

Behavioral, Normative, and Control Beliefs Impacts on the Intention to Offer Food Safety Training to Employees

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SUMMARY

Training is an important aspect of food safety programs in commercial restaurants and is integral in ensuring that safe food is served. The purposes of this research were to explore restaurant managers' beliefs, attitudes, subjective norms, and perceptions of control with regard to providing employees the opportunity to attend food safety training and to determine how these characteristics differ between independent and chain restaurant managers as well as between managers with and without food safety certification.

A telephone survey yielded a total of 237 responses. Results indicated that intention to offer food safety training was high. Restaurant managers had a positive attitude about food safety, placed importance on the beliefs of those around them, and felt in control about offering food safety training.

Compared with managers without food safety certification, certified managers had more positive attitudes about offering food safety training and placed greater emphasis on subjective norms, but perceived less control. Certified managers had a higher intention to train employees than non-certified managers. When behavioral, normative, and control beliefs were compared between chain and independent restaurant managers, only behavioral and normative beliefs differed. Sanitarians can use the results of this study in training and inspections to help overcome potential barriers to managers' allowing employees to attend training.

INTRODUCTION

Foodborne illnesses continue to be a major public health concern in the United States. The federal government has identified the reduction of foodborne illnesses by 2010 as a major health goal (16). However, each year approximately 76 million people fall ill to a foodborne illness; 325,000 individuals are hospitalized and 5,000 die after contracting a foodborne illness (25). Buzby, Frenzen, and Rasco (7) report that of all hospitalizations in the United States, foodborne disease accounts for one out of every 100 illnesses and one out of every 500 deaths. A large number of foodborne illnesses are traced to restaurant operations (15, 17, 28).

Of all foodborne illnesses reported to FoodNet in 2005, 59% were associated with restaurants (8). In 1997, Collins (13) found that the most common risk factors leading to foodborne diseases and illnesses were improper holding times, cross contamination, and poor personal hygiene, all of which can be controlled by employees and managers within the foodservice operation.

In 2000 and 2004, the Food and Drug Administration (FDA) conducted studies to assess the most prevalent practices that were out of compliance with the Food Code (21, 22). The initial study

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in 2000 (21) found that 26% of quick-service restaurants and 40% of full service restaurants were out of compliance with one or more identified standards. Both types of operations were primarily out of compliance for holding time/temperature, personal hygiene, and contaminated equipment/protection from contamination. The 2004 follow-up study by the FDA (22) found that both quick and full-service restaurants had improved, but not to the level of institutional foodservice operations. The FDA has set a goal of a compliance rate of 81% for quick service and 80% for full service restaurants by the year 2010.

To assist in achieving this goal, the Food and Drug Administration has recommended that all operations have at least one person on staff during normal business hours who can demonstrate knowledge of food safety or who has successfully completed food safety certification training. Food safety training programs have been found to increase sanitation inspection scores (14, 24), the microbiological quality of food (12), and self-reported food safety practices (26). However, other research has found the opposite to be true, indicating that even when foodservice employees are trained in proper food handling and have the knowledge to perform proper food safety practices, the knowledge does not always transfer to actual behavior (9, 10, 24, 30, 32).

A study completed by Roberts, et al. (30) conducted a pre- and post-test survey and observation of foodservice employees to determine if food safety training improves overall food safety knowledge and behaviors. The results indicated that knowledge and behavior increased significantly for handwashing ($P \leq .001$), but neither knowledge nor behaviors improved for time and temperature abuse or thermometer use.

The FDA explored the impact of certification on the control of food-borne illness risk factors within foodservice establishments (22). In full-service restaurants, personal hygiene and protecting contaminated equipment were significantly better for operations with a certified manager. For quick-service operations, statistically significant differences were noted in two categories, improper holding/time and temperature and protecting contaminated equipment; the certified managers outperformed the non-certified with regard to those opera-

tions. However, many basic food safety practices, including purchasing food from safe sources, proper cooking, and chemical control, did not increase significantly.

Training is an important aspect of any overall food safety program. Therefore, managers must train their employees accordingly, which includes allowing them to attend or participate in food safety training classes. ServSafe®, sponsored by the National Restaurant Association Educational Foundation, is the most widely used food safety training program. The National Restaurant Association has estimated that approximately two million food handlers have been trained in ServSafe®, which is equal to less than 16% of the 12.8 million employed in the restaurant industry.

Although this indicates that many foodservice employees have not been trained, no research to date has been conducted to explain managers' beliefs about implementing training or providing training for their employees. To design an effective training program that not only is useful to restaurant managers but would also be used by them, it is necessary to explore the factors that underlie their intention to train employees, including the impact that manager food safety certification has on the intention to train employees and the differences in chain and independent restaurants, because training may be different between the groups.

One way to explore behavioral intention and the cognitive beliefs underlying the formation of intention is through the use of the Theory of Planned Behavior (TpB). The TpB states that behavior intention is based on a person's attitude (one's evaluation of the behavior), subjective norm (one's perception that those who are important to the person think that he/she should or should not perform the behavior), and perceived behavioral control (one's ability to perform a behavior or barriers which would prevent one from performing it) (2, 5).

Attitude, subjective norm, and perceived behavioral control can be assessed using direct measures that ask respondents to rate each overall construct on a set of scales (3). These also can be measured indirectly, by asking respondents specifically about their beliefs. By utilizing predictor variables through the beliefs subjects hold, it is possible to understand why people hold certain overall attitudes, subjective norms, and perceptions of behavioral control (4). Additionally, when

belief-based measures are used, reliability is not a concern, because predictor variables are combined into a single composite score that represents the construct (4).

The goal of this research was to explore the beliefs of restaurant managers have about offering food safety training to employees, by determining the antecedents of behavioral intention (beliefs, attitudes, subjective norms, and perceptions of control). Specific objectives were to (1) determine what the beliefs, attitudes, subjective norms, and perceptions of control managers have about offering food safety training to their employees; (2) determine if the beliefs, attitudes, subjective norms, and perceptions of control differ based on ownership structure (chain or independent); and (3) determine if certification status (certified vs. non-certified) has an impact on the beliefs, attitudes, subjective norms, and perceptions of control of the managers.

METHODOLOGY

Sample

Commercial foodservice operations in the state of Kansas were the targeted population for this study. A listing of operations licensed to sell food within the state was obtained from the Kansas Department of Health and Environment. Of the 7,558 operations licensed, 5,468 operations were selected as meeting the predefined criteria of being a commercial foodservice operation. Of those, 50 operations were chosen for a pilot test. From the remaining, approximately 25% (1,347 operations) were selected to provide a final sample size large enough to ensure that the data were valid and reliable. Utilizing online research to determine which operations did not meet the commercial foodservice classification, of the sample was further refined which removed 26 operations, yielding a final sample of 1,321 operations.

Data collection

A telephone survey was utilized to collect the data. The 1,321 operations were divided into seven different groups; each group of 188 was contacted over the course of the seven-week study. Advance letters introducing managers of the operations to the purpose of the study, their rights in the research process,

and the researchers' contact information were sent to all operations approximately five days prior to the initial telephone call. The research protocol was approved by the Kansas State University Institutional Review Board.

Instrument development

The questionnaire was developed based on the Theory of Planned Behavior (TpB) (1), which can be used to identify beliefs that prevent individuals from performing behaviors. In this study, the behavior in question is the offering of food safety training to employees. The TpB posits that a person's behavioral intention is based upon three antecedents: his or her attitude, the values of important referents (subjective norm), and one's ability to perform the behavior (perceived behavioral control) (5, 18).

An elicitation study to determine what antecedents or beliefs about offering food safety training were most important to restaurant managers was conducted with a convenience sample of 20 restaurant managers. The elicitation study identified the commonly held beliefs that provided the basis for constructing the questionnaire. Examples of responses for each of the constructs included: behavioral beliefs (increase employee satisfaction, time to conduct food safety training), normative beliefs (employees, customers, health inspector), and control beliefs (time and money).

The initial questionnaire developed from the literature review and elicitation study was then reviewed by five graduate students and faculty familiar with food safety to ensure face validity. Major wording changes were made to the questionnaire and to the telephone scripting based on this review.

A pilot study was conducted with 50 operations drawn from the sample. Restaurant managers were sent an advance letter approximately one week prior to calling. Managers were then contacted by trained undergraduate research assistants; if there was no answer or if the manager was unavailable, the manager was contacted again at a later time. To track the time, date of each call, and the number of overall attempts to reach a manager, a call tracking form was used. Restaurants were contacted six times prior to being labeled as a "no response." A total of 19 of the 50 operations completed the questionnaire,

for a 38% response rate. The pilot test did not yield any questions or wording that needed changing.

The final version of the instrument included 85 questions to measure the components of the TpB and demographic information. Part I included nine questions to measure operational demographic information such as seating capacity, number of employees, types of food safety training offered, etc.

Part II collected direct and indirect measures of the TpB. Direct measures of attitude, perceived behavioral control, subjective norm, and behavioral intention were measured on a 7-point scale. Therefore, direct measures range on a scale from 1 to 7, with higher numbers indicating more positive attitudes and subjective norms or higher perceived control and intention. Attitudes were measured on a set of five semantic scales: *good/bad*, *worthless/valuable*, *difficult/easy*, *unpleasant/pleasant*, and *unimportant/important*. Subjective norms were measured by asking managers to rate if their important referents would approve or disapprove of offering food safety training to their employees. For example, "Most people who are important to me think that I should offer food safety training to my employees within the next year." Perceived behavioral control was measured by two questions: "I am able to send my employees to food safety training if I choose" and "It is my choice whether I offer food safety training to my employees within the next year." Intention was measured with three items: "I will try to offer," "I intend to offer," and "I plan to offer" food safety training within the next year. For all three measurements, a 7-point disagree-agree scale was used anchored by (1) strongly disagree and (7) strongly agree.

Indirect measures included behavioral, normative, and control beliefs and ranged on a scale from -21 to 21. Measures represent the mean of the belief multiplied by the evaluation of that belief. Nine behavioral beliefs identified in the elicitation study were measured by asking the respondent to rate the strength of his/her belief on a 7-point scale from (1) *extremely unlikely* to (7) *extremely likely*. These beliefs included (1) increasing customer satisfaction, (2) ensuring safe food, (3) ensuring food quality, (4) reducing food waste, (5) increasing employees' food safety awareness, (6) maintaining the operation's reputation, (7) employee satisfaction, (8) reducing

the likelihood of lawsuits, and (9) improving food safety practices of employees. Outcome evaluations were measured by asking respondents to rate how good or bad each of the beliefs were to them on a 7-point scale from (-3) *extremely bad* to (3) *extremely good*. The bipolar scoring (-3 to +3) is used in TpB research to reflect unfavorable evaluations as a negative score and positive evaluations as a positive score. Overall belief score was then calculated by multiplying the behavioral beliefs scores by the outcome evaluation to compute a total behavioral belief score.

Normative beliefs, or beliefs of how important referents (district managers, peer managers, etc.) view the behavior, are an important determinant of one's behavior (5). The managers' supervisor, long-term employees, short-term employees, customers, health inspectors, and vendors were identified through the literature review and elicitation study as important referents (normative beliefs). The strength of their beliefs was measured by asking respondents to rate the likelihood that each referent group/individual would think that food safety training should be offered to employees. A 7-point scale from (-3) *extremely likely* to (3) *extremely unlikely* was used. The motivation to comply with those normative beliefs was evaluated by asking respondents how much they care what the referent group/individual thinks on a 7-point scale from (1) *not at all* to (7) *very much*. A total normative belief score was calculated by multiplying the individual normative beliefs by the motivation to comply to derive an overall belief score that was summed across all evaluations.

Employee availability, managers' time, financial resources, lack of off-site food safety training availability, lack of on-site food safety training availability, lack of targeted training materials, employees not following what they learn from food safety training, and the time commitment required for food safety training were identified as control beliefs from the elicitation study. Control beliefs are those beliefs that can inhibit the performing of the behavior (5). These were measured by asking managers' to rate their agreement with the belief that it makes food safety training difficult on a 7-point scale ranging from *strongly disagree* (-3) to *strongly agree* (3). Perceived power was measured by asking respondents to rate how often not having the item affects their offering employee food safety training

TABLE 1. Characteristics of managers (n = 237)

Characteristic	n	% ^a	Characteristic	n	% ^a
Responses may not equal 100% due to non-response to a question					
Age			Years employed in foodservice		
30 years or younger	81	34.2	5 or less	0	0
31 – 40 years	52	21.9	6 – 15	84	35.4
41 – 50 years	56	23.6	16 – 25	53	22.4
51 – 60 years	38	16.0	26 or more	35	14.8
60 years or older	8	3.4	Years employed in the restaurant industry		
Gender			5 or less	45	19.0
Male	119	50.4	6 – 15	112	47.3
Female	117	49.6	16 – 25	54	22.8
Education			26 or more	24	10.1
Less than high school degree	5	2.1	Years employed in current position		
High school/GED	60	25.3	5 or less	146	61.6
Some college	83	35.0	6 – 15	64	27.0
Associate's Degree	29	12.2	16 – 25	17	7.2
Bachelor's Degree	55	23.2	26 or more	7	2.9
Graduate Degree	3	1.3	Professional affiliations		
Food safety certification			National Restaurant Association	32	13.5
Yes	162	68.4	Kansas Restaurant & Hospitality Association	38	16.0
No	72	30.4	Local Restaurant Association	10	4.2
Which food safety certification			Job title		
ServSafe®	116	71.6	Owner/Co-owner	81	34.2
Serving-It-Safe	4	2.5	General manager	37	15.6
Other	42	25.9	Department manager	108	45.6
			Regional/district manager	4	1.7

on a 7-point scale from *very rarely* (1) to *very frequently* (7). A total control belief score was then calculated by multiplying the individual control beliefs scores by the power of those control beliefs to derive an overall belief score, which was then summed across all evaluations.

Part III included nine questions that obtained information about the demographics of the managers. These questions gathered data about age, gender, educational level, food safety certification status, and employment characteristics.

Data analysis

All data analysis procedures utilized the Statistical Package for the Social Sci-

ences (SPSS, Version 11.5). Descriptive statistics, including means, standard deviations and frequencies, were calculated. Independent samples t-tests were used to determine the differences between mean item scores based on type of operation and certification status of the manager. Alpha levels of .05 were considered significant.

RESULTS

A total of 266 managers responded. Because of incomplete and missing data, 237 responses were usable. The final overall response rate was 17.9%. This is comparable to the response rates reported by Roberts and Sneed (31) and Cochran-Yantis et al. (11), who achieved response rates of 19% and 20%, respectively.

Demographics

Respondent characteristics and operational data are presented in Tables 1 and 2, respectively. An approximately equal number of male (50.4%) and female (49.6%) managers participated in the study. This is comparable to results of a study by Roberts and Sneed (31), in which 53% of the restaurant managers responding were male. The majority of managers were department managers (45.6%), such as back-of-the-house, food and beverage, and/or service managers. All managers had been employed in the industry for more than six years, with 14.8% having worked in the industry for 26 or more years.

The majority of operations had a seating capacity of less than 100 people

TABLE 2. Characteristics of the restaurants (n = 237)

Frequency			Frequency		
Characteristic	n	% ^a	Characteristic	n	% ^a
Seating Capacity			Number of Full-Time Employees		
50 or less	71	30.0	15 or less	189	79.7
51–100	74	31.2	16 – 30	28	11.8
101–150	35	14.8	31 – 60	16	6.8
151–200	25	10.6	Greater than 60	4	1.7
201–250	18	7.6			
251–300	6	2.5	Number of Part-Time Employees		
Greater than 300	8	3.4	15 or less	175	73.8
			16 – 30	53	22.4
Restaurant Classification			31 – 60	8	3.4
Independent	119	50.2	Greater than 60	1	0.4
Chain – franchised	52	21.9			
Chain – corporate	68	27.8	Total Number of Employees		
			15 or less	117	49.4
Service Classification			16 – 30	61	25.7
Quick service	74	31.2	31 – 60	43	18.1
Quick casual	73	30.8	Greater than 60	16	6.8
Casual dining	85	35.9			
Fine dining	5	2.1			
Provided an opportunity to attend a ServSafe® Class within the last year			Percentage of employees knowledgeable in food safety to meet health code regulations		
Yes	122	51.5	25% or less	65	27.4
No	114	48.1	26% – 50%	58	24.5
			51% – 75%	17	7.2
If yes, where was the training conducted?			76% – 100%	63	26.6
In-house	31	25.4	Greater than 100%	11	4.6
Off-site	91	74.6	Don't know/unsure	23	9.7
Percentage of total employees who were trained?			Operation has a person whose primary responsibility is food safety		
25% or less	56	45.9	Yes	179	75.5
26% – 50%	18	14.8	No	58	24.5
51% – 75%	6	4.9			
76% – 100%	16	13.1			
Greater than 100%	6	4.9			
Don't know/unsure	20	16.4			
Estimated Annual Costs for Training/Employee					
\$10 or less	4	11.5			
\$11 – \$20	9	7.4			
\$21 – \$30	3	2.5			
\$31 – \$40	4	3.3			
\$50 or greater	10	8.2			
Don't know/unsure	63	51.6			

^aResponses may not equal 100% due to non-response.

TABLE 3. TpB direct and indirect belief comparisons between chain and independent restaurant operations

	Mean ± Standard Deviation			t	p
	Overall (n = 236)	Independent Operations (n = 119)	Chain Operations (n = 117)		
Direct Measures^a					
Attitude	6.26 ± 0.76	6.24 ± 0.75	6.29 ± 0.78	-0.537	0.592
Subjective norm	5.89 ± 1.39	5.82 ± 1.36	5.95 ± 1.44	-0.742	0.459
Perceived behavioral control	5.22 ± 2.10	5.68 ± 1.74	4.76 ± 2.33	3.432	0.001*
Behavioral intention	5.88 ± 1.59	5.84 ± 1.55	5.91 ± 1.63	-0.310	0.757
Indirect Measures^b					
Behavioral Beliefs					
Ensuring safe food	18.43 ± 4.87	17.90 ± 5.39	18.97 ± 4.24	-1.678	0.095
Increase employees' awareness of food safety	17.68 ± 5.94	17.66 ± 5.90	17.71 ± 5.99	-0.070	0.945
Help maintain operations' reputation	17.66 ± 5.52	17.47 ± 5.71	17.85 ± 5.34	-0.534	0.594
Increase food safety practices of employees	17.42 ± 5.90	17.39 ± 5.87	17.44 ± 5.95	-0.075	0.940
Better food quality	17.16 ± 6.17	16.34 ± 6.77	17.98 ± 5.40	-2.071	0.039*
Decrease lawsuits	16.83 ± 7.13	16.34 ± 7.69	17.34 ± 6.50	-1.086	0.279
Keeping customers satisfied	16.36 ± 6.65	15.23 ± 7.09	17.50 ± 5.99	-2.668	0.008*
Reduce food waste	12.78 ± 8.32	12.66 ± 7.75	12.89 ± 8.88	-2.090	0.835
Increase employee satisfaction	12.67 ± 7.82	11.87 ± 7.88	13.48 ± 7.71	-1.581	0.115
Normative Beliefs					
Health inspector	19.10 ± 6.00	18.61 ± 6.86	19.59 ± 4.97	-1.271	0.205
Customers	15.85 ± 8.83	14.16 ± 10.01	17.58 ± 7.07	-3.031	0.003*
Long-term employees	13.04 ± 9.35	12.70 ± 10.12	13.39 ± 8.54	-0.569	0.570
Vendors	12.57 ± 9.73	11.92 ± 9.72	13.23 ± 9.74	-1.037	0.301
Supervisor	13.24 ± 9.96	9.59 ± 10.36	16.92 ± 8.04	-6.094	0.000*
Short-term employees	5.81 ± 11.31	5.82 ± 11.73	5.79 ± 10.92	0.019	0.985
Control Beliefs					
Employee scheduling	8.17 ± 9.30	8.68 ± 9.57	7.66 ± 9.03	0.844	0.399
Managers' time	7.38 ± 9.70	8.28 ± 9.78	6.49 ± 9.57	1.420	0.157
Time commitment for food safety training	6.52 ± 8.49	7.50 ± 8.91	5.54 ± 7.96	1.764	0.079
Lack of off-site training opportunities	5.53 ± 9.94	6.48 ± 10.41	4.56 ± 9.38	1.491	0.137
Financial resources	4.99 ± 9.36	5.57 ± 9.78	4.41 ± 8.93	0.953	0.342
Employees don't follow what they learn	5.83 ± 9.41	5.54 ± 9.63	6.12 ± 9.22	-0.474	0.636
Lack of on-site training opportunities	4.27 ± 10.31	4.61 ± 10.25	3.92 ± 10.40	0.510	0.610
Lack of targeted training materials	2.20 ± 8.64	1.44 ± 8.91	2.96 ± 8.34	-1.349	0.179

^aDirect measures range from 1 to 7, with higher numbers indicating more positive attitudes and subjective norms or higher perceived control and intention.

^bIndirect measures range from -21 to 21. Measures represent mean of the the belief multiplied by the evaluation of that belief.

(61.2%). Roberts and Sneed (31) found similar results; more than 70% of the operations in their sample of restaurants seated less than 100 people. There were approximately equal numbers of chain (49.7%) and independent (50.2) restaurants participating. The majority of operations (49.4%) had less than 15 employees.

Most managers in this study had food safety certification (68.3%), which

is slightly higher than the national sample found in an FDA study (22) in which 58.4% of surveyed managers were certified in food safety. The majority of operations utilized off-site training (74.6%) and had trained only 25% or less of their total staff (45.9%). Over half of the managers (51.6%) were unsure of how much money they spent per employee annually for food safety training.

Overall analysis

The direct measures of attitudes, subjective norms, perceived behavioral controls, and behavioral intentions indicated that restaurant managers had fairly high intentions to offer food safety training to their employees ($M = 5.88 \pm 1.59$) (Table 3). They also had positive attitudes ($M = 6.26 \pm 0.80$), placed emphasis on their important referents (subjective norms) (M

TABLE 4. TpB direct and indirect belief comparisons between managers with and without food safety certification

	Mean $\pm$ Standard Deviation				
	Overall (n = 236)	Certified Operations (n = 162)	Non-certified Operations (n = 72)	t	p
Direct Measures^a					
Attitude	6.26 $\pm$ 0.76	6.32 $\pm$ 0.75	6.14 $\pm$ 0.78	1.589	.115
Subjective norm	5.89 $\pm$ 1.39	6.08 $\pm$ 1.31	5.44 $\pm$ 1.52	3.097	.002*
Perceived behavioral control	5.22 $\pm$ 2.10	5.00 $\pm$ 2.21	5.67 $\pm$ 1.76	-2.500	.013*
Behavioral intention	5.88 $\pm$ 1.59	6.16 $\pm$ 1.34	5.22 $\pm$ 1.92	3.73	.000*
Indirect Measures^b					
Behavioral Beliefs					
Ensuring safe food	18.43 $\pm$ 4.87	19.03 $\pm$ 4.48	17.11 $\pm$ 5.47	2.61	.010*
Increase employees' awareness of food safety	17.68 $\pm$ 5.94	18.39 $\pm$ 5.31	16.00 $\pm$ 6.95	2.599	.011*
Help maintain operations' reputation	17.66 $\pm$ 5.52	17.94 $\pm$ 5.23	16.93 $\pm$ 6.18	1.210	.229
Increase food safety practices of employees	17.42 $\pm$ 5.90	17.91 $\pm$ 5.53	16.19 $\pm$ 6.61	1.926	.057
Better food quality	17.16 $\pm$ 6.17	17.89 $\pm$ 5.65	15.35 $\pm$ 6.99	2.72	.008*
Decrease lawsuits	16.83 $\pm$ 7.13	17.50 $\pm$ 6.64	15.29 $\pm$ 8.03	2.044	.043*
Keeping customers satisfied	16.36 $\pm$ 6.65	16.57 $\pm$ 6.57	15.69 $\pm$ 6.89	0.908	.366
Reduce food waste	12.78 $\pm$ 8.32	13.56 $\pm$ 7.98	10.99 $\pm$ 8.89	2.105	.037*
Increase employee satisfaction	12.67 $\pm$ 7.82	12.94 $\pm$ 7.69	11.83 $\pm$ 8.15	.971	.333
Normative Beliefs					
Health inspector	19.10 $\pm$ 6.00	19.12 $\pm$ 5.83	18.97 $\pm$ 6.53	.162	.872
Customers	15.85 $\pm$ 8.83	15.58 $\pm$ 8.59	16.22 $\pm$ 9.51	-0.489	.626
Long-term employees	13.04 $\pm$ 9.35	13.90 $\pm$ 8.24	11.10 $\pm$ 11.38	1.878	.063
Vendors	12.57 $\pm$ 9.73	13.76 $\pm$ 8.97	10.06 $\pm$ 10.84	2.522	.013*
Supervisor	13.24 $\pm$ 9.96	14.59 $\pm$ 9.20	10.16 $\pm$ 10.93	2.994	.003*
Short-term employees	5.81 $\pm$ 11.31	6.34 $\pm$ 11.03	4.43 $\pm$ 11.88	1.156	.250

= 5.89 $\pm$ 1.39), and perceived that they are able ($M = 5.22 \pm 2.10$) to offer food safety training to employees. These results are supported by Giampaoli, Sneed, Cluskey, and Koenig (23), who also found that managers had a positive attitude about food safety programs.

For the indirect measures (see Table 3), managers generally believed that training would increase the probability of serving safe food ($M = 18.43 \pm 4.87$), increase employees' awareness of food safety ($M = 17.68 \pm 5.94$), and help maintain the operations' reputation ($M = 17.66 \pm 5.52$). Managers also rated the health inspector ($M = 19.10 \pm 6.00$), customers ($M = 15.8 \pm 8.83$), and long-term employees ($M = 13.04 \pm 9.35$) as the top three important referents who cared if they offered food safety training to employees. Managers felt that they had the most control over employee scheduling ($M = 8.17 \pm 9.30$) and manager's time ($M = 7.38 \pm 9.70$)

and the least control over lack of targeted training materials ($M = 2.20 \pm 8.64$) and lack of on-site training opportunities ($M = 4.27 \pm 10.31$).

Ownership structure

Independent samples t-tests determined the differences in the direct measures and indirect measures based on whether managers classified their restaurant as an independent or chain operation (Table 3). For the direct measures, only perceived behavioral control was significantly different between the two. Chain operations had lower mean scores than their independent counterparts ($t = 3.432$, $P = .001$), indicating that chain operations felt that they had less control over offering food safety training than independent restaurant managers.

For indirect beliefs, managers in chain operations indicated that food

safety training would improve overall food quality ($t = -2.071$, $P = .039$) and keep customers satisfied ($t = -2.668$, $P = .008$). Managers of chain operations also felt that their customers ($t = -3.031$, $P = .003$) and supervisors ($t = -6.094$, $P = .000$) had the greatest influence on their decision to train employees in food safety. There were no differences between the control beliefs (training, time, money, employees) of chain and independent restaurant managers.

Although the results of the comparisons between chain and independent restaurant operations are meaningful, it should be noted that this study a significantly greater number of restaurant managers certified in food safety were employed in chain operations ($n = 92$) than in independent operations ($n = 72$) ($P = .002$). Although this may seem to jeopardize these results, the demographic and training characteristics of the sample

used in this research are comparable to those of the sample used in other studies, and the results therefore still present a realistic picture of the differences between chain and independent operations.

Certification status

Independent samples *t*-tests determined differences in beliefs between respondents based on certification status (Table 4). Managers who were certified had stronger beliefs about their important referents (subjective norms) ($t = 3.097$, $P = .002$), indicating that they placed more importance on what others around them thought. Those who were certified believed that offering food safety training was not as much under their control; that is non-certified managers had significantly higher mean scores ($t = -2.500$, $P = .013$). As for behavioral intentions, managers who were certified had significantly higher intentions ($t = 3.73$, $P = .000$) to train their employees than their non-certified counterparts. This supports the findings of other food safety studies, which found that certified managers also perform better on health inspections than their non-certified counterparts (11, 22).

For indirect beliefs, certified managers had more positive beliefs that food safety training would ensure safe food ($t = 2.61$, $P = .010$), increase employees' awareness of food safety ($t = 2.599$, $P = .011$), increase food quality ($t = 2.72$, $P = .008$), decrease lawsuits ($t = 2.044$, $P = .043$), and reduce food waste ($t = 2.105$, $P = .037$).

Certified managers thought that their vendors ($t = 2.522$, $P = .013$) and supervisors ($t = 2.994$, $P = .003$) were important referents in offering food safety. However, certified managers perceived stronger controls over the time commitment for food safety training ($t = -2.557$, $P = .012$) and lack of financial resources ($t = -2.205$, $P = .029$). The FDA (2004) found similar results, reporting that operations with certified managers outperformed those with non-certified managers. Managers who were certified perceived less control over off-site training opportunities ($t = -3.490$, $P = .001$) and had greater concern over a lack of financial resources ($t = -2.205$, $P = .029$) and the time required for food safety training ($t = -2.557$, $P = .012$).

DISCUSSION AND IMPLICATIONS

This research sought to determine the beliefs of restaurant managers about offering food safety training to their employees. Overall, the results of the direct measures of the TpB indicated that intention to offer food safety training to employees was high. Restaurant managers had a positive attitude toward food safety and rated their referents as important to the decision to offer food safety training, which indicates that they do care about others' opinions. Managers indicated that their perception of control was high and that they are therefore able to offer food safety training to their employees if they choose.

The indirect measures related to the TpB provided insight into the reasons why food safety training is not being conducted for restaurant employees. Behavioral beliefs, which included ensuring safe food, increasing employee awareness of food safety, and maintaining the operation's reputation, were ranked high and thus are important reasons managers choose to offer food safety training for employees. The most important referents included the health inspector, customers and long-term employees. Control beliefs, while not ranked as high as behavioral and normative beliefs, can still provide insight into why managers are not providing food safety training. These beliefs included employee scheduling, manager's time, and the overall time commitment. These issues, while individual in nature, relate to financial resources.

Ownership structure

Between chain and independent restaurant managers, the only difference was that independent restaurant managers perceive greater control over being able to offer food safety training. This is an indication that while managers of chain operations have more support for food safety from the corporate office, they could be more restricted by company policies and procedures. Managers in chain operations have strict performance and financial goals to meet, which might result in less money being available for additional off-site training.

Chain managers felt more strongly than independent managers that offering food safety training to employees improves food quality and keeps customers satisfied

and that customers and supervisors are more important referents. One explanation may be that chain operations face greater national exposure and financial losses should a foodborne illness outbreak occur, so that their success depends on the food quality and customer satisfaction not only in their restaurant, but in all of the chain's restaurants.

Certification status

Managers who were certified had a higher intention to train employees and placed more emphasis on their referents, but they felt they had less control over offering food safety training. Because certified managers may well have greater knowledge than non-certified managers about food safety, they rated ensuring safe food, increasing employees' awareness of food safety, improving food quality, decreasing lawsuits, and reducing food waste as more important. This would indicate that once certified, managers may be more aware of the serious consequences that can and will result from a foodborne illness outbreak, because most certification programs, including ServSafe®, emphasize this throughout the training.

Certified managers also realized that time, lack of off-site training opportunities, and financial resources were greater barriers to offering food safety training. This could be because managers who have gone through the training are more aware of the financial and time requirements necessary to complete a food safety training class and may be more aware of where to locate off-site training classes.

CONCLUSIONS AND APPLICATIONS

Overall, the results of this research indicate that although managers felt that food safety training for employees was important, there are important barriers, such as difficulty with employee scheduling, lack of management time, and lack of off-site training opportunities, that need to be addressed before employee food safety training can become more widespread. Managers felt that training employees was important for ensuring safe food and increasing employees' awareness of food safety. However, they did not feel as strongly that food safety training for employees would aid in the reduction of food waste or increasing employee satisfac-

tion. Managers placed emphasis on the opinions of health inspectors, customers, supervisors, and long-term employees and were least concerned about the opinions of short-term employees.

There were few differences in beliefs between chain and independent operations, but several differences in beliefs between certified and non-certified managers. Certification appears to help managers fully appreciate the impact of food safety training and the effect it can have on the operation. The FDA (19, 20) has recommended that states adopt a requirement that a person in charge of a restaurant is knowledgeable about food safety and about the relationship of food handling practices to foodborne illnesses, but not all states have adopted this policy. Currently, the State of Kansas does not mandate food safety training for food handlers. However, this study illustrates that many positive changes occur in manager attitudes and important referents once certification has taken place and verifies the importance of certification as an important tool in food safety training.

Sanitarians can use the results of this study in training and inspections to assist managers in becoming more aware of the need for employee training. It is imperative that sanitarians discuss the importance of food safety training for employees with the management team and stress the need for employee training and its impacts on overall food safety practices. During training, food safety educators should reinforce the importance of serving safe food to customers and maintaining the operation's reputation as primary reasons for providing employee training. Sanitarians also may want to discuss and reinforce these issues with managers during the inspection process. For example, knowing that managers perceive a lack of training materials as an issue, sanitarians can provide managers with information on this topic. Additionally, knowing that managers value the opinions of the health inspectors, customers, long-term employees, and supervisors, sanitarians can stress the importance of training and the relationship between safe food and increased customer satisfaction, the operations' reputation, food quality, and development of long-term employees. Sanitarians should discuss food safety training with owners and general and regional managers to assure that they are stressing food safety training with the store-level management team. Sanitarians and food safety educators may want

to schedule shorter, more frequent food safety training sessions at varying times to reduce the barriers related to employee scheduling.

One limitation of this study is that the sample is limited to commercial restaurant operations in Kansas. Thus, the results cannot be generalized to other foodservice systems or to commercial restaurant operations in other states. Future studies could seek to understand the beliefs of restaurant managers in multiple parts of the United States and use region or location as a basis for comparison. Results could then be compared to state food safety programs in an attempt to uncover methods of food safety training that restaurant managers would be more apt to utilize. Other studies could seek to use the TpB with managers in non-commercial foodservice operations.

Another limitation is the response rate. Even though 237 responses were usable and adequate for data analysis, this represents only 17.9% of the sampling population and is a relatively small number. Non-response bias is also a potential limitation. Managers who participated in the study might be more responsive to food safety training than nonparticipants were, and therefore responses may be biased.

Another limitation of this research is that it does not explore the relationship between behavioral intention and behavior. Although the restaurant managers rated behavioral intention positively, the link between behavior and behavioral intention was not explored in this study. More in-depth research is needed to explore this relationship, because although restaurant managers perceive training as important, anecdotal evidence indicates that managers are not conducting training for employees.

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REFERENCES

1. Ajzen, I. 1985. From intentions to actions: A theory of planned behavior. (pp. 11–39). In J. Kuhl & J. Beckmann (eds.). *Action control: From cognition to behavior*. Springer-Verlag, NY.

2. Ajzen, I. 1991. The theory of planned behavior. *Organizational behavior and human decision processes* 50(2):179–211.
3. Ajzen, I. 2002. Behavioral intentions based on the theory of planned behavior. (<http://www.unix.oit.umass.edu/~ajzen/pdf/tpb.intervention.pdf>).
4. Ajzen, I. 2002. Constructing a TpB Questionnaire: Conceptual and methodological considerations. (<http://www.unix.oit.umass.edu/~ajzen/pdf/tpb.measurement.pdf>).
5. Ajzen, I. and M. Fishbein. 1980. *Understanding attitudes and predicting social behavior*. Prentice Hall, Englewood Cliffs, NJ.
6. Bean, N. H., J. S. Goulding, C. Lao, and F. J. Angulo. 1996. Surveillance for foodborne-disease outbreaks—United States, 1988–1992. *MMWR*. 45(SS-5):1–55.
7. Buzby, J., P. Frenzen, and B. A. Rasco. 2001. Product liability and food safety: The resolution of food poisoning laws. In N. Hooker & E. A. Murano (eds.). *Interdisciplinary food safety research*. (pp. 121–137). CRC Press, Boca Raton, FL.
8. Centers for Disease Control and Prevention. 2000. Surveillance for foodborne disease outbreaks—United States, 1993–1997. *MMWR*. 49(SS-1):22–26.
9. Casey, R., and C. Cook. (1979). Assessment of a food service management sanitation course. *J. Env. Hlth*. 41(5):281–284.
10. Clingman, C. D. (1976). Ohio evaluated effects of food certification training. *J. Env. Hlth*. 38(4):235–236.
11. Cochran-Yantis, D., P. Belo, J. Giampaoli, L. McProud, V. Everly, and J. Gans. 1996. Attitudes and knowledge of food safety among Santa Clara County, California restaurant operators. *J. Foodsvc. Sys*. 9:117–128.
12. Cohen, E., A. Reichel, and Z. Schwartz. 2001. On the efficacy of an in-house food sanitation training program: Statistical measurements and practical conclusions. *J. Hosp. Tourism Res*. 25(1):5–16.
13. Collins, J. E. 1997. Impact of changing lifestyles on the emergence/reemergence of foodborne pathogens. *Emerg. Infect. Dis*. 3:471–479.

14. Cotterchio, M., J. Gunn, T. Coffill, P. Tormey, P., and M. A. Barry. 1998. Effect of a manager training program on sanitary conditions in restaurants. *Publ. Hlth. Reports* 113:353–358.
15. Council for Agriculture Science and Technology. 1994. Foodborne pathogens: Risks and consequences. Council for Agriculture Science and Technology, Ames, IA.
16. Department of Health and Human Services. 2000. Healthy People 2010: Understanding and Improving Health. 2nd ed. US Government Printing Office, Washington, D.C.
17. Economic Research Service. 1996. Bacterial foodborne disease: Medical costs and productivity losses (Report No. 741). Economic Research Service, Washington, D.C.
18. Fishbein, H. A., and I. Ajzen. 1975. Belief, attitude, intention, and behavior: An introduction to theory and research. Addison-Wesley, Reading, MA.
19. Food and Drug Administration. 1999. Food Code 1999. National Technical Information Service, Springfield, VA.
20. Food and Drug Administration. 2005. Food Code 2005. National Technical Information Service, Springfield, VA.
21. Food and Drug Administration. 2000. Report of the FDA retail food program database of foodborne illness risk factors. (<http://vm.cfsan.fda.gov/~dms/retrsk.html>).
22. Food and Drug Administration. 2004. FDA report on the occurrence of foodborne illness risk factors in selected institutional food-service, restaurant, and retail food store facility types. (<http://www.cfsan.fda.gov/~acrobat/retrsk2.pdf>).
23. Giampaoli, J., J. Sneed, M. Cluskey, and H. F. Koenig. 2002. School foodservice directors' attitudes and perceived challenges to implementing food safety and HACCP programs. *J. of Child Nut. & Mgmt.* (<http://www.asfsa.org/childnutrition/jcnm/02spring/giampaoli1>).
24. Kneller, P., and T. Bierma. 1990. Food service certification measuring the effectiveness of a state program. *J. of Env. Hlth.* 52(2): 292–294.
25. Mead, P. S., L. Slutsker, V. Dietz, L. F. McCaig, J. S. Bresee, C. Shapiro, P. M. Griffin, and R. V. Tauxe. 1999, September. Food-related illness and death in the United States. *Center for Disease Control and Preventing Emerging Infectious Diseases.* 5(5):1–38. (<http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm>).
26. McElroy, D. M., and C. N. Cutter. 2004. Self-report changes in food safety practices as a result of participation in a statewide food safety certification program. *Food Prot. Trends.* 24:150–161.
27. Olsen, S. J., L. C. MacKinnon, J. S. Goulding, N. H. Bean, and L. Slutsker. 2000. Surveillance for foodborne disease outbreaks – United States, 1993–1997. *MMWR.* 49(SS-5):1–51.
28. Riben, P. D., R. G. Mathias, M. Wiens, W. Cocksedge, A. Hazelwood, B. Kirshner, and J. Pelton. 1994. Routine restaurant inspections and education of food handlers: Recommendations based on critical appraisal of the literature and survey of Canadian jurisdictions on restaurant inspections and education of food handlers. *Canad. J. of Public Hlth.* 85 (Suppl. 1):567–570.
29. Roberts, K. R., B. Barrett, and J. Sneed. 2005. Health department sanitarians perception of food safety practices in restaurants. *Food Prot. Trends.* 25(9):694–700.
30. Roberts, K. R., B. B. Barrett, A. D. Howells, C. W. Shanklin, V. K. Pilling, and L. A. Brannon. 2007. Food safety training and foodservice employees' knowledge and behavior. *Food Prot. Trends.* 28:252–260.
31. Roberts, K. R., and P. J. Sneed. 2003. An assessment of the status of prerequisite and HACCP programs in Iowa Restaurants. *Food Prot. Trends.* 23:808–816.
32. Wright, J., and L. Feun. 1986. Food service manager certification: An evaluation of its impact. *J. of Env. Hlth.* 49(1):