

Food Safety Attitudes Among Well-Educated Consumers

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Abstract: This study represents another attempt to determine whether food safety concerns of consumers vary according to some demographic variable. More specifically, the study attempted to determine whether the higher-education segment is more confident or less confident than others regarding food safety. This highly educated segment of the consumer market shares concerns about food safety although in general they seem to have relatively high levels of confidence. Over 60% had experienced illness from eating food, largely (48%) from full-service restaurants—which, nevertheless, are trusted more than fast-food restaurants. Well over half of the respondents who had changed their eating habits never returned to their previous ones; and even those that did took months.

Key words: Food safety, Food-related illness, Contamination, E. Coli, Salmonella, Parasites, Consumers, Attitudes

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Introduction

Increasingly, the corporations that supply Americans with processed foods are unable to guarantee the safety of their ingredients. In [the pot pie/salmonella case of 2007] ConAgra could not pinpoint which of the more than 25 ingredients in its pies was carrying salmonella. Other companies do not even know who is supplying their ingredients, let alone if those suppliers are screening the items for microbes and other potential dangers, interviews and documents show (Moss, 2009).

Background

Our current food safety system is broken and has been in need of reform for more than a decade,” said Jean Halloran, Director of Food Policy Initiatives at Consumers Union (Consumers Union, 2009). According to a recent story (Medalie, 2009), food contamination even in the United States results in a large number of illnesses, deaths, and dollar costs:

The Centers for Disease Control and Prevention (2000) has estimated that 76 million food borne illness cases occur in the United States every year. This amounts to one in four Americans becoming ill after eating foods contaminated with pathogens such as E. Coli O157: H7, Salmonella, Hepatitis A, Campylobacter, Shigella, Norovirus and Listeria. Every year about 325,000

people are hospitalized with a diagnosis of food poisoning and 5,000 die. The annual dollar cost in terms of medical expenses, lost wages and productivity ranges from \$6.5 to \$34.9 billion. While most food borne illness cases go unreported to health departments, nearly 13.8 million food poisoning cases are caused by known agents — 30 percent by bacteria, 67 percent by viruses, and 3 percent by parasites.

In addition, food-contamination outbreaks are costly to organizations as they can do irreparable harm to consumer perceptions of the organizations all along the farm-to-home chain. For example, “Mad cow disease not only decimated the British beef industry, it destroyed consumers’ faith in the British system for ensuring food safety” (DeWaal, 2003, 79). American food manufacturers have also seen their reputations decimated by the foolish actions of a few corner cutters, as most recently (2009) happened in the peanut industry. According to a new study by the NPD Group, the percentage of US consumers who believe that supermarket food is safe has dropped from 68% to 63% over the past five years (Stones, 2009).

The large number of cases and the resulting costs raise a question as to the extent to which the general public may be aware of and concerned about food safety and security in the United States, their own responsibility for ensuring the safety of foods they prepare, and how much they are willing to pay versus how much risk they are willing to take. In addition, these statistics may also suggest the need for increased regulation, which in turn raises questions as to the types of, or areas in which, legislation might be desired and would likely be supported and by whom (Ivanhoe Newswire, 2009). Highly publicized cases of food contamination or recall remind customers that food safety is not guaranteed. But how long does that concern last, and does it vary according to some demographic variable?

After all, government cannot take full responsibility for food safety. Those who grow, transport, sell, purchase, prepare, and eat food also must bear some responsibility. As far back as 1978, Senator Edward Kennedy is said to have noted that consumers cannot expect the government to bear all of the responsibility (as cited in Wilcock, Pun, Khanona, & Aung, 2004, 56)

Yet according to Jean Halloran, director of food policy initiatives at the Consumers Union, the most effective solution to food-borne illnesses was updated food safety rules, more federal inspections and more regulatory oversight (Stones, 2009). Soon after President Obama took office in 2009, he and the FDA

began pushing for the passing of the 2009 Food Safety Enhancement Act, which among other things, will give the FDA the power to force companies to issue food recalls more promptly. Such action is sorely needed as from 2006 to 2008, the FDA lost 20 percent of its science staff and 600 inspectors. As a result of this dramatic understaffing, it currently inspects only 5% of our producers and processors annually, and only about 1% of our imported foods (Scott-Thomas, 2009).

Studies have indicated that not all consumers have adequate food-safety knowledge to protect themselves (McCarthy, Brennan, Kelly, Ritson, de Boer, & Thompson, 2007; Röhr, Lüddecke, Drusch, Müller, & Alvensleben, 2005). If major food processing corporations cannot identify the presence or the sources of contamination, or give customers adequate information on preparing their packaged food, can the consuming public be expected to protect itself? Further, those who have the knowledge do not necessarily practice what they know (Wilcock, Pun, Khanona, & Aung, 2004, 63). Nevertheless, Yarrow, Remig, and Higgins (2009) and other previous researchers have argued that food safety beliefs, attitudes, knowledge, and practices can be changed through educational intervention. They and other researchers have therefore attempted to determine how to segment consumers so that effective communication can take place.

Previous studies (e.g., Brewer & Prestat, 2007; Brewer, Sprouls, & Russon, 1994; Stinson, Ghosh, Kinsey & Degeneffe, 2008; Unklesbay, Sneed, & Toma, 1998; Wilcock, Pun, Khanona, & Aung, 2004) have suggested that education and income are associated with attitudes toward food safety. Mature adults have been specifically studied (Boone, Penner, Gordon, Remig, Harvey, & Clark, 2005), but few other consumer segments have been examined. As suggested by others (Kennedy, Worosz, Todd & Lapinski, 2008; Worsley & Lea, 2008), there may well be differences in attitudes and experiences associated with geographic locations and demographic characteristics of the public as well as buyers’ and/or consumers’ experiences with the different products (e.g. raw food vs. prepared food, meat vs. vegetable, home cooked vs. restaurant, irradiated vs. “natural”) and different “links” in the food supply chain (e.g. producer, processor, distributor) or different sources of supply (e.g., domestic vs. foreign). In particular, would a highly educated segment of the consumer market share concerns about food safety, or would their attitudes suggest higher levels of confidence? Antle (1999) noted that research is needed on various population

segments, so we conducted a survey to examine food safety attitudes among well-educated consumers.

Materials and Methods

During April and May of 2009 SurveyMonkey.com[®] was used to gather information about food safety attitudes among well-educated consumers. Using email lists available to the authors, individuals in higher education were contacted to obtain responses from both faculty and students (graduate and undergraduate). To focus the thinking of those responding to the survey, we began by focusing their attention:

"Think of a time when you heard about or experienced an incident involving food safety (e.g. a bout of food poisoning by you, a member of your family, or a friend; the peanut butter contamination in early 2009; a recently purchased can or package of food that was spoiled when it was opened; the Tylenol tampering in 1982; or one of the incidents regarding Chinese food products)."

There were then 12 follow-up items and seven demographic items for a total of 19 items on the survey (see Appendix).

A total of 313 people responded to the survey. They came from 227 different zip codes in 33 states (see Figure 1). In terms of gender the sample was evenly split (49.3% female; 50.7% male). Overall, the group was older than the general population — 29.6% were 60 or older; 51.6% were 30-59; and none were younger than 18. Only 11% had children under the age of six. Very few were unemployed (85% were employed either full- or part-time). And, most importantly for our purposes, over 98% had attended college — 42.8% had doctoral degrees, 24.9% masters or professional degrees, and 16.2% bachelor or associate degrees. As might be expected, then, 30.5% indicated incomes of greater than \$100,000 and 35.4% reported incomes between \$40,000 and \$100,000. This sample is therefore a well-educated, relatively financially stable, somewhat older segment of the consuming population.

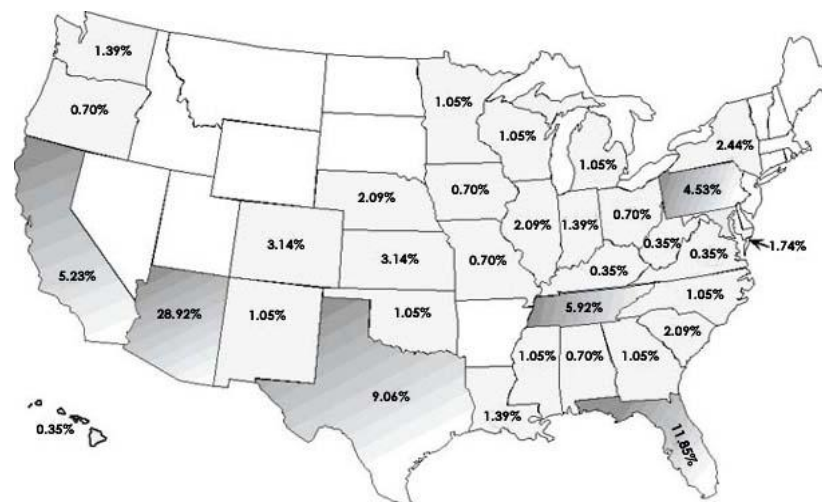


Figure 1. Distribution of respondents by state.

Results

In response to one of our questions, 61.7% indicated that they had personally been sick from food that they ate. Yet when asked to “think about a time when you heard about or experienced an incident involving food safety,” only 23.6% reported one that they had personally experienced whereas 65.5% referred, instead, to one that they had read or heard about (10.2% reported one that a friend or relative had experience, and 0.6% did not report an incident). Thus, while most had been personally sick, the incidents reported were mostly those that they had read or heard about.

The 61.7% of respondents who had personally experienced illness from food they ate were asked where that food had been served. Nearly half (48.4%) responded that it was from a full-service (sit-down) restaurant, 22% at home or a picnic, and 18.15% from a fast-food restaurant. Those who reported that it happened at home or on a picnic were then asked a follow-up question about the source of the “raw” food. Most of that group (56.9%) said that the food came

from a grocery store, but virtually all the rest (41.2%) indicated they were simply not sure.

Since well over half of the respondents (182 or 62%) indicated that they had personally been sick from food that they had consumed, we examined that group further. Specifically we did so by comparing their attitudes toward the safety of their reported sources of contamination with the attitudes of respondents who had not experienced a personal episode with the same set of sources of contamination. As shown in Table 1, the attitudes were lower indicating less confidence in all three cases of those who had experienced illness, but the difference was significant only for fast-food restaurants. In other words, having gotten ill from food eaten in a fast-food restaurant resulted in a loss of confidence in the safety of that food source, but having gotten ill from food served by a full-service restaurant or purchased at a grocery store did not significantly affect their trust in those sources.

As would be expected based on the findings from previous research, this group of consumers viewed food as being relatively safe. As indicated by the means shown in Table 2, they felt that full-service restaurants, farms, and grocery stores were the safest sources of food but similar to previous research (e.g., Brewer & Rojas, 2008), these respondents seemed considerably less sure about imported food. They generally did not concern themselves with possible contaminants except for ingredients that would be added in the manufacturing process and bacteria such as e-coli. Further, these respondents seemed reasonably confident that the government (federal and/or state) is doing enough to assure food safety and that food safety in general is improving. However, when asked, "Which do you think is safer in the United States — Water or Food?" 69.3% said water. So while they felt that food is relatively safe, the respondents indicated that they felt that water is even safer.

Individual Experience	Source of Food-Borne Illness		
	Full-Service Restaurant	Fast-food Restaurant	Grocery Store
Personally ill from source	3.68	2.94	3.88

Not personally ill from source	3.83	3.44*	3.86
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* p < 0.05

Note: Attitudes were coded as follows:

In general, how safe do you feel these food sources are?

very safe = 5; reasonably safe = 4; unsure = 3; somewhat risky = 2;

very risky = 1

Table 1. A comparison of mean attitudes toward sources of food-borne illnesses by those who personally had been ill with those who had not.

Although virtually all the correlations among these various attitude indicators were significant, there were few very large effects (see Table 2). The highest correlations were among attitudes about food from fast-food restaurants, full-service restaurants, and grocery stores, and about disease and bacterial source of possible contamination. There was also a moderate correlation between attitudes regarding grocery stores and imported sources of food.

Even though the consumers in our study generally felt positive about food safety, there were considerable numbers among them who reported changing food habits after experiencing, hearing about, or reading about a food safety incident in the past. Indeed, 47.7% indicated that they changed their eating habits as a result of the incident that they had in mind whether it involved one that they had experienced or one that they had read or heard about. When they changed their eating habits, fully 57.1% indicated that they never returned to their previous eating habits and another 20.6% indicated that it took several months before they did so. Indeed, only 6.9% returned to their previous habits within a week.

This, then, raises questions as to whether the particular incidents were different or whether the demographics differed for those who changed their eating habits versus those who had not. Those who changed their eating habits mentioned salad, Chinese food, and tomatoes more frequently than did those who had not changed – items that are not necessarily pre-packaged and would, therefore, most likely become contaminated in the preparation and serving processes. Similarly,

they also noted soup, sauces, pizza, lettuce and pet food, whereas those who had not changed their buying or eating habits made no mention whatsoever of these sources. Those who had not changed mentioned peanut butter, seafood, Tylenol, beef/hamburger, veggies, and pork/ham — packaged items and meats — more frequently than those who had changed. These differences, however, do not seem to suggest any clear pattern that would cause consumers to change their eating habits as most items were at least mentioned by both groups. The differences were in the frequencies of mentions rather than in the presence or absence of the source being mentioned.

Almost 73% of the 148 individuals in our study who said they changed their eating habits as a result of a food safety incident had personally gotten sick from food at some time, versus only about 52% of the 162 who had not changed. So we compared these two groups further (see Table 3). As one might expect, those who had personally gotten sick would be more likely to change their eating habits. That was indeed the case. Next, we computed an overall average for their attitudes about the safety of food sources (restaurants, groceries, farms, etc.) and

found that those who changed their eating habits were significantly less sure about the safety of those sources. We did the same for contaminants with similar results. Attitudes toward the role of government and improving food safety were also similar. Differences in the demographics for these two groups were not as clear. The group who changed eating habits had a significantly larger proportion of females than did the group that had not changed, but only the "60 or older" category was significantly different. There were no significant differences in terms of education, but there were some for income. The group who changed eating habits reported slightly lower income levels, but a significant number failed to disclose their incomes, possibly affecting the accuracy of this comparison.

	In general, how safe do you feel these food sources are?						How concerned are you about the following sources of possible food contamination?							Government Doing Enough?	U.S. Food Safety Improving?
	Fast Food	Full-service	Farms	Imported	Groceries	Roadside	Rodent Droppings	Added in Manufacture	Diseases	Bacteria	Employees	Terrorists	Pet Food		
Fast Food	1.0000	0.6297***	0.3774***	0.3548***	0.5209***	0.1627*	0.1885*	0.2640***	0.1991***	0.1658***	0.1729*	0.1219	0.2174	0.3061***	0.2242***
Full-service		1.0000	0.4213	0.3557***	0.5034	0.2350**	0.1891***	0.1672***	0.1638***	0.1606***	0.1384***	0.1373***	0.2146***	0.2489***	0.2839***
Farms			1.0000	0.4488***	0.4118	0.2855***	0.1144***	0.1115***	0.0900***	0.1163***	0.1723***	0.1046***	0.3034***	0.2350***	0.2492***
Imported				1.0000	0.5049***	0.2515***	0.2402**	0.1922	0.2163	0.2538**	0.2249**	0.2946***	0.2180***	0.3139*	0.2028
Groceries					1.0000	0.1792***	0.1552***	0.3513***	0.2229***	0.2041***	0.1793***	0.2150***	0.2818***	0.3492***	0.2736***
Roadside						1.0000	0.1368***	0.0361***	0.1846***	0.1940***	0.1870***	0.1603*	0.1794*	0.0332***	0.0119***
Rodents							1.0000	0.3761***	0.4945	0.4304***	0.4246	0.4301*	0.3230*	0.1667***	0.0447***
Manufacture								1.0000	0.2868***	0.3784	0.2586***	0.3023***	0.3331***	0.3101	0.2755
Diseases									1.0000	0.6820***	0.4853	0.4471***	0.4957***	0.1136***	0.0186*
Bacteria										1.0000	0.4529***	0.3997***	0.3892***	0.1914	0.0795*
Employees											1.0000	0.6014*	0.4405*	0.1450***	0.0411***
Terrorists												1.0000	0.4720	0.2423***	0.1176***

Pet Food													1.0000	0.2993***	0.1383***
Government Safety														1.0000	0.4985
															1.0000
n	296	291	296	292	294	293	296	293	293	294	294	293	294	294	294
Mean	3.3682	3.8213	3.8446	2.9521	3.8231	3.5392	3.1757	2.8123	3.0512	2.7177	3.1667	3.3174	3.3061	2.7483	2.8980
δ	1.0937	0.8803	0.8043	1.0142	0.8522	1.0231	0.7830	0.8413	0.8763	0.7741	0.9141	0.9206	0.8463	1.1762	0.9757
	For these six items, the scale ranged from 1 to 5 with 5 indicating the most confidence in the food source.						For these seven items, the scale ranged from 1 to 4 with 4 indicating the least concern about the source of possible contamination.						1 to 5 scale with 5 that the government was doing enough and food safety was improving.		

* p < .05 two-tailed correlations

** p < .01

*** p < .001

Table 2. Means, standard deviations, and correlations among safety attitudes.

	Changed Eating Habits (n = 148)	Did Not Change Eating Habits (n = 162)
Personally Had Gotten Sick:		
Yes	72.92%	51.68% ***
No	27.09%	48.32% ***
Food Safety Attitudes:		
Ave. - Source	3.45	3.67 **
Ave. - Contaminant	2.94	3.22***
General:		
Role of Government	2.50	2.98***
Food Safety Improving	2.75	3.04 **
Gender:		
Female	57.45%	40.94% **
Male	42.55%	59.06% **

Age:		
18 to 29	21.83%	16.33%
30 to 44	22.54%	23.81%
45 to 59	28.87%	27.89%
60 or older	2.67%	31.97% ***
Employment Status:		
Employed	82.52%	87.84%
Not Employed	17.48%	12.16%
Education Level:		
No Degree	14.18%	19.05%
Degree	85.82%	80.95%
Income Bracket:		
< \$40,000	14.18%	22.30%
\$40,000 to \$60,000	12.06%	12.23%
\$60,000 to \$100,000	28.37%	17.99% *

Over \$100,000	23.40%	38.13% **
Not Disclosed	21.99%	9.35% **

* p < .05
** p < .01
*** p < .001

Table 3. A comparison of those who changed eating habits and those who did not.

Thus, in this sample, those who were most likely to change their eating habits after a food safety incident were, in general, younger, well-educated females earning higher incomes. They were somewhat less sure about the safety of food sources and possible contaminants, somewhat unsure about whether the government was doing enough about food safety, and unsure about whether food safety was improving. On the other hand, those who were not likely to change their eating habits were, in general, older, well-educated males with high incomes who were moderately sure about the safety of food sources and contaminants and were somewhat sure that the government was doing enough about food safety and that food safety was improving.

Discussion and Conclusions

Since level of education has been suggested to be positively related to food-safety knowledge and attitudes, this study gathered information about food safety should be taken with regard to the generalization of these results. Nevertheless, the attitudes reported here could also be important to help establish baselines for evaluating approaches to food safety (Cho, 2009; Segerson, 1999; Todt, Munoz, Gonzalez, Ponce & Estevez, 2009).

Consumer education continues to be of primary importance (Jevšnik, Hlebec, & Raspor, 2008) although, if not carefully conducted, it can do more harm than good (Redmond & Griffith, 2004). Targeting educational efforts would be more effective and efficient in efforts both to lessen any misconceptions held by the targeted group and to increase the groups' awareness of proper safety precautions that should be exercised in obtaining and consuming food (Altekruse, Yang, Timbo, & Angulo, 1999; Verbeke, Frewer, Scholderer, & De Brabander, 2007). The challenge may be to determine just what roles each government agency

attitudes of 313 well-educated consumers in 227 different zip codes in 33 states. Half were male, half were female; 98% had at least attended college and 68% had advanced degrees, and they were somewhat older than the general population. Most who had personally been sick from food said it was from a full-service (sit-down) restaurant, yet respondents trusted full-service more than fast-food restaurants. Almost half who had experienced food-related illness changed their eating habits, and more than half of those never returned to eating that food. Those who changed were younger, well-educated females earning good incomes. Food items mentioned by those who had changed habits were not pre-packaged, whereas items mentioned by those who had not changed included packaged foods and meats. The respondents did not exhibit great concern about contaminants other than bacteria and for the most part were confident that the Government is doing enough to assure food safety. However, 69% of them believe water is safer than food.

There are clearly costs associated with negative attitudes, especially if those attitudes are based on misinformation; and there are clearly benefits associated with positive attitudes, especially if those attitudes are based on accurate information (Richards & Patterson, 1999). Hopefully this project will increase the awareness of appropriate food and government officials regarding the need to train consumers in different demographic groups and regarding the level of possible support among consumers for developing appropriate regulation in all aspects of the food supply chain (Schroeder, Tonsor, Pennings, & Mintert, 2007). Although the number and distribution of responses in the study seem reasonable, the use of limited email lists to stimulate responses may suggest that caution should play in those efforts (Billy, 2002). Consistent and appropriate communication can speed an organization's recovery from food safety events (Degeneffe, Kinsey, Stinson, & Ghosh, 2009). This study is one more step in determining how to segment consumers so that effective communication can take place, with its findings contributing to educational efforts targeted to better educated segments of the general public (Yarrow, et al., 2009).

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APPENDIX
Questionnaire (Format changed here)

A. Food Safety Incident

Your assistance in this short survey would be greatly appreciated and may help to assure the continued safety of the food we eat.

1. Think of a time when you heard about or experienced an incident involving food safety (e.g. a bout of food poisoning by you, a member of your family, or a friend; the peanut butter contamination in early 2009; a recently purchased can or package of food that was spoiled when it was opened; the Tylenol tampering in 1982; or one of the incidents regarding Chinese food products).

Is the incident that you have in mind, one that:

- you personally experienced
- a relative or friend personally experienced
- you read or heard about

2. Did that incident cause you to change your eating habits?

- no
- yes

If yes, in what way?

3. If you changed your eating habits as a result of the above incident, about how long before you returned to your previous eating habits?

- a week
- a month
- several months
- never have

4. Tell us briefly about the incident that you referred to above.

B. Food Safety in General

Now shift your thinking away from the above incident to food in general and specifically the food you eat — at home or out — and respond to these few questions.

5. Which do you think is safer in the United States?

- water
- food

6. In general, how safe do you feel these food sources are?

(Select from these drop-down menus — very safe; reasonably safe; unsure; somewhat risky; very risky)

- Fast-food restaurants
- Full-service ("sit down") restaurants
- From farms in the U.S.
- From imported food
- From grocery stores
- From "farmers' markets" or roadside stands

7. How concerned are you about the following sources of possible food contamination?

(Select from these drop-down menus — not at all; I think about it; I worry about it; it frightens me)

- Insects and rodent droppings
- Ingredients added during manufacture
- Human spread diseases such as Hepatitis B
- Human spread bacteria, such as e-coli
- Contaminants deliberately added by employees

Contaminants added by terrorist groups
Contaminated food for pets

8. In general, do you feel that the government is doing enough to assure food safety?

absolutely reasonably unsure could do more should do much more

9. Do you feel that the safety of food in the U.S. is improving?

absolutely reasonably unsure probably not
 definitely not

10. Have YOU personally ever been sick from food that you ate?

no yes

11. If you answered YES to the previous question, where was the food served?

fast-food restaurant sit-down restaurant
 at home or a picnic other If "other," please specify:

12. If you answered "at home or a picnic" to the previous question, what was the source of the raw food?

grocery store farmers' market roadside stand not sure

C. Personal Information

So that we can compare the thinking of different groups of individuals, please answer the following questions. No personally identifying information is requested.

13. Your ZIP code?

14. Your gender?

Female Male

15. Your current age?

(Select from these drop-down menus — under 18; 18 to 29; 30 to 44; 45 to 59; 60 or older)

16. Do you have children under the age of six?

No Yes

17. Your current employment status/

(Select from these drop-down menus — not currently employed and NOT seeking employment; not currently employed but actively seeking employment; employed part-time; employed full-time; retired but working part-time; fully retired)

18. Your highest level of education?

(Select from these drop-down menus — high school; some college; associate degree; bachelor's degree; master's degree; professional degree; doctoral degree)

19. Your approximate annual income?

(Select from these drop-down menus — less than \$20,000; \$20,000 to \$40,000; \$40,000 to \$60,000; \$60,000 to \$100,000; over \$100,000; I prefer not to disclose this information)