective of this research endeavor is to examine if job satisfaction, job involvement, and organizational commitment have an impact on safety and security behaviors, in particular the provision of safe food.

Job satisfaction is the job attitude that is likely to have received the greatest attention. Job satisfaction is considered the evaluative reaction that workers have to their jobs and their experiences in their jobs. Given the great magnitude of research on job satisfaction (cf., Hulin & Judge, 2003), it is not feasible to conduct a review of this research. Existing reviews indicate that job satisfaction can be an important predictor of intentions and performance on a variety of jobs (Judge, Thoresen, Bono, & Patton, 2001; Shore, Newton, & Thornton, 1990). There is also an abundant literature indicating that job satisfaction has an impact on intentions, such as turnover intentions, which are related to turnover and other work activities (Mobley, 1982; Hinsz & Nelson, 1990; Shore & Martin, 1989; Shore et al., 1990). Thus, there is good evidence to suggest that job satisfaction might aid an understanding of the prediction of food safety intentions and behaviors.

Job involvement is conceptually distinct from job satisfaction as well as organizational commitment (Brooke et al., 1988). Whereas job satisfaction can be considered a person's reactions to their job and related experiences, job involvement reflects the degree people are engaged in their jobs (Brown, 1996; Kanungo, 1982). That is, the degree people construe their jobs and themselves such that the job incorporates the person's sense of self. Job involvement is often contrasted with alienation from work in which the person sees little relationship between the work the person does and who they think they are. The amassed research on job involvement indicates that job involvement is related to aspects of job performance such as effort, turnover, organizational citizenship behavior, and absenteeism (Brown, 1996; Saks, 2006). Similarly, job involvement is related to intentions toward work-related behaviors and outcomes (Brown, 1996; Shore et al., 1990) including turnover intentions (Blau & Boal, 1987). Given that food safety behaviors and intentions appear to involve concerted effort on the part of food processing workers (Hinsz et al., 2007), it is likely that the

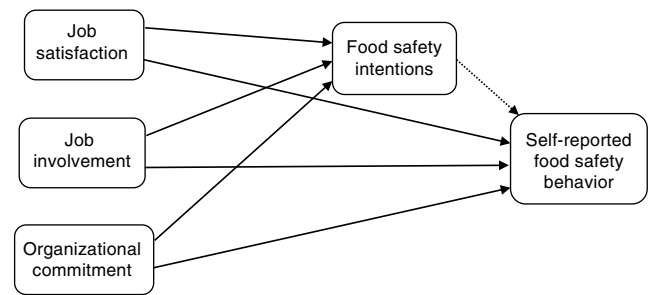


Figure 2. The prediction of food safety intentions and behavior as a function of three job attitudes.

engagement in work associated with job involvement would facilitate such food safety actions. Consequently, it can be predicted that job involvement should be predictive of food safety intentions and behaviors.

Organizational commitment is another class of job attitudes that has received considerable conceptual and empirical attention (Klein, Becker, & Meyer, 2012; Meyer & Allen, 1991; Meyer & Herscovitch, 2001; Mowday, Porter, & Steers, 1982; Reichers, 1985; Solinger, van Olffen, & Roe, 2008). Although distinct from job involvement and job satisfaction, organizational commitment is an attitude toward the organization rather than a job (McCaul, Hinsz, & McCaul, 1995; Shore et al., 1990; Solinger et al., 2008). The literature on organizational commitment indicates that it does relate to work-related intentions, with turnover intentions receiving much attention (Blau & Boal, 1987; Shore et al., 1990). Nevertheless, organizational commitment has also been associated with job performance, albeit often unimpressively (Mathieu & Zajac, 1990; Meyer, Paunonen, Gellatly, Goffin, & Jackson, 1989; Riketta, 2002), and other work-related behaviors such as organizational citizenship behaviors (Mathieu & Zajac, 1990; Organ & Ryan, 1995; Shore & Wayne, 1993). It is notable that Meyer et al. (1989) uncovered these relationships in a food service organization. Consequently, the literature provides a foundation for expecting that organizational commitment would be predictive of food safety intentions and behaviors.

Based on the general conception of job attitudes predicting worker behaviors and intentions, a model can be proposed that job satisfaction, job involvement, and organizational commitment individually and in combination could be predictive of food safety intentions and behaviors (illustrated in Figure 2). An important question this research seeks to address is whether the reasoned action approach provides better prediction of food safety intentions and self-reported behaviors than does the model based on job attitudes.

Alternative models of food safety intentions and behavior

Job attitudes can impact food safety behaviors in a variety of ways. As indicated in Figure 2, this could be through the intentions of the organizational members. That is, job satisfaction, job involvement, and organizational commitment could influence safety and security behaviors through their impact on safety and security intentions. In particular, given the strong predictive capability of the reasoned action approach (Nickell & Hinsz, 2015), job attitudes could be considered to have their impact on food safety behaviors through the reasoned action components intentions and perceived behavioral control (illustrated in Figure 3). In this way, the reasoned action precursors of behavior would statistically mediate the influences of job satisfaction, job involvement, and organizational commitment.

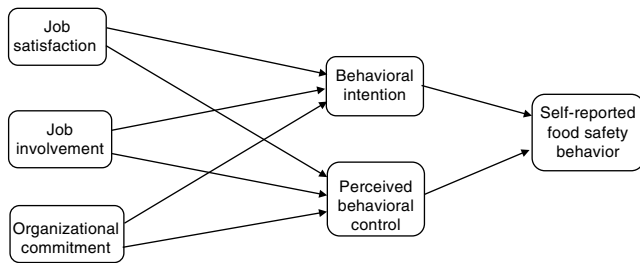


Figure 3. Prediction of food safety behavior by three job attitudes mediated by intentions and perceived behavioral control from the reasoned action approach.

Another way in which job attitudes might influence food safety intentions and behavior is by complementing the impact of attitudes, subjective norms, and perceived behavioral control (illustrated in Figure 4). That is, job satisfaction, job involvement, and organizational commitment would make unique contributions to the prediction of food safety intentions and behaviors beyond the reasoned components of attitudes, subjective norms and perceived behavioral control. Alternatively, because of the capability of the reasoned action approach to predict a variety of intentions and behaviors (e.g., food safety, Hinsz et al., 2007; Nickell & Hinsz, 2015), perhaps the job attitudes of job satisfaction, job involvement, and organizational commitment would have their impact through attitudes toward the behavior, subjective norms, and perceived behavioral control (Figure 5). We know of no research that has particularly addressed the possibilities of these different models, particularly not with regard to safety and security behaviors. Consequently, in this investigation of the prediction of food safety intentions and behavior, a set of models are examined to help us understand the factors that are predictive of food safety as well as how job attitudes and the reasoned action approach might be integrated for the prediction of food safety behaviors.

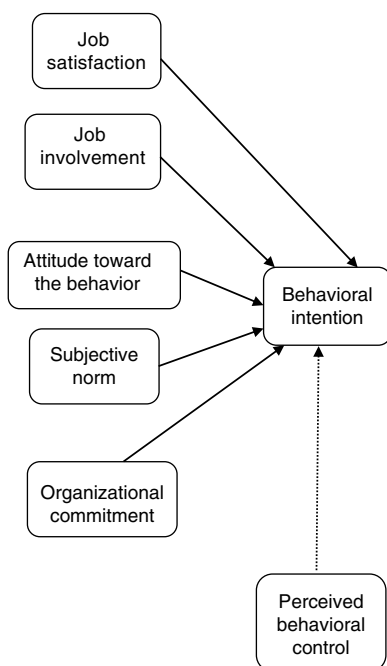


Figure 4. Prediction of food safety intentions and behavior by the three job attitudes of job satisfaction, job involvement, and organizational commitment in conjunction with the attitude toward the behavior, subjective norm, and perceived behavioral control from the reasoned action approach.

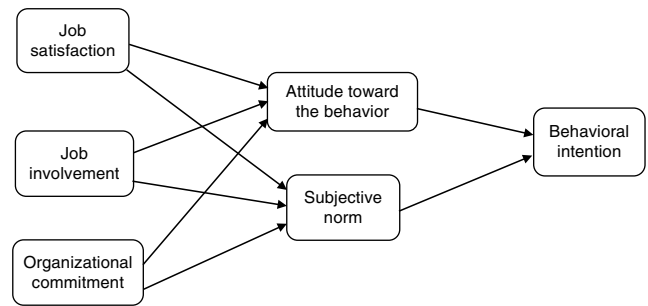


Figure 5. Prediction of food safety intentions by three job attitudes of job satisfaction, job involvement, and organizational commitment as mediated by attitude and subjective norm from the reasoned action approach.

Method

Participants

Respondents to the questionnaire were the non-managerial workers ($n = 260$) at a poultry processing facility on the upper Great Plains of the U.S.A. An extensive questionnaire including the critical measures was offered to the workers by the facility's human resources manager. If the workers completed and returned the questionnaire, they were promised and did receive \$25. Of the facility's workforce, 209 (80%) took a copy of the printed questionnaire. When the researchers returned to collect completed questionnaires, 180 (86%) of those workers did so. The workers who completed a questionnaire were fairly representative of the facility's workers. The respondents worked at the facility for 0.02 to 30.3 years ($M = 8.79$), were 19 to 74 years of age ($M = 42.89$), and 66% male.

Questionnaire

The questionnaire included extensive introductory information about the reasons for asking for the workers' responses to the questionnaire, that the workers' responses would remain confidential and not disclosed to management of the facility, and the \$25 being offered for a completed questionnaire. Moreover, we also described what was meant by specific phrases used repeatedly in the questionnaire (i.e., 'clean and uncontaminated turkey products,' 'doing all that is needed to produce clean and uncontaminated turkey products'). In general, the rating scales were constructed using recommendations of Ajzen and Fishbein (1980, Appendix A). Accordingly, the introductory information included instructions for completing the rating scales along with sample questions and illustrative responses. Items from the various measures were distributed throughout the survey. The different measures constructed, which are described below, generally had acceptable levels of internal consistency (see diagonal on Table 1 below), which allowed us to construct composite scores based on averaged responses to the items.

We had hoped to acquire general measures of each worker's performance and behavioral assessments of safe and unsafe actions. However, the facility's management and the workers' supervisors did not want us to gather any such assessments. Consequently, this article focuses on self-reports of behavior without any direct measures of performance or independent assessments of food safety behaviors.

Self-reported food safety behaviors. Six items were used to self-report food safety behaviors. Some of the items were: "I don't always do all that is needed to produce clean and uncontaminated turkey products" and "How often do you do things that lead to contaminated or unclear turkey products?" These items were assessed

Table 1

Intercorrelations, coefficient alphas, means and standard deviations for the measures assessed.

Measures	1	2	3	4	5	6	7	8	9	M	SD
1. General self-reported behavior	.86									6.08	0.80
2. Behavioral intentions	.78	.80								6.18	0.82
3. Attitude toward the behavior	.76	.71	.81							5.93	0.87
4. Subjective norm	.77	.84	.74	.84						5.93	0.85
5. Perceived behavior control	.59	.51	.64	.63	.53					5.53	0.82
6. Job satisfaction	.56	.54	.51	.61	.44	.81				5.63	1.02
7. Job involvement	.31	.26	.34	.35	.33	.57	.86			4.61	0.90
8. Organizational commitment	.37	.44	.46	.48	.36	.55	.48	.64		5.16	0.93
9. Impression management	.46	.44	.44	.47	.44	.41	.19*	.36	.84	5.55	0.67

Note $n = 180$. All correlation coefficients are significant at $p < .001$ except the one denoted by an asterisk which indicates $p < .05$. Coefficient alpha values are presented in boldface along the diagonal. Higher mean values indicate more positively valued responses.

on 7-point Likert scales (7 = *strongly agree* to 1 = *strongly disagree*) and frequency response scales (1 = *never* to 7 = *always*).

Intentions. Intentions toward engaging in the food safety behaviors were assessed with five items. The items reflected statements of 'I desire/intend/plan/want/am willing to do all that is needed to produce clean and uncontaminated turkey products,' all assessed on 7-point Likert scales (7 = *strongly agree* to 1 = *strongly disagree*).

Attitudes toward the behavior. The attitude toward the behavior was captured with seven alternative semantic differential responses to five questions having the stem 'My doing all that is needed to produce clean and uncontaminated turkey products is' favorable-unfavorable, pleasing-annoying, important-unimportant, enjoyable-unenjoyable, and something I like-I dislike.

Subjective norms. The subjective norm was measured with five items indicating responses to 'Most people who are important to me (think I should do/ approve of my doing/ support my doing/ want me to do) all that is needed to produce clean and uncontaminated turkey products.' Responses were all on 7-point Likert scales (7 = *strongly agree* to 1 = *strongly disagree*).

Perceived behavioral control. Perceived behavioral control was measured with five items on response scales based on recommendations of Ajzen (2002). Sample items included: "If I wanted to, I could easily do all that is needed to produce clean and uncontaminated turkey products," and "It is mostly up to me if I do all that is needed to produce clean and uncontaminated turkey products." These items were assessed on 7-point Likert scales (7 = *strongly agree* to 1 = *strongly disagree*) and easy/difficult response scales (1 = *extremely difficult* to 7 = *extremely easy*).

Job satisfaction. Job satisfaction was measured using five items taken from a job satisfaction scale (Seashore, Lawler, Mirvis, & Camman, 1982) and the Job Diagnostic Survey (Hackman & Oldham, 1975). These items were assessed on 7-point Likert scales (7 = *strongly agree* to 1 = *strongly disagree*) and included "All in all, I am satisfied with my job", "I am generally satisfied with the kind of work I do in this job", and "Generally speaking, I am very satisfied with this job."

Job involvement. The eight-item measure from Kanungo (1982) was used to assess job involvement using 7-point Likert scales (7 = *strongly agree* to 1 = *strongly disagree*) response scale. For example, "The most important things that happen to me involve my work," and "Most of my interests are centered around my job."

Organizational Commitment. The six-item organizational commitment scale (Meyer & Allen, 1991) was used, with two items each assessing affective commitment (e.g., "I would be happy to spend the rest of my career working at this plant"), continuance commitment (e.g., "It would be costly for me to quit working at this plant now"), and normative commitment (e.g., "I would feel guilty if I stopped working at this plant now"). Although items from the three subscales were assessed, the overall six-item

organizational commitment scale was used in the analyses. All items were assessed on 7-point Likert scales (7 = *strongly agree* to 1 = *strongly disagree*).

Impression management. To assess desirability in responses to the questionnaire, a 20-item scale from the International Personality Item Pool (Goldberg et al., 2006) was used. For example, "I rarely overindulge" and "I easily resist temptations" (1 = *extremely inaccurate* to 7 = *extremely accurate*).

Results

Mean values, standard deviations, and intercorrelations for the measures involved in the analyses are presented in Table 1. An initial look indicates that the critical variables included in the survey were significantly correlated with the self-report of food safety behavior composite measure ($r_s \approx .30 - .80$). Generally, the workers at this plant were quite positively disposed toward pursuing safe food production. Moreover, the workers were generally positive about their work and the organization, though less so than toward producing safe food, with job involvement having the lowest mean value. Importantly, all three job attitudes were significantly and positively correlated with intentions toward producing safe food and self-reports of such behavior. Additionally, the reasoned action constructs were all positively and significantly correlated with each other and the measures of food safety intentions and behaviors. Basically, every measure correlated with every other measure although these correlations varied in strength.

These strong correlations may be viewed as inflated due to common method biases associated with the cross-sectional self-report method used. Although there is some dispute about the impact of common method biases on self-report responses (e.g., Conway & Lance, 2010; Spector, 2006), we took steps to mitigate the potential impact of these biases with procedural and statistical strategies. Procedurally, we highlighted respondent anonymity in the instructions, used a variety of scale types and response formats, and intermixed items from different measures throughout the survey. Because social desirability may be the source of bias that leads to common method biases (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003), we also included an impression management measure in the survey. It is also noteworthy that the impression management measure was correlated with all the measures presented in Table 1. Consequently, for all the regression analyses that follow, impression management was initially entered into the analysis to remove the effect of impression management on the prediction of the criterion variables (e.g., self-reported behavior and intentions).

Reasoned action analyses

The mean values for most of the measures of the reasoned action constructs had mean values near six on the seven alternative

response scales with the exception of perceived behavioral control (Table 1). These responses indicate again that the workers were positively disposed toward food safety actions. However, the mean values also indicate that a restriction of range might arise for analyses based on these reason action variables because the mean responses indicate the measures could potentially suffer from ceiling effects. The impact of the potential ceiling effect would be that the observed relationships that involve reasoned action measures having high mean values would be reduced by some degree. So, the observed relationships involving these reasoned action measures are likely conservative estimates.

As an initial analysis of the models initially described, regression analyses were conducted to test the predictive capability of the components of the reasoned action approach to predict self-reported food safety behavior. Intentions toward engaging in food safety behaviors are clearly expected to predict the self-reported behavior; however, perceived control may also be predictive. The regression equation indicated that both the intention, $\beta = .63$, $t(173) = 11.80$, $p < .001$, and perceived behavior control, $\beta = .24$, $t(173) = 4.50$, $p < .001$, contributed significantly to the prediction of self-reported behavior, $F(3, 173) = 118.11$, $p < .001$, $R^2 = .67$. These findings are consistent with the reasoned action approach as well as other research that predicted self-reported food safety behavior (Hinsz et al., 2007; Nickell & Hinsz, 2015).

For understanding the prediction of food safety behaviors, it can be useful to consider intentions to engage in safe food behaviors. The reasoned action approach states that intentions will be predicted by the attitude toward the behavior, the subjective norm, and perhaps perceived behavioral control. When tested with regression analyses, the overall equation was significant, $F(4, 172) = 113.31$, $p < .001$, $R^2 = .72$. Attitude toward the behavior, $\beta = .23$, $t(172) = 3.50$, $p = .001$, and subjective norm, $\beta = .70$, $t(172) = 11.01$, $p < .001$, both contributed to the prediction of intentions, although perceived behavioral control failed to reach significance, $\beta = -.09$, $t(172) = -1.61$, $p < .11$. Again, these results are consistent with the reasoned action approach and previous research attempting to predict intentions to engage in food safety behaviors (Hinsz et al., 2007; Nickell & Hinsz, 2015). In particular, according to the reasoned action approach, depending on the behavior being predicted, intentions are not always predicted by perceived behavioral control (Armitage & Conner, 2001; Fishbein & Ajzen, 2010).

Job attitudes as predictors

To determine how the three job attitudes of job satisfaction, job involvement, and organizational commitment might contribute to the prediction of food safety intentions and behaviors, a set of regression analyses were conducted (Figure 2). The prediction of self-reported food safety behaviors by the three job attitudes was significant, $F(4, 170) = 24.65$, $p < .001$, $R^2 = .37$, but less effective than measures from the reasoned action approach. Of the three job attitudes, only job satisfaction was a significant predictor of self-reported food safety behavior, $\beta = .41$, $t(170) = 4.76$, $p < .001$. Neither job involvement, $\beta = -.01$, $t(170) = -0.06$, $p > .95$, nor organizational commitment, $\beta = .05$, $t(170) = 0.67$, $p > .50$, contributed significantly to the prediction of self-reported food safety behavior.

Although only job satisfaction had an impact on self-reported food safety behavior, the three job attitudes may have important relationships with intentions to engage in food safety behaviors. The three job attitudes did result in significant prediction of food safety behavioral intentions, $F(4, 170) = 25.91$, $p < .001$, $R^2 = .38$, which was again less predictive than the reasoned action related measures. Both job satisfaction, $\beta = .42$, $t(170) = 4.92$, $p < .001$, and organizational commitment, $\beta = .18$, $t(170) = 2.32$, $p < .05$, contributed significantly to the prediction of food safety behavioral intentions, while job involvement, $\beta = -.10$, $t(170) = -1.26$, $p >$

.20, did not. So, for both self-reported behavior and intentions, job involvement was not a significant predictor.

Predictive effectiveness of reasoned action and job attitude constructs

Mediation in predicting food safety behavior. Given the greater capability of the reasoned action approach to predict food safety behaviors and intentions, it can be informative to determine the degree that job attitudes might enhance the reasoned action approach's prediction of these food safety behaviors and intentions. To assess the degree that the effect of the job attitudes on food safety behavior might be statistically mediated by intentions and perceived behavioral control, mediation analyses were conducted (Figure 3). As indicated above, perceived behavioral control and intentions were predictive of self-reported behaviors. Job satisfaction and organizational commitment were predictive of intentions. Additionally, when perceived behavioral control was predicted by the three job attitudes, $F(4, 170) = 17.70$, $p < .001$, $R^2 = .29$, job satisfaction was a significant predictor, $\beta = .17$, $t(170) = 2.37$, $p < .02$, but job involvement, $\beta = .09$, $t(170) = 1.18$, $p > .24$, and organizational commitment, $\beta = .07$, $t(170) = 1.02$, $p > .30$, were not. When the three job attitudes were added to perceived behavioral control and intentions to determine if they added to the prediction of food safety behavior, $F(6, 168) = 60.78$, $p < .001$, $R^2 = .68$, intentions, $\beta = .61$, $t(168) = 10.49$, $p < .001$, and perceived behavioral control, $\beta = .22$, $t(168) = 4.02$, $p < .001$, remained significant predictors, however, job satisfaction, $\beta = .11$, $t(168) = 1.65$, $p = .10$, job involvement, $\beta = .03$, $t(168) = 0.60$, $p > .55$, and organizational commitment, $\beta = -.08$, $t(168) = -1.34$, $p > .18$, each failed to add significantly to the prediction of self-reported food safety behavior. These results demonstrate that the variance associated with food safety behaviors could be accounted for by intentions and perceived behavioral control, and the three job attitudes did not add significantly to the prediction of these behaviors.

Job attitudes as complementary predictors of intentions. It is also of interest to determine how the reasoned action and job attitude constructs predict intentions to engage in food safety behaviors (Figure 4). The impact of attitude toward the behavior, subjective norm, and perceived behavioral control on the prediction of food safety intentions are described above. Regression analyses then included the three job attitudes to the prediction of these intentions. The regression equation for the intentions was significant, $F(7, 167) = 66.47$, $p < .001$, $R^2 = .74$. Consistent with the analysis of the reasoned action prediction of intentions reported above, attitude toward the behavior, $\beta = .22$, $t(167) = 3.45$, $p = .001$, and subjective norm, $\beta = .68$, $t(167) = 10.06$, $p < .001$, were both significant predictors of food safety intentions, and perceived behavioral control was not, $\beta = -.08$, $t(167) = -1.51$, $p > .13$. The job attitudes of job satisfaction, $\beta = .08$, $t(167) = 1.31$, $p < .20$, job involvement, $\beta = -.09$, $t(167) = -1.65$, $p > .10$, and organizational commitment, $\beta = .04$, $t(167) = 0.73$, $p > .46$, were each non-significant in their prediction of intentions toward food safety behaviors. Consequently, the job attitudes of job satisfaction, job involvement and organizational commitment did not add significantly to the prediction of the food safety intentions beyond that of the reasoned action components of attitude toward the behavior and subjective norm.

Mediation in predicting food safety intentions. An alternative way in which the job attitudes could contribute to the prediction of food safety intentions is indirectly through the reason action components of the attitude toward the behavior and the subjective norm (Figure 5). Given the focus here on intentions and the failure of perceived behavioral control to predict intentions, perceived behavioral control was not included in these analyses. In order to test these indirect effects, initial analyses are required to indicate how the three job attitudes relate to the attitude toward the

behavior as well as the subjective norm from the reasoned action approach. The regression analysis predicting the attitude toward the behavior with the three job attitudes was significant, $F(4,170) = 24.21, p < .001, R^2 = .36$. Job satisfaction, $\beta = .27, t(170) = 3.13, p < .001$, and organizational commitment, $\beta = .20, t(170) = 2.58, p < .05$, both were significant predictors of the attitude toward the behavior while job involvement did not, $\beta = .06, t(170) = 0.77, p > .44$. Similarly, the three job attitudes were significant in the prediction of the subjective norm, $F(4, 170) = 33.56, p < .001, R^2 = .44$. Both job satisfaction, $\beta = .43, t(170) = 5.41, p < .001$, and organizational commitment, $\beta = .15, t(170) = 2.07, p < .05$, contributed significantly to the prediction of the subjective norms, while job involvement did not, $\beta = -.03, t(170) = -0.37, p > .70$. Consequently, the same pattern is observed with job satisfaction and organizational commitment being predictive of both the attitude and subjective norm components, while job involvement was not predictive.

An analysis was conducted to determine whether the effect of job attitudes on the food safety intentions was statistically mediated by the reasoned action components of attitude toward the behavior and the subjective norm (Figure 5). As anticipated by the analyses reported above, the three job attitudes were entered into a regression equation and were followed by the subjective norm and attitude toward the behavior equation, $F(6, 68) = 110.95, p < .001, R^2 = .73$. Similar to earlier results, the attitude toward the behavior, $\beta = .19, t(168) = 3.12, p = .002$, and subjective norm, $\beta = .66, t(168) = 9.94, p < .001$, were both significant predictors of food safety intentions while job satisfaction, $\beta = .08, t(168) = 1.31, p < .20$, job involvement, $\beta = -.09, t(168) = -1.78, p > .07$, and organizational commitment, $\beta = .04, t(168) = 0.78, p > .43$, were each non-significant in their prediction of intentions. Consequently, consistent with the reasoned action approach, to the degree that the job attitudes were predictive of food safety intentions, this relationship was statistically mediated by the components of the reasoned action approach.

Discussion

This research focused on the ways that job attitudes and reasoned action measures could predict workers' reports of food safety intentions and behaviors. In accordance with the reasoned action approach, intentions toward food safety and perceptions of control over safety behaviors were predictive of self-reports of food safety behaviors. Moreover, consistent with the reasoned action approach, both subjective norms and attitudes toward the behaviors significantly predicted intentions to perform food safety behaviors. The three job attitudes of job satisfaction, job involvement, and organizational commitment correlated positively with self-reports of food safety behaviors and intentions, but failed to make a unique contribution to the prediction of self-reported food safety behaviors and intentions beyond that of the reasoned action measures. Consequently, the reasoned action approach provides the best explanation for the food safety behaviors and intentions in this sample and serves as a strong foundation for explaining safety and security behaviors in general.

Job attitudes are a traditional area of study of work within organizations (Brief, 1998; Hulin & Judge, 2003; Spector, 1997). This study investigated the role that the three job attitudes of job satisfaction, job involvement, and organizational commitment had in the prediction of food safety intentions and behaviors. Although there are rich literatures for each of these constructs (e.g., job satisfaction, Locke, 1976; job involvement, Kanungo, 1982; organizational commitment, Meyer & Allen, 1991; Mowday et al., 1982), they have rarely been considered in the context of food processing workers (see Probst & Brubaker, 2001, as a counter-example). In the context of job satisfaction and organizational commitment, job

involvement did not contribute to the prediction of the intentions and behavior. This was not a result of a poor measure because we used the standard job involvement measure (Kanungo, 1982) or because the measure had low reliability. Rather, the nature of food processing, and perhaps safety and security behaviors in general, may not allow job involvement to account for the variance of interest because these workers did not see their jobs as involving aspects of their self-identity which is associated with job involvement. Future research will need to further explore the overlap of constructs such as job involvement and under what conditions they might add to our understanding of safety and security behaviors.

As a conceptual orientation for this study, the reasoned action approach implies that behaviors such as food safety are predicted by workers' intentions toward food safety and perhaps the workers' perceived control over engaging in food safety behaviors. This study found strong support for the impact of both of these measures on the prediction of self-reported food safety behaviors, accounting for 67% of the variance. It is important to note that this predictive ability was in part uncovered because the survey followed recommendations to use measures of intention and perceived behavioral control that were compatible with the measure of behavior (Fishbein & Ajzen, 2010). The measure of food safety behavior involved general, global self-reports, so the measures of other reasoned action constructs were made at the general and global level. Under these conditions, the reasoned action measures of intention and perceived behavioral control were sufficient to parsimoniously account for food safety behaviors reports.

According to the reasoned action approach, the critical precursor of behavior is a proper measure of intentions to engage in the behavior. This study found support for this claim, with subjective norms and attitudes toward the behavior predicting 72% of the variance in the intention to perform food safety behaviors. Hence, the reasoned action approach is an empirically-supported approach for understanding and predicting the intentions that anticipate food safety behaviors. Intentions toward food safety, and toward safety and security behaviors in general, can be an important focus for prevention and protection that are part of safety and security. These behavioral intentions can gauge workers' willingness to engage in the safety and security behaviors. Also, conceptual approaches to intentions (Fishbein & Ajzen, 2010; Hinsz et al., 2007; Triandis, 1977) can provide a foundation for developing interventions that can enhance safety and security behaviors.

It is interesting that in this study, the subjective norm was the better predictor of intentions toward food safety. In earlier research (Nickell et al., 2005), we focused on injunctive and descriptive norms (Cialdini, Bator, & Guadagno, 1999; Cialdini, Reno, & Kallgren, 1990) in an attempt to determine whether enhancing the normative component might enhance food safety behaviors. Similarly, more traditional approaches of modifying attitudes toward the behavior can be additional ways of intervening to enhance the (food safety) behaviors of interest (Eagly & Chaiken, 1993; Fazio & Olson, 2014; Fishbein & Ajzen, 2010; Petty & Cacioppo, 1982). Consequently, intentions can be an important focus for research as a way to assess and influence workers' inclinations toward engaging in safety and security behaviors.

Within the context of the reasoned action approach, the attitude, subjective norm, and perceived behavioral control components are expected to be predicted by corresponding sets of beliefs (Fishbein & Ajzen, 2010; Nickell & Hinsz, 2015). These behavioral, normative, and control beliefs reflect the experiences of the organizational members. Moreover, these beliefs would be conceptually similar to the beliefs that impact the workers' job satisfaction, job involvement, and organizational commitment. That is, there would be covariance between the three job attitudes and the reasoned action components because they are both derived from the workers' beliefs based on their experiences. Perhaps the reason this

study found that job satisfaction, job involvement, and organizational commitment did not add to the prediction of food safety intentions or behaviors was because the three job attitudes reflect the same beliefs that more directly relate to the reasoned action components of attitudes and subjective norms. The finding that job satisfaction and organizational commitment were predictive of the attitude toward the behavior and subjective norm is consistent with this reasoning. However, it is also possible that a job attitudes approach is inadequate for the prediction of food safety intentions and behaviors even though they share some core beliefs that would anticipate actions in support of food safety.

The reasoned action approach rests upon the assumption that workers engage in specific behaviors because it is reasonable for them to do so (Fishbein & Ajzen, 2010). That is, the workers reflect upon the information available and in a reasoned fashion (not rational or irrational) determine which behaviors they will or will not perform. The reasons behind their actions are often the beliefs workers have which they associate with engaging in the behavior. Knowing the beliefs that are salient to the workers as they perform their jobs and tasks is an exceptional way of understanding the reasoning behind the workers' actions (Nickell & Hinsz, 2009; Nickell & Hinsz, 2015). Moreover, targeting these beliefs is the most direct way for developing interventions to reinforce or modify behavior. Many interventions have the effect of changing the attitude toward the behavior, the subjective norm, or perceived behavioral control, which will then have the effect of enhancing the workers' intentions to engage in proper food safety behaviors, and also to result in more effective performance of food safety behaviors on the part of the workers. Thus, beliefs provide a conceptual basis to guide intervention efforts so that desirable intentions, behaviors, and outcomes result.

Limitations and future directions

Although this research contributes importantly to our understanding of the prediction of food safety intentions and behaviors, it also suffers from limitations. Critically, all of the measures were contemporaneous self-reports of the underlying constructs. Because of organizational constraints, it was not possible to gather direct or indirect measures of food safety behavior and performance. To limit the impact of relying solely on self-reports, the questionnaire and our interactions with the workers encouraged them to provide honest and accurate responses. Also, impression management was included in all the analyses to capture some of the variance associated with the workers attempt to appear more socially desirable or manage the impressions of researchers. Lindell and Whitney (2001) note that attitude-behavior relationships based on cross-sectional research are susceptible to common method variance issues. Thus, the conclusions based on the use of a cross-sectional self-report survey may be limited. Moreover, as a consequence of the restrictions placed upon this research by the organization, the inferences that can be drawn are limited as a function of the responses being self-reports by the workers gathered at one time.

Another limitation of this investigation is that the job attitudes assessed were limited to job satisfaction, job involvement, and organizational commitment. Although our measures were generally quite reliable, the survey included only one measure of each of the three job attitudes. For example, although organizational commitment was assessed with a standard measure (e.g., Allen & Meyer, 1990), the organizational commitment questionnaire (Mowday, Steers, & Porter, 1979) was not included because of desires to limit the length of the questionnaire. Other job attitudes were not explored and assessed in this study (e.g., perceived organizational support). Nevertheless, the results of this study are

internally consistent and uniformly supportive of the reasoned action approach, with none of the job attitudes adding significantly to the prediction of food safety intentions and behaviors.

Another limitation of this research is that it was limited to a sample from one food processing facility, which only processed turkeys. It would be beneficial to expand beyond this facility to explore other food processing facilities producing other types of products. Consequently, proper caution must be taken when generalizing from the findings reported here to other organizations or forms of food safety as well as with regard to the larger sphere of safety and security behaviors that is of interest. However, within the context of this facility and the resulting sample, we are pleased with its representativeness and the response rate achieved.

An assessment issue that emerged with the data from this sample is the limited reliability of the perceived behavioral control measure. Researchers continue to struggle in getting reliable and construct valid measures of perceived behavioral control (Fishbein & Ajzen, 2010). For this reason, the perceived behavioral control measure constructed for this survey relied heavily upon the recommendations of Ajzen (2002). Although steps were taken to produce a more reliable measure, the steps were not sufficiently effective. Recently, Fishbein and Ajzen (2010) stated that the earlier recommendations to use the ease or difficulty in performing the behavior in the assessment perceived behavioral control (e.g., Ajzen, 2002) may have been misguided. Fishbein and Ajzen (2010) revised their recommendations which may allow for measures that provide for more reliable assessment of workers' perceived behavioral control over performing food safety behaviors.

Further implications

This research surveyed workers at a food processing facility to focus on food safety behaviors. As with most safety and security behaviors, food safety is important in many ways. In the U.S. alone, there are 3,000 deaths a year from food contamination, with another 48 million people becoming sick from eating such food and 128,000 having to be hospitalized (CDC, 2011). Each year there are reports of specific foods found to make people ill because it is not treated in a safe manner (e.g., hamburger, spinach, grapes, milk, chicken). These food safety problems are not limited to the United States, with incidents arising elsewhere in the world (e.g., sprouts in Europe, fish in South East Asia, chicken in China, school lunches in India). In addition to the costs to consumers' health and life, food processors who produce and handle unsafe foods which they deliver to consumers often suffer fines and inspections. Moreover, once a case of producing or distributing contaminated food is associated with a company or facility, it often leads to closing the facility and shuttering of the company (Hinsz et al., 2007). A result of the closing of the facility or the failure of the company is that the workers at the facility lose their jobs. Thus, there are many direct and indirect consequences when insufficient attention is paid to proper performance of food safety behaviors.

As a general class of behaviors in the service of organizational performance and effectiveness, safety and security behaviors are of rising importance (Bitzer et al., 2009). A wide variety of public and private commercial, business, military, governmental, and non-governmental organizations have had to focus more attention on safety and security behaviors. This has been most apparent since the attacks of September 11, 2001, but as the example of food safety illustrates, safety and security behavior have been of concern for quite some time for a variety of industries and organizations. Research has much to offer as in considering ways of improving organizational members' efforts to enhance safety and security. Topics such as selection (Park, Hinsz, & Nickell, *in press*), training (Betts & Hinsz, 2010), work design, individual differences (Betts

& Hinsz, 2015), organizational climate (Nickell & Hinsz, 2011), and the job attitudes considered here are some clear examples. Our research program aims to understand the psychological and behavioral factors that play a role in the motivation of food safety behaviors (Hinsz & Nickell, 2004). In that regard, the finding of the central importance of intention in this study illustrates how workers' willingness to perform food safety behaviors plays a large part in motivating food safety actions.

This study provides relatively strong empirical support for the reasoned action approach. Nevertheless, more research will be required to determine if other constructs can add to our understanding of the prediction of behaviors such as those that involve safety and security (e.g., work habits; Hinsz et al., 2007). For example, the affect that individuals have for the outcomes of their behavior (e.g., affective events theory; Weiss & Cropanzano, 1996) may also be an important factor that is not accounted for by reasoned action constructs such as the attitude toward the behavior. Continual efforts to investigate and challenge the reasoned action approach will provide dividends for our understanding of food safety behavior intentions, and perhaps for safety and security behaviors in general.

Conflict of interest

The authors have no conflict of interest to declare.

Financial support

This research was supported by grants to the first author from the Cooperative State Research, Education and Extension Service, U.S. Department of Agriculture. Preparation of this manuscript was completed while the first author served as a Banco Santander Chair of Excellence in the Department of Business Administration at Carlos III University, Madrid, Spain.

Notes

Portions of the larger data set from the survey concerned with conscientious personality and an organizational climate of food safety were published in a chapter (Nickell & Hinsz, 2011) and another segment related to regulatory focus and regulatory fit notions was published in Park et al. (In press) but both are independent of the arguments presented in this paper.

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