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How to Target Extension Resources to Different Age Groups: Segmenting the Public According to Interests and Information Search Strategies

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Abstract: This article suggests targeting Extension resources according to consumers' interests and information search strategies of different age groups. Survey data were used to describe topics of interest to consumers in a Midwestern state, to group consumers according to their involvement in information search, and to assess the influence of age on the information search of consumers. Respondents exhibited four intensity levels in their search for consumer information, which differed by age. Nutrition and health topics emerged as the most important consumer topics across age groups.

Introduction

"Baby boomers," "Generation X," and the "World War Generation" are popular terms to segment consumers of different ages. Popular culture has embraced the idea that people in different age groups behave in a similar manner. The academic literature on the family life-cycle supports these similarities by suggesting age-related changes that affect the psychological, social, and economic situation as well as cognitive abilities, such as information processing, memory, and learning, as a person grows older (Laroche, Cleveland, & Browne, 2004; Phillips & Sternthal, 1977).

These changes in people's environments and cognitive abilities are particularly relevant for information service providers, such as Extension. The challenge is to package and deliver information in a way that meets

changing life situations. This article contributes some insight to this challenge by presenting survey findings of consumers' information needs and information use. The article supports these efforts by:

- Describing the topics of interest to consumers in different age groups,
- Identifying the reasons for consumers' desire to stay informed,
- Grouping consumers according to their involvement in information search, and
- Identifying the key variables that influence the information search strategies of consumers.

Data

The data were collected as part of a larger effort to assess the demand for information and educational programming of key clientele groups of Ohio State University Extension. Findings reported here are based on original data of a sample of 3,000 addresses of randomly selected Ohio residents purchased from a private vendor (SSI, 2008). The mail survey was conducted in spring 2007 following best survey practices (Dillman, 2006).

In order to guarantee meaningful representation of respondents in rural areas on which to base estimates for this group, we used a sampling procedure that drew an equal number of addresses from rural and urban areas of Ohio based on 2003 Rural-Urban Continuum Code (Loibl, Cho, Diekmann, & Batte, 2009). A weighting procedure was applied in the calculation of all statistics to return the numbers to a representative sample.

Twenty-four surveys were undeliverable. A total of 943 surveys were received; 128 respondents refused to answer and sent back an empty questionnaire, and 28 surveys were excluded from the data analysis due to more than 50% missing answers. The number of usable surveys for data analysis then totaled 787 (26.4% response rate). As expected in surveys related to Extension, the lower recognition of these services in metro counties resulted in a lower response rate than in rural areas (25.6% vs. 30.7%). The overall response rate appears low but is within the range of consumer mail surveys, which tend to range between 20% and 50%, if no monetary incentive is provided (Jobber, Saunders, & Mitchell, 2004).

Sample Characteristics

Table 1 summarizes the demographic and socio-economic characteristics of the sample. About an equal number of men and women responded to the survey. A typical respondent of this survey was white, married, and living in a household of two to three people. Most respondents had a formal education of less than a four-year college degree. The majority of respondents owned a home, had Internet access from home, and lived in a non-metro county. Less than half were employed full-time. With a mean age of 52 years and a majority of respondents not full-time employed, our sample indicates a certain response bias toward older consumers. Therefore, it requires caution when making inferences about the adult population at large.

The most noticeable characteristic of the respondents was their age distribution from very young (18 years) to very old (105 years) consumers, with a large group of Baby Boomer respondents. Almost naturally, the sample fell into three generations: Generation X, born in 1965 or later (14.8%, N=117); Baby Boomers, born between 1946 and 1964 (47.1%, N=371); and World War Generation, born before 1946 (38.0%, N=299).

These three age groups differed significantly for seven of the 10 demographic and socio-economic variables (Table 1).

Using Baby Boomers as the reference group, Generation X respondents were more likely married and higher educated but less likely male and working full-time. Generation X respondents were living in larger families, and their household income was between those of Baby Boomers and World War Generation respondents. On the other hand, respondents of the World War Generation were more likely male but less likely to have Internet access at their homes, be married, work full-time, and hold as much as a Bachelors' degree or more, compared to the Baby Boomer respondents. World War Generation respondents' household income was the lowest of the three groups, and they were living in smaller families.

Table 1.
Demographic and Socio-economic Characteristics of Respondents

Variable	Range	All Mean (SD)	Generation X Mean (SD)	Baby Boomers Mean (SD)	World War Generation Mean (SD)	Sig ^a
Gender (men=1)	0-1	.55 (.498)	.43 (.497)	.54 (.499)	.61 (.489)	**
Ethnicity (white=1)	0-1	.92 (.264)	.92 (.266)	.94 (.229)	.90 (.300)	n.s.
Education (B.Sc. or higher=1)	0-1	.36 (.481)	.51 (.502)	.41 (.493)	.24 (.426)	***
Marital status (married or living together=1)	0-1	.68 (.468)	.77 (.422)	.70 (.458)	.61 (.489)	***
Family size	cont.	2.51 (1.313)	3.12 (1.439)	2.72 (1.278)	2.01 (1.125)	***
Annual household income	cont.	\$51,442 (\$40,135)	\$47,564 (\$31,082)	\$65,477 (\$40,905)	\$35,557 (\$35,937)	***
Employment (fulltime=1)	0-1	.45 (.498)	.62 (.487)	.67 (.471)	.11 (.315)	***
Homeownership (own=1)	0-1	.90 (.304)	.86 (.346)	.89 (.312)	.92 (.273)	n.s.
Internet access from home (yes=1)	0-1	.77 (.424)	.84 (.370)	.86 (.343)	.61 (.488)	***
Location of residence	0-1	.79 (.409)	.78 (.419)	.81 (.394)	.77 (.424)	n.s.

(metro=1)						
N		787	117	371	299	
^a Significance of the multivariate F-test. The symbols (*), (**), (***) denote coefficients that are statistically different from zero at the 10%, 5%, and 1% levels.						

Topics of Interest to Ohio Consumers

To assess respondents' information needs, they were asked to rate the level of importance of 67 topics on a seven-point scale ranging from not interested (=1) to very interested (=7). Factor analysis was used to uncover major themes, using the principal components method and Varimax rotation (Hutcheson & Sofroniou, 1999). Item loadings under each factor were then examined for reliability using Cronbach's alpha. Unsatisfactory items were removed, and the factor analysis repeated with the remaining items. The factors that emerged reflect nine consumer topics and are presented in Table 2.

Table 2.
Results of the Factor Analysis of Consumer Topics

Factors (Cronbach's alpha scale reliability)	Items (factor loadings)
Nutrition & health (=.872)	Keeping food safe (.777); Preserving and storing your food (.707); Preventing diseases for yourself or others (.680); Keeping your family healthy (.661)
Body weight (=.815)	Exercising and physical activity (.804); Managing your weight (.731); Eating healthy food (.653)
Youth & families (=.933)	Caring for and educating teens (.865); Encouraging success in school (.855); Caring for and educating children (.835); Involving teens as leaders (.789); Being a better parent (.779); Improving family relationships and family life (.574)
Money matters (=.772)	Planning for taxes, insurances, or other regular expenses (.782); Living within one's budget (.753); Saving for a home or managing a mortgage (.608); Planning for retirement (.536)
Business (=.948)	Growing a small business (.908); Running a business (.896); Starting a business (.885); Running a business at home (.881); Running a business on the internet (.799)
Community (=.858)	Organizing volunteers in your community (.743); Teaching volunteers in your community (.724); Improving your community (.611)
Yard & garden (=.911)	Fertilizing your lawn and garden plants (.831); Landscaping your yard or garden (.824); Caring for trees, shrubs, and lawns (.816);

	Treating lawn and garden diseases, insects, or weeds (.813); Caring for flowers, vegetables, and fruits (.777); Watering practices (.648); Creating a backyard wildlife habitat (.568)
Natural resources & environment (=.937)	Caring for forests (.814); Caring for waste water (.796); Caring for fish, fishing, or wildlife (.793); Caring for the quality of your air (.756); Looking after the use of land (.746); Caring for the quality of your water (.720); Caring for grazing land (.686); Looking after the climate (.684); Managing invasive plants and animals (.676); Using other sources of fuel or energy (.648); Using and enjoying public parks, land, or waterways (.590)
Farming & food production (=.938)	Growing specialty crops (.855); Growing major crops (.838); Farming in sustainable ways (.830); Farming on a small scale (.817); Raising livestock (.782); Growing fruits, vegetables, flowers, or decorative plants for sale (.776); Starting (or creating) a community supported farm (.704); Growing organic food (.677); Looking after plant diseases, insects, or weeds (.642)
N=787; All items measured on a seven-point scale. Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 7 iterations; Total variance explained: 72.358%; Kaiser-Meyer-Olkin Measure of Sampling Adequacy: .932; Bartlett's Test of Sphericity: $\chi^2 = 35,833$, df=1,326, Sig.:.000.	

The popularity of the nine consumer topics is depicted in Table 3. We found that respondents rated "nutrition & health" topics highest, followed by "body weight" and "money matters." However, the ranking order of the topics differed by age group. While "nutrition & health" topics held the top spot across all three groups, Generation X respondents' top three topics of interest further included "body weight" and "youth & families" topics. Baby boomers and respondents of the World War Generation selected "money matters" and "body weight" topics, thus following the general trend of the sample. Further, the strength of interest in the nine consumer topics differed among the three age groups. For example, Generation X respondents exhibited the highest interest for "business," "community," and "farming & food production" topics, followed by Baby Boomers and the World War Generation.

Table 3.
Popularity of Consumer Topics

Variable	All	Generation X	Baby Boomers	Word War generation	Sig ^a
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
Nutrition & health	6.04 (1.148)	5.98 (1.031)	6.00 (1.043)	6.11 (1.306)	n.s.
Body weight	5.76 (1.228)	5.87 (1.107)	5.74 (1.165)	5.75 (1.344)	n.s.

Money matters	5.59 (1.257)	5.05 (1.400)	5.49 (1.132)	5.91 (1.245)	*
Natural resources & environment	5.30 (1.239)	5.30 (1.421)	5.24 (1.173)	5.37 (1.242)	n.s.
Youth & families	5.14 (1.674)	5.44 (1.551)	5.12 (1.531)	5.15 (1.871)	n.s.
Yard & garden	4.76 (1.471)	4.88 (1.539)	4.70 (1.469)	4.80 (1.446)	n.s.
Community	3.62 (1.643)	4.31 (1.636)	3.63 (1.608)	3.35 (1.613)	***
Business	2.72 (1.903)	3.95 (1.999)	2.96 (1.889)	1.96 (1.520)	***
Farming & food production	2.68 (1.615)	3.13 (1.914)	2.72 (1.539)	2.47 (1.544)	**
N	787	117	371	299	
<p>SUP>a Significance of the multivariate F-test. The symbols (*), (**), (***) denote coefficients that are statistically different from zero at the 10%, 5%, and 1% levels, n.s. denotes no significant differences among the age groups.</p>					

Information Strategies of Ohio Consumers

Respondents' information strategies were measured by the number of information sources used and the frequency of their use. Information sources included nine mass media sources, five Internet-based sources, seven interpersonal sources, and eight measures of professional sources. We measured the degree to which sources were used with the question, "How often have you obtained information about [topic] from [source]?" Responses were rated on a seven-point scale ranging from never (=1) to very often (=7).

To identify groups of consumers with similar information search patterns, k-means clustering technique was employed (Gloy & Akridge, 1999; Gunnarson & Wahlund, 1997) following a procedure described in Schneider and Roberts (2004). To employ this algorithm, the desired number of clusters, K, was specified in advance, and initial cluster centers were chosen randomly in a first pass of the data. Each additional iteration group observation was based on nearest Euclidean distance to the mean of the cluster. The four-cluster solution proved to be the best approximation. It included statistically significant, high F values in the ANOVA, satisfying distances between final cluster centers, and an iteration history reaching an endpoint at the 6th iteration. Following the terminology of previous research (Kiel & Layton, 1981; Klein & Ford, 2003), we used the distances between the mean frequency of source usage to classify the consumer-type clusters presented in Table 4.

Table 4.
Description of Information Search Clusters

Cluster	Name	Description	N (% of sample)
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1	High-search strategy	High-information search type of consumers who practiced a multi-source, high-information strategy. These consumers were highly information-driven and used a diversified information strategy. The mean information gathering score was 4.88 (SD: 0.742).	134 (17.0%)
2	Moderate, offline-search strategy	Moderate information search type of consumers who practiced a multi-source but less frequent information search strategy. Compared to Cluster 3, these consumers tended to use the Internet for their information search. The mean information gathering score was 3.67 (SD: 1.142).	307 (39.0%)
3	Moderate, online-strategy	Moderate information search type of consumers who practiced a multi-source but less frequent information search strategy. They differed from Cluster 2 in a low use of the Internet. The mean information gathering score was 3.30 (SD: 1.453).	140 (17.8%)
4	Low-search strategy	Low information search type of consumers who practiced a low-information strategy. Their major information source was the local newspaper and personal experience. The mean information gathering score was 2.44 (SD: 0.998).	205 (26.0%)

Table 5 illustrates the different information search strategies for consumer information among the three age groups. We found that the information search behavior of Generation X and Baby Boomers was quite similar. The largest group of each generation practiced a moderate-search strategy with high use of the Internet (52.5%, 47.9%). A low-search strategy was practiced by less than a quarter of respondents in both groups (23.7%, 23.9%); 17.8% of the Baby Boomers and 18.8% of Generation X respondents reported a high-search strategy. The World War Generation behaved very differently. An about equal number of respondents of this generation practiced a low-search strategy (31.6%) and moderate-search strategy with no or low Internet use (34.4%); only about one in six members of the World War Generation reported a high-search strategy (15.4%).

Table 5.
Consumers' Use of Information Sources

Cluster	Range	Generation X (N, %)	Baby Boomers (N, %)	World War Generation (N, %)
High-search	1-7	22 (18.8%)	66 (17.8%)	46 (15.4%)

Moderate-search: high Internet	1-7	56 (47.9%)	191 (51.5%)	61 (20.4%)
Moderate-search: low Internet	1-7	11 (9.4%)	26 (7.0%)	103 (34.4%)
Low-search	1-7	28 (23.9%)	88 (23.7%)	89 (29.8%)
N (= 787)		117	371	299
Note: rated on a seven-point scale ranging from 1 = "never" to 7 = "very often"; Omnibus F test = 52.856, df = 2, p < .001 (two-sided)				

Conclusions

The study reported here contributes to the understanding of the scope and determinates of Ohio consumers' information needs and use. The research documents age-related differences in consumer interests and consumer strategies to gather information for these topics of interest. While the findings are based on a mail survey of consumers in a single state of the union, Ohio is particularly suited to develop recommendations that are relevant beyond state borders.

Ohio has a large, demographically and socio-economically diverse population of 11.5 million residents (7th largest state) in its urban, suburban, and rural communities, which have been recognized by market research companies who use the state as a testing ground for national policy and marketing research and innovation. Ohio is not a single economy but, rather, a group of regional and local economies that vary a great deal in economic conditions, such as unemployment rates. For example, across Ohio's counties, the unemployment rate in January 2008 ranged from 4.3% to 11.7%. Ohio has highly urban areas and very remote rural areas. Given the great economic variation within Ohio, extrapolation is reasonable and warranted, and results and conclusions can be generalized (with caution) to a larger population.

Our analysis of the survey responses resulted in key insights regarding consumers' topics of interest and their information search strategies, which are deemed of particular relevance to Extension professionals. Examining the topics of interest to consumers, nine main themes emerged from the survey. Overall consumer interest was highest for the two health-related topics, "nutrition & health" and "body weight." An interest in financial topics followed on Rank 3. Ranks 4 and 6 were taken by "green," environment-related topics; youth and parenting-related issues entered Rank 5 in our list of consumer interests. Of lower interest were topics surrounding community, business, farming, and food production issues.

With respect to consumer demographics, "nutrition & health" was the most important topic across the three age groups. The unique interest in nutrition and health issues of this wide a range of population groups may encourage Extension to expand its reach beyond the demographics served in the family nutrition program. Partnerships with health-oriented institutions at the community and the statewide level, such as hospitals, doctor's offices, and health service centers, might prove beneficial for providing subject-matter expertise, for satisfying the widespread interest in nutrition and health topics, and for gaining grant funding for targeted initiatives. Recent projects funded through the outreach-centered "OSU CARES Grants Programs" <<http://osucares.osu.edu>> certainly supports this trend, with projects aimed at after-school programs and food pantries to improve eating-related health behaviors.

Examining the strategies of consumers to gather information about their topics of interest, our findings indicate four levels of engagement and differences in the use of the Internet. About half of the members of

both Generation X and Baby Boomer age groups were likely to practice a moderate-search strategy with high use of the Internet, while the World War Generation was less inclined to gather information and preferred traditional offline media.

The implication for Extension seems clear. Information for young and middle-aged consumers should be shared via the Internet, in addition to traditional offline media. The efforts surrounding eXtension <<http://www.extension.org>> seem well positioned from the point of view of our findings. However, the information flow to the older generations will still require traditional, offline media. Because Extension is well rooted in the World War Generation, outreach efforts should take particular care of this demographic group and its informational needs.

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