

# Eat Your Fruits and Veggies: Who Informs Consumers about Produce Choices and Nutrition?

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Food consumption trends in the U.S. may be affected by and/or contributing to the growth in food- and nutrition-related information channels. Information channels are increasing in number, as are the sources (McCluskey & Swinnen 2004) that provide information. This paper examines consumer perceptions of the relative desirability of various food and nutrition information sources and education methods as well as the relative credibility of various food and nutrition sources. Using data from a 2006 nationwide consumer survey, comparative summary statistics show significant differences between information delivery methods and sources that consumers use and trust. By understanding how consumers receive and value information we can better target consumer groups.

As American eating habits are increasingly scrutinized in the face of various public health epidemics, nutrient and health claims are becoming more and more prevalent. At the same time, the food industry has seen a rise in consumer demand for nutritional food products. Consumer trends are favoring food products that are promoted (or perceived) as healthful and nutritious. For example, consumption of fresh vegetables and melons increased by 52.6 percent between 1979 and 2004 (USDA 2007). The Diet and Health Knowledge Survey indicated that eight of ten Americans believe that “choosing a healthy diet is just a matter of knowing what foods are good and what foods are bad” (USDA). However, Hodges (2003) explained that the same percentage of consumers are unsure who or what to believe because there are so many different recommendations about eating healthy. Reducing consumer confusion regarding nutrient content and health claims should be done by targeting the message effectively to the consumer. In order to do this there needs to be greater understanding of how different consumer subgroups desire their nutrition information and who they trust to deliver it.

To better understand how nutritional benefits might be driving consumer trends in the marketplace, it is important to know where consumers prefer to get their food and nutrition information and who they find credible as a source of nutrition

information. This could facilitate the delivery of a clear and effective message to the consumer through appropriate channels. The current study examines the relative desirability of various food and nutrition information methods and the relative credibility of various food and nutrition sources. Specifically, to what extent do certain information-delivery methods and sources differ in their desirability or credibility? Demographics were used to further segment the consumer population to clarify possible differences among consumers.

## **Nutrition Information**

People are inundated with nutrition information each day. Labeling a product pesticide-free, fresh, or organic are various ways our complex food system may signal to consumers that something is nutritious (Moorman 1998). Since information outlets are diverse and have evolved from word-of-mouth and print media to include more multimedia approaches such as television and the Internet (Herbold et al. 2006), different information sources might give conflicting information on what is or is not a nutritious choice.

Studies have argued that the greater availability of information, the more uncertainty the consumer has when trying to determine which product to purchase (Chrysoschochoidis 2000). The massive information inundation has not only caused greater uncertainty of who to listen to but also created a more skeptical consumer (Keller et al. 1997). Consumers are overloaded with dietary information and have to selectively choose which information is important. Therefore, consumer information-seeking

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behavior has started to shift. Herbold et al. (2006) stated that consumers are getting less information from family and social groups and more from global media such as the Internet. This shows that consumers might be moving toward a more multimedia approach to gaining knowledge and information. To show the rapid change, previous studies made similar conclusions about the effects of television and newspapers (Hackman and Moe 1999; Byrd-Bredbenner and Grasso 2000).

The literature suggests a potential shift in consumers' information-seeking behavior, but the findings are still somewhat inconclusive. Can the findings that a more-global media seem to be a leader in distributing information (Internet) be confirmed with a more-current sample population of consumers? This study evaluates current consumers' perceptions on desirability of media and information type for food and nutrition information.

### *Hypothesis 1*

Broadly distributed media—specifically, Internet and television—will be the most desirable information source of food and nutrition information.

Trust is an important part of a consumer's relationship with food. Fine and Leopold (1993) explained that "the intimacy between food and body requires absolute trust in the probity of supplies and suppliers." Therefore, the ingestion of food into our bodies might warrant an increased focus on mitigating risk compared to other consumer products. To curb the associated risk involved in eating food from an increasingly complex food system, consumers must trust the food and nutrition information they are receiving.

Hovland, Janic, and Kelley (1953) were among the first to define trust as having a component based on the perception of the level of competency associated with an institution. Clearly, understanding the level of trust a consumer has in a source of information can be related to how much credibility that institution or source is assigned. But the source from which consumers get their information might not fully align with their trust in that source. For example, Bhaskaran and Hardley (2002) found that 80 percent consumers seeking information about nutrition indicated that the Internet was a good source of information, but some participants expressed concern about the reliability of informa-

tion on the Internet.

Past literature has suggested that consumers place a high degree of trust in experts, i.e., medical, nutrition, and academic professionals. In the United States, most citizens report high levels of trust in regulatory systems and agencies that implement food-related policies (Pew Initiative on Food and Biotechnology, 2003). Wandel and Fagerli (2000) also found a continuing high degree of trust in experts. The most trusted sources of nutrition information recently have been found to be doctors, dieticians, education institutions, and family members. Beck (1992) contradicted this with his findings that experts were losing authority, but those somewhat dated findings may no longer be relevant. The current study addresses this topic in order to understand current perceptions of trust in sources of nutrition information—specifically, do consumers assign credibility to *informant* or *source* when they are seeking food and nutrition information?

### *Hypothesis 2*

Experts will be assigned a high degree of credibility. Specifically, nutrition professionals will rank highest in credibility, followed by medical professionals and then academic researchers.

## **Data and Methods**

This study was part of a larger interdisciplinary project that integrated outreach with research on production, food nutritional analyses, marketing, and nutrition education. The market analysis was based on a May 2006 national survey conducted by National Family Opinion (NFO). Data included 1,529 observations representative of American consumers.

The National Family Opinion organization was directed to obtain a representative stratified sample ( $n \geq 1,500$ ), of grocery shoppers across the country. A total of 3,170 members of the National Family Opinion organization's online survey database were contacted to take the survey. The response rate was 48.86 percent, with 1,549 returning the survey. The summary statistics of the demographic information are comparable to the United States population based on the U.S. Census. Females were the predominate response participants (74 percent) which was likely due to the fact that they are often the

primary grocery shoppers in the household. Each household spent around one hundred dollars per week on groceries.

A national online survey was used to ascertain consumer data regarding demographics, purchasing behavior, willingness to pay for differentiated produce, and the importance of different information sources related to food and nutrition. The main focus of this survey was to gain information about consumer purchasing behavior specific to fresh produce. In particular, there was a focus on possible differentiation in consumer valuation based on nutritional and production claims such as “higher in vitamin C,” “organic,” or “locally produced.”

Since it may affect purchase decisions, the current study further investigates differences in consumer perceptions of educational information about food and nutrition. One question asked, “How desirable do you find the following methods for receiving education information on food and nutrition?” The response choices included newspapers, magazines/periodicals, radio (talk, NPR), television, electronic newsletters/email updates, Internet/world wide web, videos/cd-roms/dvds, fact sheets/printed publications made available in free public places, presentations/seminars, booths at food markets, and Internet/phone hotlines. The eleven types were rated by each respondent on a Likert scale from 1 (not at all desirable) to 5 (extremely desirable).

Similarly, we asked, “How credible do you find the following as sources of educational information on food and nutrition?” The response choices included university extension personnel, government agencies, farmers/producers, food industry associations, medical professional, nutritional professionals, friends/family, academic researchers, media/celebrities, and Internet blogs/support networks. Each of the ten informants was rated on a Likert scale from 1 (not at all credible) to 5 (extremely credible).

### Standardizing Data

People who ranked any source as “high” for overall desirability as a method of nutrition information or credibility of the source of information tended to rank all sources high. These inflated responses were standardized in order to mitigate “bias.” For example, the question pertaining to desirability of information delivery had 11 types. Each of these

was rated on a five-point scale ranging from 1 (not at all desirable) to 5 (extremely desirable). A new variable was created that was an average of all ratings from each participant. The original ratings for each individual type were then divided by the “rating index” to create the standardized variable. Table 1 depicts the unstandardized and the standardized means in rank order. A similar method was used to adjust the credibility of sources (Table 2).

### Differences in Desirability of Information Delivery

Paired t-tests were run in order to compare means between ratings of the preference for information sources. Booths at food markets and Internet were not significantly different— $t(1549) = 1.12, p = 2.61$ —and had the highest means for desirability of method of receiving education information about food and nutrition. This partially supported the hypothesis that media would be the predominant method of delivery of food and nutrition information, but the fact that food booths ranked highest while television ranked lower than hypothesized (4<sup>th</sup>) is somewhat puzzling. Newspapers and booths at food markets were significantly different— $t(1549) = 2.18, p < 0.05$ —but newspapers, fact sheets, and television were not significantly different from each other, signaling consistent ratings on broad-spectrum methods of information delivery. The remaining information types in descending order by mean value were all significantly different from each other (see Table 1).

### Differences in Source Credibility

Paired t-tests were run to see if there were significant differences between credibility of sources for educational information on food and nutrition (see Table 2). All informant types were significantly different from each other except government agency and food industry association:  $t(1495) = 1.07, p = 2.83$ . The hypothesis based on expected credibility of sources was partially supported, as nutritional professionals ranked the highest and medical professionals ranked second. However, the hypothesis was not fully supported, because the farmer/producer source ranked third, with a significantly higher credibility rating than that for academic researcher, at  $t(1495) = 4.03, p < 0.01$ .

**Table 1. Mean Desirability of Methods for Receiving Information on Food and Nutrition.**

Variable	Unstandardized		Standardized		Rank	Paired <i>t</i> -test <i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Booths at food market	2.83	1.10	1.18	.410	1	1.12
Internet	2.83	1.17	1.16	0.386	2	2.18*
Newspaper	2.72	1.02	1.13	0.345	3	0.99
Fact sheets/printed pubs	2.72	1.15	1.12	0.381	4	0.10
Television/electronic	2.69	1.04	1.12	0.354	4	2.42*
Magazines	2.65	1.02	1.09	0.320	5	12.20**
Newsletters	2.32	1.09	0.94	0.318	6	2.52*
Radio (Talk, NPR)	2.23	1.04	0.91	0.320	7	5.46**
Internet/phone hotline	2.08	1.09	0.84	0.327	8	3.95**
Presentations/seminars	1.95	1.00	0.80	0.303	9	9.98**
Videos/CD Roms/DVD	1.73	0.92	0.71	0.265	10	

Note. 1 = Not at all desirable, 2 = Somewhat desirable, 3 = Desirable, 4 = Very desirable, 5 = Extremely desirable.

\* $p < 0.05$ , \*\* $p < 0.01$ .

**Table 2. Mean Credibility of Sources of Receiving Information on Food and Nutrition.**

Variable	Unstandardized		Standardized		Rank	Paired <i>t</i> -test <i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Nutrition professional	3.47	0.964	1.26	0.263	1	6.59**
Medical professional	3.32	0.985	1.20	0.268	2	4.38**
Farmer/producer	3.17	0.937	1.15	0.292	3	4.03**
Academic researcher	3.07	0.953	1.12	0.266	4	2.77*
Family/friend	2.95	0.979	1.08	0.318	5	2.77*
Cooperative extension	2.89	1.05	1.04	0.315	6	10.95**
Government agency	2.58	0.967	0.93	0.264	7	1.07
Food industry association	2.54	0.937	0.92	0.915	8	22.14**
Internet blogs	1.96	0.845	0.71	0.257	9	13.03**
Media/celebrities	1.08	0.809	0.61	0.241	10	

Note. 1 = Not at all desirable, 2 = Somewhat desirable, 3 = Desirable, 4 = Very desirable, 5 = Extremely desirable.

\* $p < 0.05$ , \*\* $p < 0.01$ .

In support of previous literature, experts still seem to be the leaders in source credibility for food and nutrition information. Interestingly, government agencies and industry associations ranked seventh and eighth in credibility of source, respectively.

### Demographic Differences

Demographics are almost always considered when analyzing consumer behavior, so we looked briefly at how gender and age might affect preferences and perceptions of credibility. Two one-way ANOVAs were conducted to evaluate the mean differences in desirability of information type and credibility of source between genders. Table 3 shows that gender preferences were significantly different for the following information types: magazine, radio, multimedia, factsheets, and hotlines. A similar analysis measured credibility assigned to different informant sources for food and nutrition information, and four sources differed significantly between genders: industry, nutritional professionals, media, and blogs.

Three groups were defined by adding and subtracting the standard deviation from the mean age. The young group was 18 to 35, a middle-aged group was 36 to 65, and the senior group was 65 to 87. Significant age-group differences regarding the desirability of information type and source credibility are shown in Table 4 (with the middle-aged group serving as a reference). Not surprisingly, the notable significant differences between the older generation and the younger generation pertained to newspapers (older  $M = 1.24$ , younger  $M = 1.07$ ) and Internet (older  $M = 1.04$ , younger  $M = 1.24$ ). This suggests that the older generation was more comfortable with receiving nutrition information from the newspapers, while the younger generation preferred the newer method of information delivery, the Internet. The results also suggest that the older generation found extension personnel more credible and industry slightly less credible than did the younger generation.

### Discussion

The results of this study suggest that consumer desirability of information delivery type and credibility of informant echo the claim by Herbold et al. (2006) that there is a major shift occurring

in information outlets. The results of this study further delineate this shift by identifying current trends in information distribution for a specific type of information. For example, the Internet is one of the primary methods desired for information gathering, reflecting a shift away from print media, but newspapers are still in the top three. This could be explained by the identification of the senior generation's continued preference for newspapers while the younger generation prefers the Internet. Given this transitional phase for information distribution, the targeting of education and information is clearly motivated by this study.

It is important to note that, in contrast to a more broad-based information highway, more local information distribution is still desired by one segment. The fact that booths at food markets ranked first in desired method of food and nutrition information delivery suggests that consumers are still interested in face-to-face contact and information. Further study could investigate whether or not this is true for particular types of information. The local component could also be seen in the high credibility rating given to the farmer/producer of the food. Although experts retained high credibility ratings in this study, in accordance with previous findings, the definition of "expert" might be in transition as well. Although most sources listed in this survey (six of ten) can be considered an expert in some way, the highest credibility was given to nutrition professionals, medical professionals, and producers, which suggests a more direct information pathway to the consumer.

As information becomes more available and "experts" may start to contradict each other, trust and credibility of a source will become increasingly important. Further research on how that process occurs with individual consumers will be needed. Theorists have claimed that there is an increased focus on risk in our food system. As our food system becomes more and more complex, and consumers are further distanced from the source of their food, it would be interesting to see how the increasing pressures of food safety and concern about food production processes influence consumer information preferences and choices.

Identifying desirability of delivery method across sub-populations allows for increased specialization and effectiveness when trying to relay a message. It allows audience segments to begin to be developed

**Table 3. Significant Gender Differences in Desirability of Information Type and Source Credibility.**

Variable	Gender mean		<i>F</i>	<i>p</i>	Eta <sup>2</sup>
	Male	Female			
<u>Information type</u>					
Magazine	1.03	1.11	15.12	0.00	0.01
Radio	0.94	0.90	4.74	0.03	0.00
Multimedia	0.75	0.69	19.24	0.00	0.01
Fact sheets	1.07	1.14	10.55	0.00	0.01
Hotline	0.87	0.83	4.13	0.04	0.00
<u>Informant type</u>					
Industry	0.89	0.92	4.19	0.04	0.00
Nutrition prof	1.22	1.27	12.65	0.00	0.01
Media	0.64	0.60	8.33	0.00	0.01
Blog	0.74	0.70	6.49	0.01	0.00

**Table 4. Significant Age Group Differences in Desirability of Information Type and Source Credibility**

Variable	Age-group mean		<i>F</i>	<i>p</i>	Eta <sup>2</sup>
	Young	Old			
<u>Information type</u>					
Newspaper	1.07	1.25	49.20	0.00	0.06
Internet	1.24	1.04	52.66	0.00	0.06
Multimedia	0.72	0.68	4.12	0.04	0.01
Food booths	1.14	1.21	6.30	0.01	0.01
Hotline	0.87	0.79	10.62	0.00	0.01
<u>Informant type</u>					
Extension	0.94	1.14	85.83	0.00	0.09
Industry	0.92	0.88	4.08	0.04	0.01
Medical prof	1.24	1.16	14.15	0.00	0.02
PhD researcher	1.13	1.09	4.53	0.03	0.01
Blog	0.73	0.69	5.90	0.02	0.01

and understood. It was not within the scope of the study to further explore the differences within the consumer population, but this study's findings motivate the need for a closer look.

Further research can continue to explore possible consumer segmentation in order to design a message specifically targeted to reach certain customers. Maibach and Parrot (1995) claimed that health-message design should be an audience-centered process. This means that the effectiveness of health and nutrition messages depends primarily on their being designed for a specific consumer audience in order to respond to the needs of that population. By understanding how consumers receive and value food and nutrition information, producers, extension professionals, and industry can better target groups that use their information. Alternatively, they can also seek ways to get their messages to a broader audience by partnering with other sources of information (medical professionals) or using different methods of communication.

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