

**Food Safety Risk Perceptions and Behavior of Consumers in the Southern  
Black Belt Region of the US.**

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## **Food Safety Risk Perceptions and Behavior of Consumers in the Southern Black Belt Region of the US.**

**Abstract** A new data set is used to study differences in the food safety perceptions and behavior of black and white consumers in the Southern Black Belt of the US. Analysis of general food safety risk perceptions and ethnic origin indicate no significant differences in the perceptions of blacks and whites. Further, the issue of 'misperception' by consumers of the origin of most foodborne illness is not explained by sociodemographic factors but rather consumers information sources and awareness of foodborne pathogens.

## **Food Safety Risk Perceptions and Behavior of Consumers in the Southern Black Belt Region of the US.**

The resurgence of food safety problems in the US food system has rekindled the interest of both public and private authorities in attempting to attenuate foodborne illnesses. Several national level surveys have been undertaken to obtain information on consumers' perceptions and attitudes towards the food safety problem. Findings from the national food safety surveys indicated that the perception of consumers of the origin of most foodborne problems is at variance with those of food safety experts. Williamson et al. (1992) found that about one third of consumers thought food safety problems most likely occurred at food manufacturing facilities. Further, Fein et al. found that most consumers -over 65% attributed foodborne illness to food prepared at a restaurant. Less than 18% of consumers considered mishandling of food at home a major source of foodborne illness. On the other hand, most food safety experts concur that more foodborne illness have their origin in homes than away from home food sources (IFT, 1995). The disjuncture between food safety perceptions of consumers and "reality" has implications for motivation to change food handling practices that have been implicated in the many incidences of foodborne illness episodes. Consumer's risk perception plays important role in consumer's current behavior and willingness to change behavior. According to the reasoned action and health belief models, in order to change, people have to perceive that their current behaviors endanger their health and that taking action has a strong likelihood of reducing their risk (McIntosh et al. 1994). Consumer's attitudes and behavior towards food are influenced by the social and cultural context within which an individual is raised. The influence of habits rooted in early socialization which transcends to behaviors relating to health has been recognized by many researchers (Carter, 1990; Janz and Becker, 1987; Rosenstock, 1990) and has been adduced to explain the seemingly "irrational" risk perceptions in regard to foodborne illness.

Given the importance of risk perception in influencing risk reduction together with the widespread misperception about the origins of food safety problems among consumers, it is important to determine the socioeconomic and demographic profile of consumers who tend to misperceive the origin of food safety problems. This so because, in order to obtain maximal impact of public intervention strategies such as food safety education, information dissemination needs to be targeted at the subpopulations most likely to benefit. Is the misperception in the origin of food safety problems distributed evenly in the general US population or is it concentrated within certain subgroups of the population. For instance is ethnicity a major determinant of formed perceptions?

National surveys, however, by their nature have been of limited use for obtaining information on the concerns and perceptions of minority, and special demographic groups whose actions may predispose them to contracting foodborne illnesses. Inadequate representation of such groups in national surveys results in an inability to derive precise conclusions about food safety behaviors and practices of certain demographic minorities. Yet, the lack of knowledge about the food safety perceptions and behaviors continues to exist for certain subgroups in the US population, hampering efforts at the policy making levels of government and industry to intervene to reduce the risk of foodborne illness. The present study endeavors to fill the niche for special surveys designed to elicit information from special groups. Our interest was in finding out whether the food safety perceptions, and attitudes, and behaviors of blacks are the same as that of other ethnic groups, particularly of the majority white population. The southern region has a high proportion of African Americans with regional dietary patterns and food practices. Furthermore, the poverty that exists in the rural south, and its concentration in the Black Belt region provides important reasons for focussing research on food safety in this bio-cultural

region. The south ranks at the top of all deaths that mention foodborne diseases on the certificates of death in the US (Stearh, 1994).

The objectives of this study are two fold: to determine if there are any differences in the food safety risk perceptions among the major ethnic groups and to identify the correlates of the formed risk perception that most foodborne illness originate for outside the home.

### *Conceptualizing foodborne risk perception*

Two lines of theory underline current studies of consumer risk prevention. On the one hand is the like of the reasoned action and health belief theory, subjective expected utility, and protection motivation theories. These theories all assume rational consumer decision making focussing on weighing the cost and benefits of the decision of undertaking self-protective measures. On the other hand, another line of reasoning suggests that self protection responses follow a stages approach that allow for differing responses at different stage that is conditioned on the beliefs people hold about the risk situation (Weinstein, 1988). Common to both lines of approaches is the critical role risk perception plays in the process to self protect against consumer risk. For example, in the health belief model, beliefs about vulnerability to illness are related to behavior to protect against illness (Becker, and Maiman 1975, Schafer et al. 1993).

The focal point of Weinstein's stages theory depends largely on the process of risk perception formation. Five stages are identified as forming the theory of self protection: 1) learns that hazard exists; 2) believes in significant likelihood for others; 3) acknowledges personal susceptibility; 4) intention to act; and 5) takes self-protective action. The first three of the stages can be considered as the process of risk perception formation. Grobe et al. (1996) based on Weinstien's stages theory form risk perception typologies for Recombinant Bovine Growth Hormone (rbGH), distinguishing between consumers with prior awareness of rbGH use

and those who are not aware of rbGH use. Their classification is based on the contention that awareness differences may ultimately influence the formation of consumer's perceived risk toward rbGH product.

Consumers risk perception is influenced by a host of factors, which can be, grouped under three categories namely: personal health influences, social and cultural influences, and or perceived locus of control (Grobe et al., 1996). Consumers' attitudes and behavior towards food are influenced by the social and cultural context. For example, researchers have found ethnicity to be a determinant of individual perception of and response to symptoms (Cleary 1987). Food safety concerns, awareness, and knowledge levels are also conditioned by socioeconomic and demographic factors. Demographic factors including age, gender, ethnicity, place of residence, household size as well as economic factors including income levels have been posited as important factors influencing consumer perceptions and knowledge of food safety issues (Basitios 1993, Misra et al. 1993., Bailey et al. 1993., Malone, 1990, Schutz et al. 1989.)

The socioeconomic research on food safety issues indicates that individual characteristics associated with food safety concerns depend on the particular kind of food safety issue. Further, the characteristics associated with food safety concerns in general may differ from those associated with particular issues. Basiotis and Gutherie (1993) found higher education and gender were more likely related to increased concern with regards to general food safety concerns. In a study of irradiation and food safety perceptions, Misra et al. (1993) also found female respondents with less than college education and lower income more likely to perceive irradiation to be a more serious problem than their counterparts. Regarding awareness, a higher level of awareness was evidenced for older men with higher levels of education.

Personal health influences such as foodborne illness experience, and family characteristics influence awareness, and risk perceptions (Cleary, 1987; Weinstein 1984). Experience of foodborne illness or a perceived exposure is associated with increasing awareness, concern and knowledge of food safety issues. Derby and Fein (1995) assert that people with chronic dietary related diseases are more likely to be aware of the relationship between diet and chronic disease and are more likely to read food labels. Fein et al. (1995) using data compiled from a 1988 and 1993 FDA food safety surveys confirm the association between experiencing foodborne illnesses and increased awareness about food safety issues.

#### *Data and Methodology*

##### Sample:

A telephone survey of consumers residing in the Atlantic southeastern states (Virginia, North Carolina, South Carolina, Georgia, and Florida) was undertaken during the second quarter of 1998. These states constitute part of the Southern Black Belt i.e. states with counties that contain more than the national average (12 %) of blacks . Using a slightly modified 1998 FDA Food Safety Survey instrument, telephone interviews were used to collect data from a random sample of consumers in the Black Belt counties of these five states. The sampling frame was provided by Survey Sampling Inc.; a screening process was used to select adults (18 years of age or older) in the household that had the most recent birthday. Areas of inquiry in the questionnaire included food safety perceptions and concerns, knowledge of foodborne pathogens, food handling and food labels, food safety behavior, and sources of food safety information. In addition, foodborne illness experience and consumers' socioeconomic and demographic information was elicited. Of the 523 total eligible respondents, 317 completed the survey, representing a 60.6% completion rate.

The sample is comprised of 30% black, 64% white and the remaining 6% is made up of persons of Asian, Hispanic, and Native American ethnic origin. The 1990 Census of the Population reported 12.1% blacks and 60% whites. The average age of the sample was 44.6; the census reported 30.8. The median annual family income of the sample was greater than \$40,000, which was higher than the census median income of about \$32,000. Of the sample 56.3% of blacks had incomes below the median of the sample compared to 41.4% for whites. About thirteen per cent of the sample received some form of government assistance. The numbers for blacks and whites are respectively, 12.5% and 13.3%.

Data:

Three measures of food safety risk perceptions were developed based on respondents' answers to three questions pertaining to consumers perception of how common it is for people in the US to become sick from the way food is prepared in 1) homes and 2) away from home. Also their perception of the magnitude of the general food safety problem in the U.S was elicited. Answers to the first two questions ranged from very common, somewhat common, not common and don't know. For the first two questions, two binary (HOME1 and AWAY1) variables based on a split between answers averaging on common vs. not common were derived. The third variable of general risk perception was a binary variable based on " no-yes" response to the question about their perception of the magnitude of the general food safety problem in the U.S.

Respondents' awareness of specific foodborne pathogens was assessed by asking whether they had heard of different types of microorganisms implicated in foodborne illnesses including salmonella, campylobacter, listeria, E. coli and cyclospora. An index of awareness (FAWINX ), was derived based on the number of 'yes' answers to the five questions on microbial food pathogens. Regarding food handling knowledge, respondents were asked about their



knowledge of what constituted safe or unsafe food handling practices in relation to cooking ground beef, cross contamination behavior, food preparation hygiene, and food storage practices. An index of handling knowledge (FHKINX), was constructed based on the correct number of safe handling practices identified by the respondent.

Precautionary food safety purchasing practices of respondents were elicited from four questions as follows: In the interest of food safety do you- (1) purchase foods that are organically grown; (2) wash fruits and vegetables before eating; (3) peel the skin from fruits and vegetables before eating; and (4) have you stopped buying certain foods because of food safety concerns. An index (FSBINX) based on the number of affirmative answers to these questions was constructed. This index measures the extent to which consumers take precautionary measures to reduce the risk of foodborne illness.

#### Analytical Methods:

A major interest of this study was to find out whether ethnicity influenced risk perception of food safety issues, awareness and knowledge of food safety problems. Data were analyzed by employing cross tabulation analysis of risk perceptions, knowledge of proper food handling practices, and awareness of foodborne illness pathogens with race. Furthermore, to identify the correlates of the formed perception of the sources of most food safety problems, a logit model of the determinants of 'away-from home' food safety risk perception, including socioeconomic and demographic factors was estimated. The away from home risk perception was chosen for analysis because of the contention by food safety experts that there is a misperception about where most food safety problems occur.

The logit model of 'away-from home' food safety problem perception is specified as follows

$$\begin{aligned} \text{Away1} = & \beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Educ} + \beta_3 \text{Age} + \beta_4 \text{Income} + \beta_5 \text{Black} + \beta_6 \text{Prep} + \beta_7 \text{Assist} + \\ & \beta_8 \text{Sick} + \beta_9 \text{Fhkinx} + \beta_{10} \text{Fawinx} + \beta_{11} \text{Infsmagz} + \beta_{12} \text{Infsnswp} \\ & + \beta_{13} \text{Infstv} + \beta_{14} \text{Infsdlb} \end{aligned}$$

where

- Away1 = Whether the respondent felt it was more common to become sick because of the way food is prepared away from home; 1 if Yes, 0 if no
- Gender = 1 if female; 0 male
- Educ = 1 is less than high school; 2 high school; 3 college; 4 graduate education.
- Age = Age of respondent
- Income = Income ;
- Black = Race; 1 if black, 0 otherwise
- Prep = 1 if primary food preparer, 0 otherwise
- Assist = 1 if receives any government assistance, 0 if no.
- Sick = 1 if had a foodborne illness experience, 0 if none
- Fhkinx = An index of safe food handling knowledge
- Fawinx = An index of awareness of foodborne microbial pathogens
- Infsmagz = Food safety information source--magazines
- Infsnswp = Food safety information source-- newspapers
- Infstv = Food safety information source--television
- Infsdlb = Food safety information source--food labels

Information sources variables were coded from one to four, with four corresponding to a lot of information received from the particular source.

### *Results*

Results of crosstabulation analysis (Table 1) of general food safety risk perceptions and ethnic origin indicate no significant differences in the perceptions of blacks and whites. Both blacks and whites consider food safety to be a problem in the US. Furthermore, both groups concur that the level of risk of foodborne illness both at home and away from home is high. Not surprisingly, both races believe that more people are getting sick from foodborne illnesses in recent times.

In general, consumer awareness of the foodborne pathogens is low. While both races exhibit a low level of awareness of foodborne pathogens, comparatively, whites tended to have a relatively higher level of awareness of food pathogens. 26% of whites compared to 17% of blacks had a moderate level of awareness of foodborne pathogens. The responses to proper food handling knowledge were similarly distributed among blacks and whites. Both racial groups possessed a high level of proper food handling knowledge. However, consumers only moderately tended to take precautionary behavior in terms of washing and peeling fruits and vegetables before consumption nor buying more organically grown foods to reduce the risk of food contamination from chemicals. Blacks tended to be slightly more attuned to taking precautionary behaviors in regard to food than whites.

Multivariate analysis to identify the influences on the formed perception of 'away from home' food being riskier for foodborne illness indicate that respondent's individual demographic characteristics were not important factors in the formed opinion. Respondent's age, education level, and income level were not statistically significant as factors influencing the probability of the held opinion. Furthermore, ethnicity was not associated with holding the 'misperception' about the origin of foodborne illness. Being a primary food preparer, however, tended to influence negatively the probability of believing that away from home food tended to cause more foodborne problems.

Consumers sources of food safety information, awareness of food pathogens, and food handling knowledge influence their risk perceptions. The particular source of information was found to be important in the process of risk formation. Newspapers were found to negatively influence the opinion of away from home food as a major culprit in foodborne illness. On the other hand television and magazines reinforced this opinion. It seemed that being aware of food

pathogens made it less likely to think away from home food is riskier. Contrariwise, knowing proper food handling practices tended to make consumers likely to think of away from home food as risky.

### *Conclusions*

Findings from this study indicate that food safety risk perceptions do not differ among the racial groups. Furthermore, ethnicity is not found to influence the formed perception that foodborne health problems have their origin more from outside the home. Neither do other personal characteristics like age, education level, marital status, and income level. These findings are at variance with other studies that have found social and demographic factors to influence risk perceptions. For example, Levy and Fein (1994) find that on most food safety measures non-whites reported they were more concerned than whites.

The formed perception of away from home food sources being more risky than home sources seemed to be influenced more by the consumer's sources of information on foodborne illness, awareness of food pathogens, and knowledge of safe food handling practices. The objective of providing food safety information is to raise the level of awareness about food safety issues so that individuals behave appropriately with respect to food handling and consumption. The finding that being a food preparer and having a higher level of awareness of food pathogens, lessened the likelihood of misperceiving the source of food risk is consistent with food safety education objectives to raise the awareness level of consumers, so as to influence their perceptions in order to self protect against foodborne illness.

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**Table 1. Crosstabulation Results of Food Safety Perceptions, Awareness, Knowledge and Behavior**

	Sample	Blacks	Whites
Do you think the US has a food safety problem? (US1).			
Yes	57.4	60.4	58.1
No	37.2	33.3	36.9
Don't know	5.4	6.3	4.9
	$\chi^2_{2 \text{ df}} = .509$	$p = .775$	
How common is it for people in the US to become sick because of the way food is prepared in the Homes. (HOME1)			
Very Common	19.2	20.8	18.7
Somewhat common	42.9	42.7	45.3
Not very common	36.0	34.4	34.0
Don't know	1.9	2.1	2.0
	$\chi^2_{3 \text{ df}} = .257$	$p = .968$	
How common is it for people in the US to become sick because of the way food is prepared away from home. (AWAY1)			
Very common	36.9	42.7	34.5
Somewhat common	46.4	44.8	49.3
Not very common	15.5	10.4	15.8
Don't know	1.3	2.1	0.5
	$\chi^2_{3 \text{ df}} = 4.4$	$p = .219$	
Would you say the number of people becoming sick during the past five years has			
Decreased	16.0	21.3	12.4
Increased	83.2	78.8	86.2
Don't know	0.8	-	1.4
	$\chi^2_{2 \text{ df}} = 4.03$	$p = .133$	
Food Safety awareness			
High	4.1	1.2	5.4
Moderate	23.4	16.7	25.8
Low	72.5	82.1	68.8
	$\chi^2_{2 \text{ df}} = 12.07$	$p = .034$	
Food handling Knowledge			
High	95.9	96.9	97.1
Moderate	-	-	-
Low	4.1	3.1	3
	$\chi^2_{2 \text{ df}} = 1.77$	$p = .412$	
Precautionary Food purchase practices			
High extent	13.1	12.6	12.0

Moderate extent	72.2	76.9	71.5
Low extent	14.7	10.5	16.5

$\chi^2_{2 \text{ df}} = 12.06 \quad p = .007$

**Table 2. Logit Regression Results**

<u>Dependent Variable- Away1</u>			
Variable	Coefficient Estimate	Standard Error	p-value
Intercept	-0.9664	2.0932	0.6443
Gender	1.0279	0.4409	0.0197**
Educ	0.2751	0.2708	0.3097
Age	-0.0216	0.0148	0.1445
Income	-0.1570	0.2432	0.5186
Black	0.3342	0.5102	0.5124
Prep	-1.0055	0.5318	0.0587**
Assist	0.3320	0.6817	0.6263
Sick	0.6448	0.5612	0.2506
Fhkinx	0.1511	0.0786	0.0546**
Fawinx	-0.1384	0.0828	0.0947**
Infsmagz	0.5416	0.2945	0.0659**
Infnsnswp	-0.7410	0.3098	0.0168**
Infstv	0.4771	0.2669	0.0738**
Infstdbl	0.2671	0.2673	0.3177
Nagelkerk R <sup>2</sup>	0.212		
Log-likelihood Ratio	187.235		

\*\* significant at the 10% level