The Role of Work Habits in the Motivation of Food Safety Behaviors

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The authors considered work habits within an integrated framework of motivated behavior. A distinction made between automatic and controlled action led to 2 measures of work habits: a habit strength measure reflecting the 4 characteristics of automaticity and a measure of work routines under conscious control. The authors considered work habits within an integrated framework of motivated behavior. A distinction made between automatic and controlled action led to 2 measures of work habits: a habit strength measure reflecting the 4 characteristics of automaticity and a measure of work routines under conscious control. Results indicated that attitudes and subjective norms predicted food safety intentions. These intentions, along with perceived behavior control and work habits, predicted reports of food safety behaviors. A mediation analysis indicated that the work routines measure accounted for the variance in self-reported behavior and mediated any effect of the habit strength measure.

Keywords: work habits, work routines, work motivation, intentions, food safety

Consuming contaminated food results in approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths each year in the United States alone (Mead et al., 1999). Many of these illnesses and deaths result from poor food production and preparation practices. In addition to the health-related costs to the consumer, the production of unsafe food can have dramatic consequences for a company’s welfare. For example, when a beef processing plant in Nebraska was found to have shipped contaminated hamburger, a recall was ordered and all the meat destroyed (CNN, 1997). The firm had to compensate its clients and pay for the cost of the recall. Moreover, because the firm was stigmatized for producing unclean meat, its reputation suffered and contracts were lost. Many plants that produce contaminated food never recover from this type of incident. The business shuts down, the employees lose their jobs, and communities lose employers. Thus, there are substantial consequences to the production of unsafe food. Our research investigates the role of employee motivation on food safety in a food processing plant. This article reports a study that explored how employee intentions and work habits can contribute to an integrated framework of motivated behavior for safe food production.

Motivated Behavior

Workers’ performance in organizations results from their actions, which depend substantially upon motivation. Our approach to motivation builds upon existing theory and research on intentional behavior. There is significant research on intentions and behavior that serves as fertile conceptual ground for considering factors that contribute to employees’ behavior in work settings. For this research, we focused on the theory of reasoned action (Fishbein, 1980), the theory of planned behavior (Ajzen, 1991), and Triandis’s (1977) model of intentional behavior. These approaches provided sound conceptual bases for developing an integrated framework of motivated work behavior (presented in Figure 1).

Theory of Reasoned Action

The theory of reasoned action assumes that much of human behavior is under volitional control (Ajzen & Fishbein, 1980; Fishbein, 1980). Because this behavior is under personal control, actions reflect deliberate choices the person makes about how to behave. From this perspective, a person’s intention to behave in a specific way is the precursor to his or her actions. Indeed, intentions that are properly assessed have been found to be very good predictors of an individual’s eventual behaviors (Sutton, 1998). Consequently, from this approach, intentions predict behaviors, but a critical question is the following: What are the factors that lead to intentions?

According to the theory of reasoned action, the attitudes and subjective norms of individuals predict their intentions (Ajzen & Fishbein, 1980). This attitude toward the behavior reflects the individuals’ positive or negative evaluations of engaging in the action. For example, behaving in ways to avoid contamination is...
judged along an unfavorable–favorable dimension. The subjective norm reflects the social forces people perceive that might affect their intentions. That is, the subjective norm indicates how individuals think people important to them think they should behave (e.g., engage in behaviors to protect food safety). The theory of reasoned action proposes that the attitudes toward the behavior in conjunction with the subjective norm are sufficient to predict intentions to engage in specific behaviors. Although the theory of reasoned action provides a strong and parsimonious conceptual foundation for understanding work behavior (Madden, Ellen, & Ajzen, 1992), other researchers have proposed that it can be improved by incorporating additional constructs.

### Theory of Planned Behavior

The theory of planned behavior (Ajzen, 1991) builds upon the theory of reasoned action by adding a construct to account for specific behaviors that may not be under complete volitional control. In addition to the attitude and subjective norm constructs, the theory of planned behavior stipulates that people’s beliefs about how much control they have over their behavior also influence their intentions to engage in the action. Perceived behavioral control reflects a person’s perceptions about how capable he or she is of engaging in the behavior as well as the perceived ease or difficulty of performing the behavior.

In the theory of planned behavior, perceived behavioral control can also add to the prediction of behavior beyond that of intentions. To the degree that people do not believe their behavior is under their complete control, their intentions to engage in the behavior will be lower. Moreover, people with lower perceived behavioral control may be less likely to engage in the desired action. Because many of the behaviors that people perform at work are not completely under their volitional control, research has shown that perceived behavioral control adds to the prediction of these behaviors and related intentions (Armitage & Conner, 1999, 2001; Bunce & Birdi, 1998). In the case of workers at a food production facility, it is reasonable to suspect that they may perceive that keeping the food safe and avoiding contamination is not under their complete control. However, additional factors may also be important for understanding and predicting food safety behaviors.

### Triandis’s Model of Intentional Behavior

Triandis’s (1977, 1980) conceptualization for intentions and behavior is similar to the theory of reasoned action in that attitudes and social forces are used to predict intentions. However, Triandis recognized the large literature suggesting that habits play an important role in predicting behavior. According to Triandis’s model, behavior can be predicted by people’s intentions in conjunction with their habits for engaging in the behavior. From Triandis’s approach, it should be possible to predict workers’ behaviors in keeping food safe using their intentions to keep food safe along with the frequency with which the workers behaved similarly in the past. Although we believe that work habits can have a strong influence on workers’ behaviors in organizational settings, there are shortcomings with assessing the habit construct in terms of the frequency of past behavior (Ajzen, 2002b; Verplanken & Orbell, 2003).

### Work Habits

A long-standing view of behavior is that previous behavior is the best predictor of future behavior (Triandis, 1977). Although empirically this is often found to be true, it is not a significant theoretical claim for the habit concept (Verplanken, 2006). Many researchers have noted that equating habits with measures of past behavior leads to several conceptual, theoretical, and methodological limitations. (For in-depth discussion of these limitations, see Ajzen, 2002b; Ouellette & Wood, 1998; Verplanken & Aarts, 1999.) Consequently, recent efforts have attempted to provide stronger theoretical and conceptual bases for considering the habit...
construct that do not rely on the frequency of enacting the behavior in the past.

One way to think about work habits is to consider the degree the behavior is controlled or follows conditions of automaticity (Ronis, Yates, & Kirsch, 1989). That is, habits can be seen as falling along an automatic–controlled continuum of influences on stable patterns of behavior. In general, habits can be thought of as influences on behaviors that are often repeated in response to situational cues. With repeated performance, the behavior might become more automatic (Neal, Wood, & Quinn, 2006), or alternatively, part of a controlled routine (Weiss & Ilgen, 1985). In this regard, habituated behavior might reflect automatic and controlled forces with conditioned responses on one end and reasoned action on the other end of the continuum, and automatic, semi-automatic, and controlled responses lying between. If the work behavior is relatively automatic, then the worker has less conscious control over and awareness of performing the behavior (Ronis et al., 1989). Alternatively, many work routines occur with awareness and control, and enacting the behavior requires some degree of intentionality and conscious effort. In this study, we examined both the automatic and controlled aspects of this dimension of work habits while investigating the role that work habits might play in workers’ attempts to keep food clean during processing.

There has been substantial consideration of the habit construct based on the characteristics of automaticity (Ouellette & Wood, 1998; Verplanken & Aarts, 1999; Verplanken & Orbell, 2003). This automaticity perspective on habits suggests that once a behavior is associated with a stable situation and has been repeated successfully, the person loses conscious control of the behavior. That is, the behavior is elicited in an automatic fashion and has the properties associated with other automatic processes (i.e., lack of awareness, uncontrollability, unintentionality, and efficiency; Bargh, 1994). Consequently, to the degree that a behavior is enacted in an automatic fashion in response to situational cues, it is considered to have habit strength (Verplanken, 2006). This approach appropriates the habit strength term from more traditional views derived from learning theory (Hull, 1943; Triandis, 1977) that consider habit strength as the degree to which a specific stimulus elicits a specific response. Although habit strength is used in both approaches, it is important to recognize that the mechanisms by which habit strength is acquired and influences behavior differ for the automaticity and learning theory approaches.

Many of the behaviors that workers perform in their jobs could be considered as habitual from the automaticity perspective, particularly for the repetitive tasks that are associated with more mundane jobs. Workers who engage in repetitive behaviors, such as those on a food production line, soon lose conscious control over those repeated behaviors and perform them with little awareness, quickly, and without much plan to do so (i.e., automatically). To the degree that the behavior is habitual in terms of the conditions of automaticity, it has habit strength (Verplanken & Orbell, 2003).

In contrast to this automaticity perspective, the routines perspective considers some work habits to occur under conscious control and reason (Bamberg, Ajzen, & Schmidt, 2003). Repeated performance may make many work behaviors routine. However, these well-practiced behaviors may still be under conscious awareness. The workers may have habitual behaviors in response to situational cues, but they still monitor the situation. The workers’ duties, like food safety, may require them to be constantly aware to detect critical events. Unlike automatic processes, these routine behaviors involve some intentionality and degree of conscious control. So, the work routines perspective suggests that work habits can be conceptualized as behavior patterns that are performed routinely but with awareness, consciousness, and intentionality.

As habitual behaviors, many work routines occur with awareness and control. For example, standard operating procedures are routine ways of responding to situations but involve behaviors that are conscious responses to situational cues. In food production, keeping the food clean involves committing focused attention while performing a variety of behaviors. This focused attention is conscious, intentional, controlled, and yet efficient. Consequently, work habits can be seen as controlled behaviors that employees perform in a routine fashion in response to situational cues. Thus, work routines are a type of work habit we refer to for frequently emitted and intentional behavior patterns for which a worker has conscious awareness and over which he or she exerts some control.

To summarize, work habits can be conceived as reflecting a dimension of automatic (habit strength) and controlled (work routines) patterns of behaviors that are performed frequently in response to situational cues. We used the controllability, intentionality, and awareness aspects of automaticity to differentiate behaviors along the automatic–controlled dimension. It is conscious control that distinguishes habit strength from work routines. Interestingly, habit strength might be a better predictor of specific behaviors (e.g., postal workers fastening seat belts), whereas work routines might be a better predictor of other behaviors (e.g., a postal worker sorting packages for delivery).

Based on these conceptualizations, we hypothesized that work habits would influence the motivation of workers to avoid contamination in a food processing plant. However, rather than using a frequency of past behavior measure, we assessed work habits with two different measures that reflect aspects of the automatic–controlled distinction. The apparent automaticity of behaviors related to keeping food products clean was assessed with a measure of habit strength. Specifically, we revised the Self-Report Index of Habit Strength (Verplanken & Orbell, 2003), which captures the degree to which the four characteristics of automaticity are associated with a particular behavior. In addition, to assess the more controlled aspects of work habits that might be considered work routines, we devised a self-report measure. We explored the role these two work habit measures play in the work employees do to keep food clean and uncontaminated.

An Integrated Framework of Intentions and Motivated Behavior

We propose that work behavior can be understood and predicted based on the models developed regarding intentions and behavior. As illustrated in Figure 1, our critical prediction was that work habits, based on habit strength and work routine measures, would make a significant contribution to the prediction of self-reported behavior. It is important to note that this study may allow us to determine whether a habit strength or work routines measure better predicts self-reported behavior. Therefore, it may be established whether a controlled versus automaticity perspective for work habits better accounts for self-reported food safety behaviors.
Furthermore, we predicted that work habits in conjunction with intention and perceived behavioral control would account for substantial variance in self-reports of behavior. In addition, intentions toward a behavior, such as avoiding contamination, should be predicted by attitudes toward that behavior, subjective norms regarding the behavior, and the worker’s perceived control over the behavior. However, as previous theorizing and research have indicated, perceived behavioral control may not have an independent effect on intentions. Because workers might perceive that they have control over their actions in avoiding contamination, perceived behavioral control might not influence intentions but may still influence self-reports of behavior. So, an alternative pattern might arise in which perceived behavioral control relates to behavior but not intentions (cf. Nickell & Hinsz, 2004).

Method

Work Site

A survey was distributed at a fully integrated turkey processing plant located in a small upper midwestern community. Turkeys are brought to the plant from 12 different suppliers in three states. The plant processes approximately 6,000 turkeys per day and distributes more than 200 standard turkey products to school districts, food service management companies, distributors, colleges and universities, and government agencies.

Participants

Workers (N = 260) at the turkey processing plant were given the opportunity to take home a questionnaire to be returned several days later. The potential respondents included all plant workers and supervisors, with the exception of managers and front-office personnel. In all, 209 workers (80% of the workforce) took a questionnaire made available by the plant’s human resources department to be completed at home. A total of 174 workers (67%) returned their questionnaire to the researchers and were paid $15 each for completing it. Because approximately 68 employees were primarily Spanish speaking or Spanish–English bilingual, a Spanish-language version of the questionnaire was provided as an option. Ten Spanish-language questionnaires were taken, and six Spanish-language questionnaires were returned. Because of concerns about being able to demonstrate equivalence of the translation, these six Spanish-language questionnaires were not used in further analyses. Six additional surveys were not used in analyses because they were from workers hired in the past few days, were very incomplete, or were from only temporary workers. Therefore, 162 (62.3%) usable surveys were used for the analyses.

The respondents averaged 40.98 years of age (range = 17–85 years) and had worked at the plant an average of 8.34 years (range = 0.02–30.00 years). The gender of the respondents (37% women) was also fairly representative of the plant’s workers (31%), Fisher’s exact p = .21. The race/ethnicity of the employees who responded to the questionnaire generally reflected that of the plant’s workforce. White workers accounted for 62% of the plant’s workforce and 72.2% of the respondents. Hispanic workers, who made up 26% of the workforce but only 11.7% of the respondents, were the most underrepresented group. The six Spanish surveys that had been excluded partially accounted for this underrepresentation.

Questionnaire

The questionnaire began with a two-page introduction that highlighted the purpose of the questionnaire, the $15 compensation, confidentiality of responses, and definitions of common questionnaire phrases (i.e., “clean and uncontaminated turkey products” and “doing all that is needed to produce clean and uncontaminated turkey products”). General instructions for completing the various rating scales were provided, along with sample questions and potential responses (cf. Appendix A of Ajzen & Fishbein, 1980). For each of the measures constructed, the related items were interspersed within the survey. The measures generally achieved acceptable internal consistency coefficients (see diagonal in Table 1), so composite scores were constructed as the mean of the item responses.

General self-reported behaviors. General self-reported behaviors were measured with six items. Some of the items were the following: “How often do you do all that is needed to produce clean and uncontaminated turkey products?” (1 = never to 7 = always), “While doing your job, how often do you produce contaminated or unclean turkey products?”, and “I always do all that is needed to produce clean and uncontaminated turkey products” (for both, 1 = strongly disagree to 7 = strongly agree).

Intentions. Intentions toward the behavior were measured with five items, each on 7-point scales (1 = strongly disagree to 7 = strongly agree). A sample item was “I (want/intend/plan/desire) to

Table 1

Intercorrelations, Coefficient Alphas, Means, and Standard Deviations for Components of the Integrated Framework (N = 162)

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>General self-reported behavior</td>
<td><strong>.79</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.85</td>
<td>0.97</td>
</tr>
<tr>
<td>Behavioral intentions</td>
<td>.68</td>
<td><strong>.70</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.33</td>
<td>0.74</td>
</tr>
<tr>
<td>Attitudes toward the behavior</td>
<td>.70</td>
<td>.64</td>
<td><strong>.70</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.95</td>
<td>0.95</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>.59</td>
<td>.69</td>
<td>.56</td>
<td><strong>.82</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.21</td>
<td>0.71</td>
</tr>
<tr>
<td>Perceived behavior control</td>
<td>.53</td>
<td>.39</td>
<td>.45</td>
<td>.42</td>
<td><strong>.56</strong></td>
<td></td>
<td></td>
<td></td>
<td>5.25</td>
<td>1.01</td>
</tr>
<tr>
<td>Habit strength</td>
<td>.53</td>
<td>.49</td>
<td>.46</td>
<td>.60</td>
<td>.52</td>
<td><strong>.82</strong></td>
<td></td>
<td></td>
<td>5.93</td>
<td>0.73</td>
</tr>
<tr>
<td>Work routines</td>
<td>.61</td>
<td>.55</td>
<td>.52</td>
<td>.63</td>
<td>.52</td>
<td>.71</td>
<td><strong>.83</strong></td>
<td></td>
<td>5.08</td>
<td>1.33</td>
</tr>
<tr>
<td>Social desirability</td>
<td>.40</td>
<td>.29</td>
<td>.37</td>
<td>.22</td>
<td>.16</td>
<td>.20</td>
<td>.28</td>
<td><strong>.78</strong></td>
<td>4.87</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Note. Coefficient alpha values are presented in boldface along the diagonal. All correlation coefficients were significant at p < .001 except those denoted by an asterisk.

*p < .05.*
do all that is needed to produce clean and uncontaminated turkey products.”

**Attitude toward the behavior.** Attitude toward the behavior was measured with five 7-point semantic differential responses to the same question: “My doing all that is needed to produce clean and uncontaminated turkey products is [good–bad], [pleasing–annoying], [favorable–unfavorable], [important–unimportant], [enjoyable–unenjoyable].”

**Subjective norm.** Subjective norms were measured with five items, each on 7-point scales (1 = strongly disagree to 7 = strongly agree). The items included “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.”

**Perceived behavioral control.** Perceived behavioral control was measured with five items. Sample items included the following: “Even if I wanted to, it would be difficult for me to do all that is needed to produce clean and uncontaminated turkey products” (7 = strongly disagree to 1 = strongly agree). “For me to do all that is needed to produce clean and uncontaminated turkey products is...” (7 = extremely easy to 1 = extremely difficult). “How much control do you have over whether you can do all that is needed to produce clean and uncontaminated turkey products?” (1 = completely no control to 7 = complete control), and “It is mostly up to me if I do all that is needed to produce clean and uncontaminated turkey products” (1 = strongly disagree to 7 = strongly agree). Although the internal consistency of the perceived behavioral control measure (α = .56) was lower than many of the other components in this study, Armitage (2005) remarked that measures of perceived behavioral control often have alpha coefficients less than .70. Cheung and Chan (as cited in Ajzen, 2002a) reported a meta-analysis of 90 studies that found that the average internal consistency for perceived behavioral control measures was .65.

**Work habits—habit strength.** The habit strength measure of work habits was assessed with 12 items (see Table 2) adapted from the Self-Report Index of Habit Strength (Verplanken & Orbell, 2003). The items were measured using the 1 = strongly disagree to 7 = strongly agree scale. Item 6 was dropped because it negatively influenced the internal consistency coefficient, leading to a poorer composite score.

**Work habits—work routines.** The work routines measure of work habits was assessed with four pairs of items based on how often “your work habits,” “the routines you follow,” “the standard operating procedures,” and “doing the tasks the same way” helped workers avoid contamination (1 = never to 7 = always) and how much it mattered for avoiding contamination (1 = not at all to 7 = completely). Four routine scores were calculated by the product of the responses to “how often routines help” and “how much routines matter” divided by 7. A composite routine score was constructed from the mean of these four “how often” by “how much” product scores (cf. Tesluk & Mathieu, 1999).

**Social desirability.** Social desirability was measured with nine items from the Impression Management scale of the Balanced Inventory of Desirable Responding (Paulhus, 1984). A 1 = not at all true of me to 7 = completely true of me response scale was used.

**Results**

Mean values, standard deviations, and intercorrelations for the measures involved in the analyses are presented in Table 1. All correlations were significant. It is important to note that the mean values approached 6 on the 7-point scale, indicating that the workers at this plant had positive attitudes and intentions toward avoiding contamination and keeping the food safe.

**Predicting Intentions**

A regression analysis was conducted to determine if intentions could be predicted by attitudes toward the behavior, subjective norms, and perceived behavioral control as would be predicted by the theory of planned behavior (Ajzen, 1991). This regression equation was significant, F(3, 158) = 68.30, p < .01, accounting for 57% of the variance in reported intentions. The attitude and subjective norm components contributed significantly to the equation, whereas perceived behavioral control did not (see Table 3). The absence of an effect for perceived behavioral control was consistent with previous analyses with intentions to avoid contamination (Nickell & Hinsz, 2004) and can be expected with specific behaviors (Armitage & Conner, 2001). These analyses demonstrated that more than half of the variance in intentions could be accounted for by measures of the attitude toward the behavior and subjective norms regarding the behavior.

**Table 2**

<table>
<thead>
<tr>
<th>Habit Strength Measure for Producing Clean and Uncontaminated Turkey Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I typically do all that is needed to produce clean and uncontaminated turkey products.</td>
</tr>
<tr>
<td>2. Doing all that is needed to produce clean and uncontaminated turkey products is something I do automatically.</td>
</tr>
<tr>
<td>3. Doing all that is needed to produce clean and uncontaminated turkey products is something I do without having to consciously remember to do so.</td>
</tr>
<tr>
<td>4. It makes me feel weird if I do not do all that is needed to produce clean and uncontaminated turkey products.</td>
</tr>
<tr>
<td>5. Doing all that is needed to produce clean and uncontaminated turkey products is something I do without thinking.</td>
</tr>
<tr>
<td>6. It would require effort on my part not to do all that is needed to produce clean and uncontaminated turkey products.</td>
</tr>
<tr>
<td>7. Doing all that is needed to produce clean and uncontaminated turkey products is something that is part of my daily work routine.</td>
</tr>
<tr>
<td>8. I do all that is needed to produce clean and uncontaminated turkey products without realizing I’m doing it.</td>
</tr>
<tr>
<td>9. I would find it hard not to do all that is needed to produce clean and uncontaminated turkey products.</td>
</tr>
<tr>
<td>10. I do all that is needed to produce clean and uncontaminated turkey products without needing to think about it.</td>
</tr>
<tr>
<td>11. Doing all that is needed to produce clean and uncontaminated turkey products is something that’s typically “me.”</td>
</tr>
<tr>
<td>12. Doing all that is needed to produce clean and uncontaminated turkey products is something I have been doing for a long time.</td>
</tr>
</tbody>
</table>

*a This item was not included in the composite habit strength measure.*
Predicting Behavior

We hypothesized that self-reports of behaviors to keep the food safe and uncontaminated could be predicted by intentions, perceived behavioral control, and work habits. Regression analyses supported this hypothesis. A regression analysis using the habit strength measure of work habits was significant, $F(3, 158) = 67.85, p < .01, R^2 = .56$, with each predictor contributing significantly to the equation (see Table 3). A separate regression analysis using the work routines measure of work habits revealed similar results in predicting self-reports of food safety behaviors. The regression equation was significant, $F(3, 158) = 74.38, p < .01, R^2 = .59$, with perceived behavioral control, intention, and work routines each contributing significantly to the equation (see Table 3). Thus, there was support for habit strength and work routines contributing to the prediction of work behavior. Moreover, these analyses demonstrated that perceived behavioral control did play a role in self-reports of behaviors to avoid contamination.

The inclusion of work routines in the regression equation resulted in a slightly better prediction of self-reported behavior than habit strength ($R^2$s = .59 vs. .56, respectively). However, it is important to note that the measures of habit strength and work routines were highly correlated ($r = .71$). Consequently, a mediation analysis was conducted to determine if either the work routines or habit strength measure mediated the influence of the other in the prediction of self-reported food safety behaviors. When both habit strength and work routines were entered into a regression equation predicting self-reported behavior along with intentions and perceived behavioral control, work routines continued to be a significant predictor, $\beta = .23, t(157) = 2.94, p < .01$, whereas habit strength was not significant, $\beta = .02, t(157) = 0.31, ns$. This mediation analysis suggested that the measure of work routines captured the variance in the prediction of self-reported behavior that was also found when using the habit strength measure.

### Path Analyses

Given the general support for the relationships we hypothesized for intentions and self-reported behavior, we sought to examine how well the integrated framework illustrated in Figure 1 would account for the employees’ responses. A path analysis conducted to test these relationships, using the routines measure of work habits, found that the integrated framework did not fit the set of responses very well, $\chi^2(3) = 25.53, p < .01$, root mean square error of approximation (RMSEA) = .219, comparative fit index (CFI) = .95, standardized root mean square residual (SRMR) = .042, goodness-of-fit index (GFI) = .95, adjusted GFI = .65 (standardized coefficients are presented in Figure 2).

One outcome of this path analysis was that perceived behavioral control did not predict intentions, just as indicated by the previous regression analyses. So, a revised model was constructed that deleted this relationship. In addition, previous research has indicated that attitudes toward the behavior can have a direct effect on behavior in addition to the indirect effect through intentions (Bentler & Speckart, 1979, 1981; Fazio & Towles-Schwen, 1999; Nickell & Hinsz, 2004). This direct effect of attitude to behavior was also incorporated into the revised model, which is presented in Figure 3. A path analysis of this revised model indicated a very good fit to the data, $\chi^2(3) = 2.01, ns$; RMSEA = .000, CFI = 1.00, SRMR = .014, GFI = 1.00, adjusted GFI = .97 (coefficients for the revised model are presented in Figure 4). The improved fit with the revised model resulting from removing the path from perceived behavior control to intention and adding a path from attitude to self-reported behavior was very consistent with earlier research involving the theory of planned behavior (Nickell & Hinsz, 2004), but for which work routines was absent. Consequently, there was evidence to suggest that the revised model provided a good description of the pattern of relationships.

The results of this path analysis were generally consistent with those of the regression analyses. Intentions were predicted by the attitude and subjective norm components, but not by perceived control. However, self-reports of work behavior were predicted by perceived control and attitudes as well as intentions and the work routines measure. A separate path analysis that used the measure of habit strength instead of work routines found that it was not a significant contributor to self-reported work behavior. Thus, work habits as measured by the Self-Report Index of Habit Strength (Verplanken & Orbell, 2003) may not be as critical a factor in predicting food safety.

One limitation of this test of the integrative framework is that it was based on self-reports. A problem with self-reports of behavior is the possibility of workers responding in a socially desirable fashion. Consequently, a social desirability measure was embedded in the survey to statistically control for this possibility. This social desirability measure was significantly correlated with each of the critical measures (see Table 1). However, when social desirability was included in the path analysis, the pattern of coefficients and fit of the models did not change in meaningful or significant ways. Consequently, although social desirability biases might have influenced the workers’ responses, there was evidence that social desirability did not change the pattern of relationships observed in this study.

### Table 3

<table>
<thead>
<tr>
<th>Predictor Valid</th>
<th>$B$</th>
<th>$SE$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predicting food safety intentions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>.28</td>
<td>.05</td>
<td>5.50**</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>.49</td>
<td>.07</td>
<td>7.29**</td>
</tr>
<tr>
<td>Perceived behavioral control</td>
<td>.02</td>
<td>.04</td>
<td>0.37</td>
</tr>
<tr>
<td><strong>Predicting food safety behaviors with the Self-Report Index of Habit Strength</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td>.67</td>
<td>.08</td>
<td>8.40**</td>
</tr>
<tr>
<td>Perceived behavioral control</td>
<td>.25</td>
<td>.06</td>
<td>4.12**</td>
</tr>
<tr>
<td>Index of habit strength</td>
<td>.19</td>
<td>.09</td>
<td>2.17**</td>
</tr>
<tr>
<td><strong>Predicting self-reported food safety behaviors with the work routines measure</strong></td>
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<tr>
<td>Intentions</td>
<td>.60</td>
<td>.08</td>
<td>7.46**</td>
</tr>
<tr>
<td>Perceived behavioral control</td>
<td>.22</td>
<td>.06</td>
<td>3.75**</td>
</tr>
<tr>
<td>Work routines measure</td>
<td>.03</td>
<td>.01</td>
<td>3.68**</td>
</tr>
</tbody>
</table>

Note. $df = 158$ for all analyses.  
*p < .01. **p < .001.

### Predicting Behavior

We hypothesized that self-reports of behaviors to keep the food safe and uncontaminated could be predicted by intentions, perceived behavioral control, and work habits. Regression analyses supported this hypothesis. A regression analysis using the habit strength measure of work habits was significant, $F(3, 158) = 67.85, p < .01, R^2 = .56$, with each predictor contributing significantly to the equation (see Table 3). A separate regression analysis using the work routines measure of work habits revealed similar results in predicting self-reports of food safety behaviors. The regression equation was significant, $F(3, 158) = 74.38, p < .01, R^2 = .59$, with perceived behavioral control, intention, and work routines each contributing significantly to the equation (see Table 3). Thus, there was support for habit strength and work routines contributing to the prediction of work behavior. Moreover, these analyses demonstrated that perceived behavioral control did play a role in self-reports of behaviors to avoid contamination.

The inclusion of work routines in the regression equation resulted in a slightly better prediction of self-reported behavior than habit strength ($R^2$s = .59 vs. .56, respectively). However, it is important to note that the measures of habit strength and work routines were highly correlated ($r = .71$). Consequently, a mediation analysis was conducted to determine if either the work routines or habit strength measure mediated the influence of the other in the prediction of self-reported food safety behaviors. When both habit strength and work routines were entered into a regression equation predicting self-reported behavior along with intentions and perceived behavioral control, work routines continued to be a significant predictor, $\beta = .23, t(157) = 2.94, p < .01$, whereas habit strength was not significant, $\beta = .02, t(157) = 0.31, ns$. This mediation analysis suggested that the measure of work routines captured the variance in the prediction of self-reported behavior that was also found when using the habit strength measure.

### Path Analyses

Given the general support for the relationships we hypothesized for intentions and self-reported behavior, we sought to examine how well the integrated framework illustrated in Figure 1 would account for the employees’ responses. A path analysis conducted to test these relationships, using the routines measure of work habits, found that the integrated framework did not fit the set of responses very well, $\chi^2(3) = 25.53, p < .01$, root mean square error of approximation (RMSEA) = .219, comparative fit index (CFI) = .95, standardized root mean square residual (SRMR) = .042, goodness-of-fit index (GFI) = .95, adjusted GFI = .65 (standardized coefficients are presented in Figure 2).

One outcome of this path analysis was that perceived behavioral control did not predict intentions, just as indicated by the previous regression analyses. So, a revised model was constructed that deleted this relationship. In addition, previous research has indicated that attitudes toward the behavior can have a direct effect on behavior in addition to the indirect effect through intentions (Bentler & Speckart, 1979, 1981; Fazio & Towles-Schwen, 1999; Nickell & Hinsz, 2004). This direct effect of attitude to behavior was also incorporated into the revised model, which is presented in Figure 3. A path analysis of this revised model indicated a very good fit to the data, $\chi^2(3) = 2.01, ns$; RMSEA = .000, CFI = 1.00, SRMR = .014, GFI = 1.00, adjusted GFI = .97 (coefficients for the revised model are presented in Figure 4). The improved fit with the revised model resulting from removing the path from perceived behavior control to intention and adding a path from attitude to self-reported behavior was very consistent with earlier research involving the theory of planned behavior (Nickell & Hinsz, 2004), but for which work routines was absent. Consequently, there was evidence to suggest that the revised model provided a good description of the pattern of relationships.

The results of this path analysis were generally consistent with those of the regression analyses. Intentions were predicted by the attitude and subjective norm components, but not by perceived control. However, self-reports of work behavior were predicted by perceived control and attitudes as well as intentions and the work routines measure. A separate path analysis that used the measure of habit strength instead of work routines found that it was not a significant contributor to self-reported work behavior. Thus, work habits as measured by the Self-Report Index of Habit Strength (Verplanken & Orbell, 2003) may not be as critical a factor in predicting food safety.

One limitation of this test of the integrative framework is that it was based on self-reports. A problem with self-reports of behavior is the possibility of workers responding in a socially desirable fashion. Consequently, a social desirability measure was embedded in the survey to statistically control for this possibility. This social desirability measure was significantly correlated with each of the critical measures (see Table 1). However, when social desirability was included in the path analysis, the pattern of coefficients and fit of the models did not change in meaningful or significant ways. Consequently, although social desirability biases might have influenced the workers’ responses, there was evidence that social desirability did not change the pattern of relationships observed in this study.
We uncovered a number of intriguing results in our study of hypothesized relationships among constructs related to food safety by workers at a turkey processing plant. Regression analyses indicated that work habits, perceived behavioral control, and intentions each contributed to the prediction of self-reports of engaging in behaviors to avoid contamination. In addition, a regression analysis found that attitudes and subjective norms regarding food safety did predict intentions toward avoiding contamination, although perceived behavioral control did not have a significant relationship with intentions. A path analysis of the proposed integrative framework (Figure 1) found that the model did not fit the data. However, a revised model fit the responses quite well (Figure 3). This revised model provides a basis for considering factors that contribute to self-reported food safety behaviors.

A key aim of this investigation was to determine the role that work-related habits might have on behaviors at work. Based on more recent conceptualizations of habits, we proposed that the automaticity–controlled distinction could be used to consider how work habits might predict behavior. We used a measure of work routines and a habit strength index based on the characteristics of automaticity (Bargh, 1994) to assess work habits. Although

![Figure 2. Path coefficients for the integrative framework for motivated behavior. *p < .01.](image)

![Figure 3. The revised integrative framework for motivated behavior.](image)
gression analyses found that both work routines and habit strength contributed to the prediction of self-reported behavior, a mediation analysis suggested that work routines accounted for the variance in this relationship. The path analysis confirmed the impact of work habits, assessed as routines, on self-reported behavior.

The results of this survey suggest an important role for work routines in the behavior of workers performing safety behaviors. In several ways, food processing workers acting in ways to avoid contamination reflects vigilance. For behaviors requiring focused attention, routines are more likely to contribute to behavior because some cognitive effort and conscious awareness are required to monitor and detect the critical event (e.g., contamination). So, it is reasonable that the work routines measure would have a stronger association with attentive behaviors than would the habit strength index. Nevertheless, it is probable that other work behaviors that involve actions for which the worker is unaware and lacks intention, and about which the worker is not conscious, would be better predicted by habit strength. For example, workers cutting the turkey carcass into parts dip their knives into a cleaning solution between each carcass. This is a behavior they engage in frequently and apparently automatically, so a habit strength measure might predict this knife dipping behavior quite well. Therefore, although we found that a measure of work routines predicted self-reports of avoiding contamination behaviors better than habit strength, it is likely that a habit strength measure would predict other repeated behaviors better.

It is also possible that the suitability of a habit measure depends on the specificity of the behaviors in question (Wood, Tam, & Guerrero Witt, 2005). In the current study, self-reported behavior was assessed globally (i.e., doing all that is necessary to avoid contamination). Perhaps, a work routine measure is more predictive of behavior when questions are general in nature, whereas a habit strength measure might be more appropriate for questions that are more specific (e.g., dipping a knife in cleaning solution after cutting a carcass). Because the habit strength index measures automaticity, which is usually applied to specific and defined actions or processes, habit strength may be more predictive of more specifically defined behaviors. This is an issue that future research should resolve. Regardless, our results from both the habit strength and work routine measures indicate that work habits are an important factor for understanding motivated work behaviors.

One potential reason why the habit strength measure of work habits did not uniquely predict food safety behaviors is a function of the way the behavior was assessed. The habit strength measure attempts to assess the degree that characteristics associated with automaticity are involved in individuals performing a repeated behavior. In contrast, self-reported behavior requires reasoning about the frequency with which the worker engaged in global behaviors related to food safety. If aspects of the behaviors are under automatic control (i.e., out of awareness, consciousness, intention), then how could workers respond regarding the automatic features of the behavior of which they are unaware (Ouellette & Wood, 1998)? That is, given the self-report nature of the measure of behavior, it may be reasonable that the habit strength measure would not relate to a self-report measure of behavior based on conscious awareness. Consequently, it may be important to examine measures of habits along the automatic–controlled dimension with automatic (e.g., implicit) and controlled (e.g., explicit) assessments of behaviors. Such research will expand researchers’ understanding of the role of habits in a variety of behaviors for which habits currently have no clear relationships.

Some interesting implications arise from consideration of the automatic and controlled aspects of work habits. Clearly, initial training in performing the behavior will help instill a work habit (Holland, Aarts, & Langendam, 2006). The more efficient the action is in achieving the task goal, the easier it will be to establish a work habit. If the behavior can occur automatically, with repeated performance the habit will emerge. However, if the behav-
ior requires continued conscious awareness such as with vigilance tasks, it might be helpful to have booster sessions to make sure that the appropriate behavior is being performed. The turkey processing plant has yearly training sessions at which the importance of, and methods for, avoiding contamination are discussed. Safety and security behaviors have the notable condition that, if performed correctly, the outcome does not occur (e.g., food contamination, a security breach; Hinsz & Nickell, 2004). It is possible that workers would fall into a routine that appears to be attentive behavior but is not protective against the negative outcome. Because different levels of conscious awareness might be required for different types of work habits, training protocols need to reflect these differences.

This study found that the work routines measure of work habits was a better predictor of self-reported behavior than the habit strength index. This finding supports a general view that many repeated behaviors might follow from conscious awareness. Although many work behaviors are repeated frequently, that does not necessarily imply that the behavior is automatic. Many of these repeated behaviors are reasoned and continue to involve cognitive processes such as monitoring and control (Bamberg et al., 2003). The complicated behaviors that workers perform in many work settings involve cognitive operations and active control, even if they are performed frequently (e.g., security guards checking to see that doors are closed and locked). Nevertheless, having argued for the importance of reasoned action even with repeated behaviors, it is also necessary to recognize that habits having at least semiautomatic features play an important role in other repetitive behaviors associated with work.

The distinction raised earlier regarding automatic and controlled influences on repeated behavior raises other important questions. Ouellette and Wood (1998) suggested that for stable behaviors that are unlikely to be exposed to changes in the situation or its cues, a measure of habit will often be a better predictor of behavior. However, when the situation or its cues change, a person’s intention is likely to be a better predictor of the person’s behavior (Wood, Quinn, & Kashy, 2002). Moreover, research has shown that the theory of planned behavior, with its introduction of a perceived behavioral control component, can better account for behaviors that lack complete volitional control. Similarly, it might be useful to add a habit component to the prediction of behavior (cf. Triandis, 1977) for situations in which the behavior is performed repeatedly.

The responses of the employees at this turkey processing plant provide support to the models of intentions and behavior that were used to develop the integrative framework. Consistent with the theory of reasoned action, attitudes and subjective norms regarding the behavior predicted intentions toward avoiding contamination. Moreover, intentions contributed to the prediction of self-reported behavior, although other factors that the theory does not include predicted behavior as well (Fishbein & Ajzen, 1975). Also inconsistent with the theory of reasoned action was the finding that attitudes had a direct link to self-reported behavior. The theory of reasoned action argues that attitudes influence behavior indirectly through intentions (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Nevertheless, other views of the attitude–behavior relationship suggest that direct effects between attitudes and behaviors will be found (Bentler & Speckart, 1979, 1981; Fazio & Towles-Schwen, 1999). Given the direct link between attitudes and self-reported behavior that was found, this relationship needs to be explored further to understand its true nature.

The employees’ responses in this study strongly support the theory of planned behavior. In addition to the finding of attitudes and subjective norms predicting intentions, intentions and perceived behavioral control combined to predict self-reported behavior quite well. These results are consistent with a recent study that showed that the theory of planned behavior was effective in explaining the food safety behaviors of consumers (Clayton & Griffith, 2003). The one concern is that perceived behavioral control did not contribute to the prediction of intentions, but, as noted earlier, this relationship should not always be expected. The lack of a relationship between perceived behavioral control and intentions makes sense for workers’ behaviors. Workers might believe that they have sufficient control over conditions such that they can pursue their intentions, yet they may believe they have less control over whether they can produce the behavior. That is, perceived behavioral control does not account for variance in workers’ intentions, but it does relate to their views of their capability to engage in the actual behaviors to keep food safe. A better understanding of the ways that perceived behavioral control contributes to specific behaviors of workers in different settings and jobs can help researchers better comprehend worker motivation.

As with any study, there are important limitations to this study that restrict the confidence with which the conclusions can be held. Many of these limitations are methodological in nature and result from the way the research was conducted. One limitation is that responses were based on self-reports of food safety behaviors. It would be preferable if direct behavioral assessments had been collected; however, plant management would not allow such intrusive behavioral assessments. It should also be noted that workers in the different sections of the plant engaged in different sets of behaviors to avoid contamination (e.g., evisceration vs. packaging). It is not clear how a general measure of food safety behavior could be constructed for the various jobs at the plant. A self-report measure of behavior can be subject to many biases from the respondent’s memory and judgment (Plous, 1993; Schwarz, 1999). The inclusion of the social desirability measure in some of the analyses was intended to determine how much influence this bias might have. The results suggested that social desirability had negligible influence. The self-report nature of the behavior is complicated by the fact that the measures of the other constructs were also self-reports. The contemporaneous assessment of all of the variables in one survey based on self-reports could lead to substantial common method variance and corresponding inflation of the estimates of the degree of relationships. As a result, this article focused more on testing models of the nature of the pattern of relationships rather than the strength of particular relationships between critical variables. Nevertheless, the limitations of the current study provide grounds for more research using alternative techniques, samples, and measures to examine the models that were proposed and tested. The unresolved conceptual issues also provide an impetus for additional consideration of the work habits construct as defined along a dimension of automatic and controlled influences on repeated behaviors.
References


